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**INFLUENCE OF HOUSEHOLD BEHAVIOUR AND PERCEPTION ON  
MALARIA CONTROL AND PREVENTION IN ZAMFARA STATE NORTH  
WEST NIGERIA**



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UNIVERSITI UTARA MALAYSIA  
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WEST NIGERIA**



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**A Thesis submitted to the Ghazali Shafie Graduate School of Government  
in fulfilment of the requirements for the Doctor of Philosophy  
Universiti Utara Malaysia**



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## ABSTRAK

Tingkah laku isi rumah telah dibangunkan sebagai elemen asas dalam amalan pencegahan kesihatan. Paradigma pengawalan penyakit malaria kebanyakannya memberikan tumpuan kepada pendekatan perubatan dan kesihatan, sebahagian besarnya didapati tidak mengambil kira tingkah laku isi rumah. Tingkah laku isi rumah bukan sahaja memainkan peranan penting dalam mempengaruhi penularan malaria, tetapi tingkah laku dan sikap juga boleh memainkan peranan dalam pengawalan dan pengurusannya. Objektif kajian ini adalah untuk menyiasat pengaruh tingkah laku dan persepsi isi rumah terhadap kawalan malaria dan penularannya di negeri Zamfara, barat laut Nigeria. Kajian ini menggabungkan penyelidikan kuantitatif dan kualitatif. Bagi kaedah kuantitatif, seramai 409 responden telah mengambil bahagian dan analisis dibuat dengan menggunakan Pakej Statistik Untuk Sains Sosial (SPSS) serta PLS 2.0 pintar (*smart PLS 2.0*). Bagi kaedah kualitatif pula, 20 orang telah mengambil bahagian sebagai responden, dan analisis tematik digunakan. Keputusan daripada analisis PLS menyokong ketiga-tiga andaian hipotesis. Secara khusus, dapatan kajian dari hipotesis pertama menunjukkan bahawa terdapat hubungan yang signifikan antara tingkah laku terhadap pengasapan dan kawalan malaria. Tambahan pula, dapatan kajian dari hipotesis kedua menunjukkan terdapat hubungan antara tingkah laku isi rumah ke atas pelupusan sisa dan kawalan malaria. Hasil analisis hipotesis ketiga juga menyokong hubungan antara persepsi isi rumah dan kawalan malaria. Penemuan daripada kajian kualitatif menunjukkan bahawa tingkah laku isi rumah mempunyai pengaruh terhadap langkah-langkah kawalan malaria sedia dan tahap keberkesanannya di Nigeria. Sebahagian daripada hasil kajian juga menunjukkan bahawa langkah-langkah pengawalan sedia ada dan kawalan yang efektif mempengaruhi tingkah laku isi rumah. Dapatan kajian ini disokong oleh literatur dan teori. Secara umumnya kajian ini memberikan bukti lanjut mengenai pengaruh tingkah laku isi rumah terhadap kawalan dan pencegahan malaria dengan rujukan khusus di negeri Zamfara, barat laut Nigeria. Tingkah laku isi rumah harus dianggap sebagai suatu konsep yang penting bagi kawalan dan pencegahan malaria.

**Kata kunci:** Langkah-langkah kawalan, Tingkah laku isi rumah, Persepsi isi rumah, Kawalan malaria, Pencegahan malaria.

## ABSTRACT

Household behaviour has been established as a fundamental element in health preventive practices. Malaria control paradigm focuses mostly on the medical and health approach. Household behaviour has been to a large extent do not take into account. Household behaviour, not only plays a critical role in the influence of malaria prevalence, but these behaviours and attitudes can also play a role in its control and management. The objective of this study is to investigate the influence of household behaviour and perception on malaria control and prevalence in Zamfara state North West Nigeria. The study used a mixed methodology of quantitative and qualitative research. For the quantitative, a total of 409 respondents participated in the study. Statistical Package for Social Science (SPSS) and smart PLS 2.0 is use for the quantitative analysis. For the qualitative, 20 people participated as respondents. Thematic analysis was used for qualitative analysis. Result from the PLS analysis supported the entire three hypothesis. Specifically, the finding from hypothesis one shows that there is a significant relationship between behaviour on fumigation and malaria control. Furthermore, results from hypothesis two indicate that there is a connection between household behaviour on waste disposal and malaria control. The result from the hypothesis three reveals that there is a relationship between household malaria perception and malaria control. A finding from the qualitative study reveals that household behaviour has the influence to available and effective malaria control measures in Nigeria. Part of the result also shows that available and effective control measures influence household behaviour. The findings of the study were supported by the literature and theories. In general the study provides further proofs on the influence of household behaviour on malaria control and prevention with particular reference to Zamfara state in North West Nigeria. Household behaviour should be considered as an important concept for malaria control and prevention.

**Keywords:** Control Measures, Household Behaviour, Household Perception, Malaria Control, Malaria Prevention.

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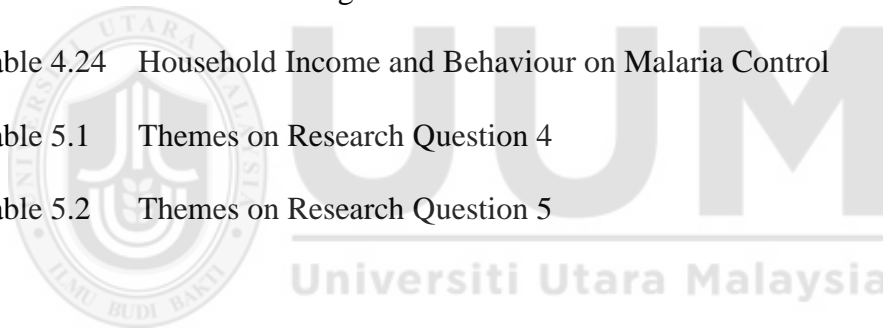
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## LIST OF ABBREVIATION

ACM	Available Control Measures
ACT	<i>Artemisinin</i> -based Combination Therapies
AEA	American Educational Association
ANC	Antenatal Care
APA	American Psychological Association
AVE	Average Variance Extracted
BF	Behaviour on Fumigation
BW	Behaviour on Waste Disposal
CMV	Common Method Variance
DDIC	Direct Delivery and Information Captured
DDT	<i>Dichlorodiphenyl Trichloroethane</i>
ECM	Effective Control Measures
F <sup>2</sup>	Effect Size
FGN	Federal Government of Nigeria
FMH	Federal Ministry of Health
LGAs	Local Government Areas
LLIN	Long Lasting Insecticide Net
MAPS	Malaria Action Plan for States
MC	Malaria Control
MDG	Millennium Development Goals
NGOs	Non-Governmental Organizations
NMCP	National Malaria Control Program in Nigeria
NPC	National Population Commission
NCME	National Council on Measurement in Education

PM	Perception on Malaria
Q <sup>2</sup>	Predictive Relevance
R <sup>2</sup>	Assessment of Variance
SFH	Society for Family Health
SMOH	State Ministry of Health
SMCP	State Malaria Control Program
SP	Sulphadoxine-pyrimethamine
SPSS	Statistical Package in Social Sciences
PRRINN-MNCH	Partnership for Reviving Routine Immunization in Northern Nigeria; Maternal Newborn and Child Health Initiative
UNICEF	United Nation International Children Emergency Fund
WHO	World Health Organization
ZESA	Zamfara Environmental Sanitation Agency



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## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Introduction**

Household behaviour has been established as a fundamental element in health preventive practices. Household behaviour is expected to play a critical role in the management and prevention of malaria disease. This study bordered within the context and frame of medical sociology, whereby the emphasis is on social and behavioural factors in managing and preventing malaria problem. Thus, this study uses sociological explanation of the social and behavioural dimension of malaria control and prevalence.

Malaria is a threat to more than 40% of the world's population. More than 300 to 500 million acute cases are diagnosed annually (WHO, 2013; WHO, 2012; WB, 2009) and malaria is estimated to cause between 1.1 and 2.7 million deaths annually (Ameh et al., 2015; WHO, 2013; RBM, 2010). That is why the disease is described as a major public health problem, and its consequences roots go deep within human societies. The vast majority of malaria cases (90%) are found in sub-Saharan Africa, where malaria adds up the total disease prevalence (WHO, 2013 & 2012). Malaria contributes almost 25% of all childhood deaths in Africa (WHO, 2012). According to Roll Back Malaria (RBM), malaria causes economic losses, estimated at more than \$2 billion per annum in Africa alone (WHO, 2013). In Nigeria, the prevalence of malaria causes frequent suffering to human society and places enormous burdens on the human population (FMH, 2007, & 2005).

Because of the seriousness of the problem, many stakeholders have joined forces in a universal effort to control malaria. Those stakeholders include the World Health Organization (WHO), United Nations Children Fund (UNICEF), United Nations Development Program (UNDP) and World Bank (WB). The interest of those stakeholders, aims at reducing malaria morbidity and mortality (WB, 2009; WHO, 2009). The effort of those joint forces and their organized anti-malaria programmes are often conducted largely without reference to the behaviour or the belief systems of the societies affected (Amzat, 2009). Therefore, the failure of those initiatives can often be blamed on the lack of adequate consideration given to the human and behavioural aspects of malaria control. As a result, human behaviour needs to be understood as a factor in malaria control. According to Afolabi et al. (2009), human behaviour clearly relates to health, including risks for an infectious disease like malaria. Human behaviour affects health promoting and disease preventing activities, in some instances increasing risk and in others reducing it (Thandar, Kyaw, Jimba, & Yasuoka, 2015; Afolabi et al., 2009).

Human behaviour that is ignored by policy and programmes of malaria control can influence the risk of malaria for individual and communities. In countries in which malaria is endemic (Nigeria included) and especially those that are poor and often cannot afford a decent environment, people lack frequent fumigation and proper waste disposal facilities (Funk, Salathe, & Jansen, 2010; Ityavyar & Gusau, 1999). The lack of proper waste water maintenance as well as available and effective preventive measures that would reduce exposure to malaria-transmitting mosquitoes is also a problem (Sundararajan et al., 2015). Human activities can create breeding sites for larvae such as stagnant water, indiscriminate waste disposal and lack of

fumigation near the houses (Ityavyar & Gusau, 1999). Those deficiencies, provide alternate sources for breeding mosquito. Therefore, human behaviour in endemic countries with respect to alternate breeding sites for mosquitoes often determine how successful malaria control activities will be in their efforts to decrease transmission.

This current study assumes that correcting household behaviours with respect to alternate breeding sites is a great challenge that must be addressed if malaria control (and ultimately elimination) is to be successful. Malaria can be studied from biological, human and social-cultural points of view. Indeed, though considerable work has been done, most weight has been given to the biological sphere (WHO, 2013; WHO, 2012; WHO, 2011; Kristian, et al., 2003).

However, this current study focuses on the human factors with respect to how household behaviour affects the overall malaria prevalence. This is necessary to indicate its relevance to malaria control efforts. Based on the assumptions of this study, only by the means of a combined approach employing biological and human behavioural aspects may likely bring the best results for malaria control prevention practices.

This study posits that lack of concentration of the human behavioural factors is a significant reason for the failure of several malaria control efforts. The assumptions of this current study are that human attitudes must be incorporated in an investigation of how people respond to their health conditions and that the issues related to malaria cannot be handled alone without considering the behavioural aspect of households (Koenker et al., 2015; Ajala & Wilson, 2013). Human attitudes and behaviours, not

only play a critical role in the influence of malaria prevalence, but also attitudes and behaviours play a role in the disease control and management (Kilian et al., 2015; Ricotta et al., 2015; Koenker et al., 2015; McInerney, 2002).

Therefore, understanding household behaviour is the keystone of this study, which was conducted to understand and explain individual behaviour with respect to malaria prevalence, control and prevention issues. In the field of medical sociology, particularly health seeking behaviour, understanding what people may or usually do about concerns for their health is vital. In this instance, this current research is concerned with household behaviour about malaria control activities. Thus, it is pertinent to note that a sociologist is interested in (and focuses on) the many behavioural and social circumstances of disease control and prevention. However, the focus of this study is on household behaviour patterns, actions and habits that people perform. Specifically, this focus concerns household conducts as well as attitudes and behaviour with respect to fumigation, their behaviour with respect to waste disposal control, and their perceptions of malaria and also their behaviour with respect to availability and effective malaria control measures.

## **1.2 Problem Statement**

Nigeria is involved in several initiatives to control malaria. One of these initiatives is establishing the National Malaria Control Program (NMCP) in 1997 to deal with the increasing burden of the disease. The National Malaria Control Program is partnering with some contributor agencies to ensure the execution of malaria control across the nation (WHO, 2012). The agencies include the United States Agency for International Development (USAID). Another program embark from Nigeria is Roll

Back Malaria (RBM) that was established in 1998. All those collaborating agencies and programs (NMCP, USAID, WHO, RBM) focus on the provision of effective, affordable, acceptable antimalarial drugs and insecticide treated nets as major strategies for malaria control (RBM, 2010). This indicates that malaria control activities in Nigeria largely carried out on the medical aspect without considering the role of human societies in health seeking behaviour of malaria control.

However, despite everything has been done these programs could not yield the expected outcomes as malaria continues to revenge the Nigerian society as stated by the World Health Organization (2013). This current study attributed this failure to control malaria to the inability of the stakeholders and policy makers to include human behavioural aspect into their policy and activities of malaria control and prevention. It is belief in this study that malaria cannot be adequately taken care of without reference to the believed systems of the communities affected. These include the way they understand and define the etiology and perception of malaria disease itself. It is also through such understanding that they are able to adopt health seeking practices. Because people respond to health largely depend on how they define, understand and perceived the disease or illness. These are the behavioural point of view largely neglected by policy of malaria control.

Therefore in Nigeria, malaria control paradigm focuses mainly on the medical and health approach (RBM, 2010). Human beings as social animals and their behaviour to a large extent have not take into serious considerations with respect to malaria control (Maheu-Giroux & Castro, 2013). However, malaria control cannot be sufficiently dealt with without accounting for the role of human behaviour. The

problem of malaria control is not a medical problem alone; the problem is cultural and in some instances social and economic and, as a result, an understanding of human behaviour is needed. In many fields of study such as environment, psychology, and anthropology, researchers use human behaviour to investigate several issues. For example, studies using human behaviour factors as predictive reasons for control programmes include those of Fredriksen et al. (2013), Iliyasu et al. (2012), Afroz et al. (2010), Basolo et al. (2008), Ajzen (1988), and Ajzen and Fishbein (1977). Scholars have studied people's recycling participation, disaster control, crime involvement and cigarette smoking. Their findings revealed the significance of behaviour as predictive reasons for either the success or failure of the phenomena under investigation. Therefore, medical approach alone cannot provide a solution to the fundamental and causal problems of malaria unless human behaviour is also considered.

Some blame for the failure of malaria prevention programmes on the concerned authorities because many have not accounted for human behaviour as a measure of malaria control. Often this is because concerned authorities such as WHO, RBM, and FMH have utilized only medical professionals who use contemporary medicine to control malaria. Those medical institutions leave out the human and behavioural aspects out of the equation (RBM, 2010). As a result, the underlying problems of human behavioural are often left out of the fight against malaria, which, in turn, may lead to challenges in conducting successful programs.

One example derived from the medical model is using bed nets as a defensive mechanism. The medical task is to make people sleep under bed nets. However,



using bed nets is also a behavioural problem because such usage must include human culture and behaviour in doing things. Therefore, this study posits that using medical measures alone to control malaria is inadequate and not enough by themselves to lessen sufficiently the malaria crisis. To do so, considering human behaviour is imperative.

Thus, a need exists to consider household behaviour in health and its influences on successful health initiatives, which this study seeks to fill by exploring the relationship between household behaviour and malaria control. This is to provide a new understanding of the connection between household behaviour on fumigation of the environment, behaviour on waste disposal treatment, household perception of malaria as well as household behaviour on the availability and effectiveness of control measures. Behaviour in this study is measured as the actions and conduct of households concerning their activities and attitudes about the fumigation of the environment and stagnant water treatment as well as the availability and effectiveness of malaria control measures.

The focus of this study is in household behaviour and malaria control which recommended the application of theories used by medical sociologist and or theories of human behaviour in the understanding of human health practices related to malaria control and prevention (Maheu-Giroux & Castro, 2013). It is found out that five major concepts are very critical in malaria control. These include provision of fumigation services, proper waste disposal control, people perception and understanding about malaria, available control measures and the effectiveness of

those control measures provided. It is understood that for malaria control to adequately address those control measures must be taken care of.

The focus of this research is to examine the relationship between household behaviour on those factors with regard to malaria control. Since the focus of sociology in general is on social problems, there is a need, therefore, to use sociological explanation to the social and behavioural dimension of malaria control in order to come out with a new idea toward addressing the issue of malaria and its prevalence. The extant literature shows that research on the influence of household behaviour is urgently needed. The current study intends to help fill that gap and is defined to focus on household behaviour and knowledge using both qualitative and quantitative research methods employing health behaviour theories and/or theories of knowledge on malaria control programmes (Maheu-Giroux & Castro, 2013). The research focused on the influence of household behaviour on malaria control in Zamfara state, North West Nigeria. The above Statements prompt the researcher to form the following fundamental research questions

### **1.3 Research Questions**

Based on the problems stated above, the current study tried to find out and attend to the following research questions

1. What is the relationship between household behaviour on fumigation of the environment and malaria control and prevalence in Zamfara state, North West Nigeria?
2. What is the relationship between household behaviour on waste disposal and malaria control and prevalence in Zamfara state, North West Nigeria?

3. What is the relationship between household malaria perceptions and malaria control and prevalence in Zamfara state, North West Nigeria?
4. How does household behaviour with respect to available control measures influence malaria control in Zamfara state, North West Nigeria?
5. How does household behaviour affect the effectiveness of malaria control measures in Zamfara state, North West Nigeria?

#### **1.4 Research Objectives**

By the means of research questions highlighted above, the general aim of this study is to examine the influence of household behaviour on malaria control in Zamfara state, North West Nigeria. Specifically the study is designed to achieve the following objectives. They are:

1. To examine the relationship between household behaviour on fumigation of the environment and malaria control in Nigeria;
2. To examine the relationship between household behaviour on waste disposal and malaria control and prevalence
3. To examine the relationship between household malaria perceptions and malaria control and prevalence in Nigeria;
4. To identify how household behaviour with respect to available control measures influences malaria control in Zamfara state, North West Nigeria; and
5. To explore how household behaviour affect the effectiveness of malaria control measures in Zamfara state, North West Nigeria.

## 1.5 Formulation of Hypothesis

The following hypotheses are proposed to achieve the objectives of this study. They are:

**H<sub>1</sub>:** There is a relationship between household behaviour with respect to fumigation of environment and malaria control

**H<sub>2</sub>:** There is a relationship between household behaviour with respect to waste disposal and malaria control

**H<sub>3</sub>:** There is a relationship between household perceptions and malaria control

Explanation of the formation and development of those hypothetical assumptions is provided in chapter two hypothesis development sections. The explanation is provided with supporting literatures and theories.

## 1.6 Theoretical Framework

Introducing the theories chosen for this study as the theoretical framework in this chapter is important in order to provide the foundation upon which this present research is constructed. This study conducts a widespread search among sociological theories of health/illness and behaviour, to determine those that are suitable for this research. Those theories include the health belief model, the theory of planned behaviour, the behavioural theory of health and rational choice theory. The following statements justify the choice of these theories.

1. The Health Belief Model (HBM) is one of the theories which is widely used by medical sociologists and anthropologists to evaluate, explain and predict health and illness behaviour (Anderson et al., 2010).
2. The theory of planned behaviour is chosen because it is one of the most widely cited and applied behaviour theories. The theory is one of a closely interrelated family of theories that provide perspectives for explaining behaviour centred on feelings and beliefs.
3. The behavioural model is used to explain human behaviour in health services and is founded on a sequence of empirical studies. This model informs the understanding of the household use of or failure to use health services (Andersen, 1995).
4. The rational choice theory is formed around the belief that human actions are primarily 'rational' and that people determine the possible or expected cost and benefits of every action before determining what to do.

The above theories are discussed further in Chapter Two, Section 2.8.

### **1.7 Significance of Research**

The findings of this study would benefit the general members of the society, the government and professional body in charge of malaria control activities. This study significantly contributes to the body of knowledge and methodology. It is also has significance to the policy makers and practitioners, the administrators and public health managers. Theoretically the study would contribute to the body of knowledge by offering empirical proof of the influence of household behaviour on malaria control and, accordingly, add to the existing literature. The ability of this study to

employ more than one method justified the methodological contribution of this current study. Practically, the study could help policymakers, researchers, students and general members of society as a reference for consultation concerning malaria control. Specifically, the significance of this study is as follows:

### **1.7.1 Significance to the Body of Knowledge (Theoretical)**

1. This research incorporates the health belief model, the theory of planned behaviour and the behavioural theory of health services. New concepts (i.e., behaviour on fumigation, behaviour on waste disposal, and people's perceptions) as well as the availability and effectiveness of control measures are considered with respect to the influence of household behaviour on malaria control.
2. Theoretically, this study tests and confirms the influence of household behaviour on malaria control, which, in turn contributes to the body of knowledge.
3. Similarly, this study tests and validates the influence of household behaviour with respect to fumigation, waste disposal and perceptions of malaria. Correspondingly, these contribute theoretically to the body of knowledge.
4. Furthermore, these findings offer empirical support for the influence of household behaviour on the availability of malaria control measures and the effectiveness of the control measures in the treatment-seeking practices.

### **1.7.2 Methodological Significance**

1. The study employed more than one method recommended by Maheu-Giroux and Castro (2013) justified the significance of this research to methodology.

Therefore, both methods of quantitative and qualitative were used to analyze the data gathered from interviews and questionnaires.

2. Furthermore, removing insignificant items from original scale by adding significant items, cleansed and tested the new measure to suit the study setting using Cronbach's alpha coefficient is another vital significance of this research to methodology.
3. In a nutshell, a sample size above 400 was used by this current study after data screening and clearance as clear responses after initial verification proved to be another fundamental significance of this study to methodology.

### **1.7.3 Significance to the Policy Makers and Society (Public Health managers)**

1. This study is important to policy makers, including the World Health Organization (WHO), the Federal Ministry of Health (FMH), National Malaria Control Program (NMCP), non-governmental organization (NGOs) and other policy makers with respect to malaria control activities. Moreover, the study could be of great significance if the government uses the findings to reduce the expenditures on malaria control that the nation spends.
2. This study could benefit researchers and students as a reference point for carrying out additional studies related to malaria control and management. The general public will also find it useful in re-examining the issues regarding malaria control and prevention.
3. This study contributes by creating awareness and drawing the attention of professionals, government and the general society to understand how household behaviour is linked to malaria control practices.

4. This study contributes in a practical manner to members of society to help change people's behaviour and their perceptions of malaria and revealing the recommended behaviour more suitable for controlling malaria.

### **1.8 Scope of the Study**

This study uses a combination of quantitative and qualitative research design. The research was conducted in Zamfara state North West Nigeria, and people who live in that area and examine the influence of household behaviour on malaria control. For the quantitative, a total of 409 respondents participated in the study and for the qualitative part of the study, 20 people participated as respondents. Quantitative respondents are household heads in Zamfara State. Qualitative respondents include experienced household heads and some stakeholders handling the malaria issues in Zamfara State. These respondents are selected because of the assumption that they are in a position to provide comprehensive information and answers to the influence of household behaviour and malaria control. The study investigates household behaviour with respect to fumigation, household behaviour with respect to waste disposal control, and the perception of malaria as well as the availability and effectiveness of malaria control measures. Other areas often considered by sociologists in their study of behaviour like physical activities, community, intellectual, emotional as well as leadership and other aspects of sociological investigation of behaviour are not considered in this study. Therefore, lack of focus by this current study of those sociological areas constitutes a limitation of this study.



## **1.9 Operational Definitions**

Some concepts used in this study must be defined. These concepts include: household heads, household behaviour, and behaviour with respect to fumigation, behaviour with respect to waste disposal, perceptions of malaria, available control measures and effective control measures.

### **1.9.1 Household Behaviour**

Behaviour in this study is measured as the actions and conduct of household members that influence the prevalence of malaria and control practices. Household behaviour is used in this study as household's conduct and attitudes and behaviour with respect to fumigation of the environment, behaviour with respect to waste disposal control, their perceptions of malaria and also their behaviour with respect to availability and effective malaria control measures.

### **1.9.2 Household Head**

A household in this study comprises all the persons who reside in a housing unit. A component in which economic manufacture, consumption, tradition, child rearing, inheritance, and shelter be structured, controlled and carried out. The household head is that individual in a family setting who offers and provides actual support and assistance in the housing unit. Assistance includes social and economic support, consumption, and provision of shelter and many more of the individuals who reside in a household and who also related to him or her through adoption, blood or marriage.

### **1.9.3 Fumigation Behaviour**

Fumigation behaviour in this study entails the behaviour of people concerning the application of several fumigation activities such as mosquito coils, and insecticide spraying for the purpose of eliminating mosquitoes that cause malaria from the environment.

### **1.9.4 Behaviour with respect to Waste Disposal**

Behaviour with respect to waste disposal implies household practices on disposing waste materials, unused or unwanted resources within the environment and the consequences of such action to the malaria control practices.

### **1.9.5 Household Perceptions of Malaria**

Household perceptions, in this case, means a higher - level of evidence of household understanding, knowledge, views and insights concerning malaria.

### **1.9.6 Control Measures**

Control measures in this study entail all treatment and prevention mechanisms available for malaria control and prevention purposes.

### **1.9.7 Availability of Control Measures**

Availability of control measures is used to describe either the presence or absence of the means of malaria control and prevention and how been those control measures available relate to household treatments seeking behaviour on malaria prevention.

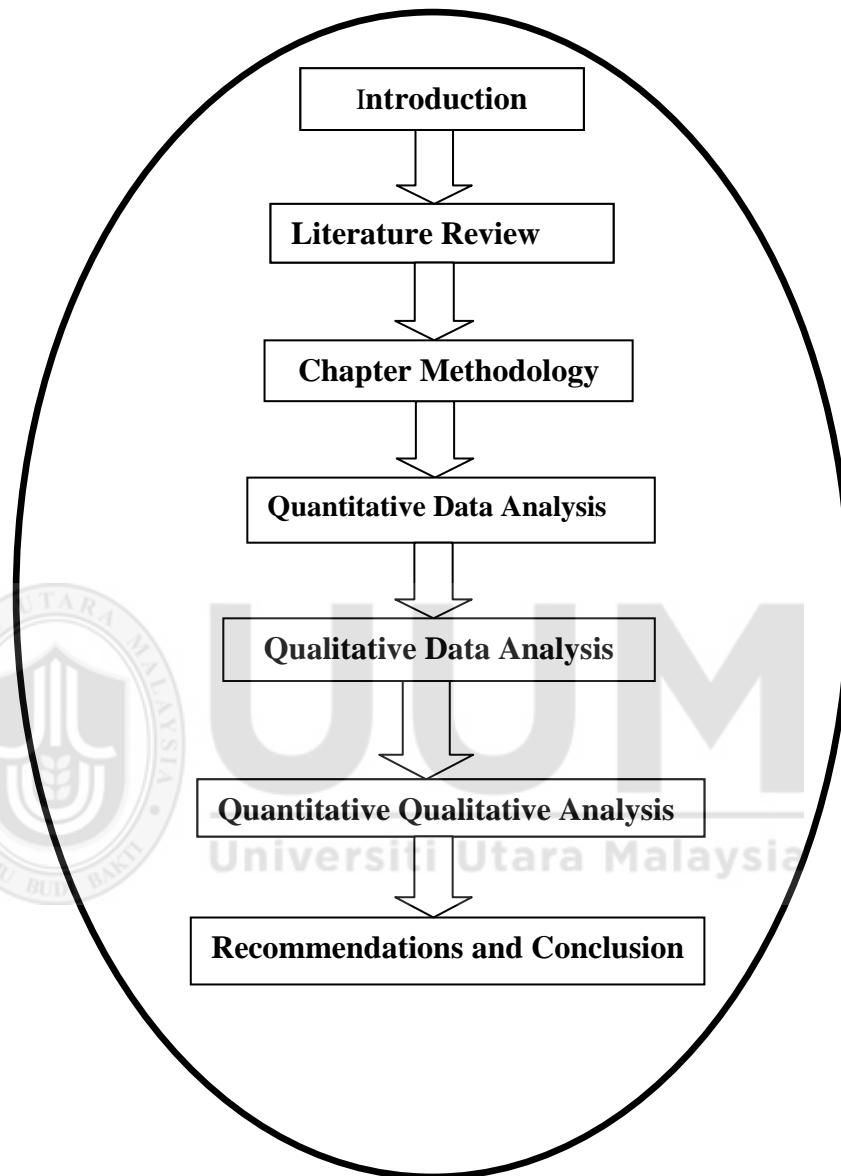
### **1.9.8 Effectiveness of Control Measures**

The effectiveness of control measures in this current study means the extent to which the malaria control measures either provided or available are perceived as effective. This comprises an understanding of whether the perceptions of the effectiveness of measures taken to control malaria influence household behaviour for seeking malaria treatments and prevention.

### **1.10 Thesis Organization**

This thesis comprised seven chapters and is organized as follows. Chapter One comprises an introduction, problem statement, research questions, research objectives, formulation of the hypotheses, and significance of the research. It includes the scope of the study, operational definitions, thesis organization and a conclusion. Chapter Two is a literature review. It includes an introduction, a history of malaria and the early attempt to control malaria, the concept of household behaviour and understanding of human health behaviour. Similarly, Chapter Three discusses methodology. It comprised introduction, research paradigm, research design and unit of analysis. The population and sampling, the sampling framework, instrumentation, the pilot test and its results are also discussed as well as the data collection procedure, data analysis and chapter's conclusion. Chapter Four discusses the influence of fumigation, waste control and perceptions on malaria control and prevention. Chapter Five discusses the influence of household behaviour on the availability and effective measures of malaria control. Chapter Six comprises discussion of the findings of the present study in relation to previous studies. Lastly, Chapter Seven comprises conclusions and recommendations, including theoretical, practical and methodological implications and directions for future research and then

finally the conclusions. The organization of this thesis is summarized in Figure 1.2 below.



*Figure 1.2* Thesis organization

### **1.11 Conclusion**

This chapter introduced the topic of this research. The chapter presents the general overview of this study. The section contains brief insights on the situation of malaria from local and global perspectives and human behaviour. The research problem of

this study is highlighted in this chapter. The chapter also includes the research questions of this study. After highlighting the research questions, research objectives of the study were discussed, following by the hypothesis. Critical concepts of the study are defined, and, consequently, the significance and scope of the study are emphasized. Then finally, thesis organizations are presented. The next section of this study is Chapter Two, the literature review.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter provides a review of the works of scholars, writers, researchers and theorists on household behaviour and malaria control. The reason of this literature review is to examine the contemporary position of knowledge, information about human (household) behaviour and malaria control. Another essence of the investigation is to discover writers, editorial, theories in the study of medical sociology, in general, human behaviour and malaria control in particular. The review is also conducted to discover gaps in knowledge in the area under study. This literature provides the background knowledge and information on this study that is supported by research findings.

#### **2.2 History of Malaria and Early Attempt of Malaria Control**

Malaria is one of the major health problems that threaten human survival today. The illness had been explained since before the middle age and still stayed as an important health concern. The word ‘malaria’ comes from Italian, and means ‘bad air’ (Carter et al. 2002). According to Azizi (2013), Joy et al. (2003), malaria has been among individuals for a long period of time. Malaria in human beings has been well-known since the prehistoric period of human existence (Hill, 1992). The earliest confirmation account of what may have been malaria as a human disease is originated by Hippocrates around 2,700 BC (Hill, 1992).

Various efforts to control malaria can be traced since in the ancient times, but a major attempt at a global and local level to reduce the burden created by malaria is established after world war the second. Many of the developed countries and some parts of Latin America and Asia successfully eliminated malaria using local perspectives in 1967. Their success of eliminating malaria is attributed to the massive global fight against the disease. Their programs on malaria eradication centred on the extensive use of Dichloro-Diphenyl-Trichloroethane (DDT) to fight mosquitoes and massive use of anti malaria vaccines. For example, in Panama 1878, that was then in part of Colombia there is an incidence of high malaria fever. This affected the productivity of workers in the Panama Canal. Consequently, environmental management is adopted as a key to malaria control, by drainage construction, infrastructure provision and other provision of environmental facilities. As a result, the prevalence of malaria reduced with a greater proportion (Satterthwaite, 2003). Not in Panama alone in the early 19<sup>th</sup> century Malaysia applied environmental modification as a strategy employed for the elimination of malaria. Watson (1921) demonstrated the importance of environmental modification by showing that selective clearing of the forest around the settlements could control the mosquito, which results in the management and possible elimination of malaria.

As of the period after world war the second, there is no attempt in Africa for the fight against malaria. The high malaria prevalence in Africa, resources needed to start and maintain the program is the main reason behind the absence of proper malaria control effort. Present approaches to deal with malaria in sub Saharan Africa, Nigeria inclusive is carried out by WHO, RBM program and other supporting partners. Their activities in malaria control comprise early diagnosis and prompt treatment, vector

control and provision of insecticide treated nets (WHO, 2012). Those malaria control strategies are very successful in some part of the world, but they are largely not successful in Africa. The reason behind the failure of those programs is linked with the inaccessibility of health facilities, poor perception and knowledge of malaria and drug resistance. Other attempts such as larval control and spraying practices have not been successful because of the harm caused by DDT. The number of possible breeding sites is large and also increasing. Therefore, the programs and initiative for malaria control rely heavily on ITN as a strong weapon for malaria control (WHO, 2005).

Malaria is a worldwide pandemic disease that engaged the global concentration. The World Health Organization in 1985 submitted a motivated plan for the suppression of malaria globally at the World Health Assembly (WHO, 2005). The enormous trouble of malaria all around the globe formed earlier attempt by certain social institutions (both formal and non-formal) on malaria administration (FMH, 2005). According to Takken (2009), construction of drainage and other environmental modification substantially reduced the rate of malaria in Indonesia. Titanji et al. (2002) conducted a study in Bolifamba and the result shows that malaria transmission was reduced by the improvement in hygiene and sanitation (Takken, 2002). Utzinger et al. (2001) stated that the use of Insecticide Treated Nets (ITN) among European workers is also found to be very successful. The programmed is carried out in areas with high malaria prevalence in Apapa (Nigeria) and northern Rhodesia in present day Zambia. However, the study relatively covered the small populations of Royal Air Force Station in Apapa and Zambian copper mining communities (Utzinger et al., 2001).



In Nigeria, there is also the National Malaria Control Program as another attempt for malaria control (FMH, 2005). However, on the other hand, Amzat (2009) argues that the inability of public health facilities to deliver timely and effective malaria treatment necessitated people to engage in the home management of malaria. The pattern of health care seeking behaviour in Africa has been governed by cultural beliefs and the perceived causes of the illness and the choice of treatment is greatly influenced by the individual's access to health care services (Amzat & Omololu, 2009). The implementation of sound environmental strategies, integrated into the concurrent malaria control programs, significantly lessens the burden of malaria disease across the globe (Utzinger et al., 2001). This section addresses the history of malaria and discusses various attempt used for malaria prevention across different geographical settings. The next section looks at the environmental practices and malaria control.

### **2.3 Environmental Practices and Malaria Control**

The effect of the association connecting health and environment has been since recognized (Ityavyar & Gusau 1990). It is essentially observed in the earlier century by the influential contributions of Rene Dubos (1968), Thomas Mckeown (1976), John B., and Sonjo Mckinlay (1975) cited in Ityavyar and Gusau (1990). In their different conclusion, these intellectuals arrived at findings now generally accepted and acknowledged. According to them, human behaviour on the environment has an additional deep impact on the physical condition of individuals than modern medicine (Ityavyar & Gusau, 1990).

There are several other studies showing exact effects of certain environmental behaviour on morbidity and mortality in diverse settings. Owoeye and Omole (2012) carried out a study to examine the health situation among slum dwellers in Akure, Nigeria. The result of the study shows that better environmental management has an impact on the physical condition of the people (Owoeye & Omole, 2012). Similarly, in another study Owoeye (2012) confirm that sanitation has a profound impact on the health of the society. Findings from these studies confirm the connection between diseases such as malaria and environmental services (Owoeye, 2012; Owoeye & Omole, 2012).

Alemu et al. (2011) conducted a study on climate and malaria transmission in Jimma town south-west, Ethiopia. The study reported that lack of services like, shortage of drainage, poor housing and water logs is an important contributing factor that increased mosquito breeding (Alemu et al., 2011). Buttressing relationship between environment and malaria, Haque et al. (2010) conducted a study to investigate the prevalence of malaria in the endemic district of Bangladesh. The findings of the study show that environmental factors like pools of stagnant water, bushes, heaps of garbage and poor housing conditions encourage disease prevalence (Haque et al., 2010). Similarly, Owoeye (2012) who stated that the effect of environmental factors on the incidence of malaria shows highest malaria cases among children living in places around or surrounded by swamps and bushes.

An environmental condition such as poor housing is associated with higher malaria prevalence. Coleman et al. (2009) conducted a cross-sectional study in Mpumalanga, South Africa. The finding indicates that there is a significant relationship between

malaria and the nature of environmental conditions (Coleman et al., 2009). Similarly, in West Africa a longitudinal study of malaria was carried out by Nahum et al. (2010). The result reveals that affordable, decent and good housing provided with sanitary facilities experienced lower malaria cases comparatively to their counterpart residing in poorly housing structures (Nahum et al., 2010; Coleman et al., 2009).

It is established that people protect their self from mosquito biting using different sanitation activities to reduce the number of mosquitoes. According to Ogoma et al. (2010) the rate of mosquito is significantly reduced by using environmental clearance in Lupiro village in southern Tanzania. Iwashita et al. (2010) reports that houses built close to jungle or around the bushes are more likely to have further malaria prevalence. The reason behind this prevalence link to the availability of environmental factors that increased the survival and dominance of mosquitoes (Iwashita et al., 2010).

Aniringiye and Douglason (2010) conducted a study in Uganda to examine socioeconomic and environmental determinant of malaria. The study found out that poor housing, overcrowding and poverty are a mediating factor in the association between malaria, environment and sanitation. A research conducted in Ethiopia by Perterson et al. (2009) connected the high malaria prevalence with poor environmental sanitation conditions. Furthermore, a case-control study to assess mosquito prevalence was conducted by Atieli et al. (2009) in the satellite villages in the Republic of Gambia. The result of the study reveals that the sanitation practices and the nature of the environment of the areas under study have a profound impact on the malaria prevalence and mosquito density (Atieli et al., 2009). Kirby et al.

(2008) found out that malaria prevalence in rural areas is high because rural people are communities who live in the places without safe and affordable environmental services.

According to Okafor and Amzat (2009) lack of strong control method as well as poor environmental services and quality houses, are potential risk factors for malaria disease transmission. Those factors favour the production and transmission of vector parasite. In a related finding Caldas et al. (2004) stated that houses around the bushes and those close to potholes of stagnant water probably bring more sites for malaria vector to breed. Similarly, a cross-sectional study was conducted by Ye et al. (2006) on North West Burkina Faso and reveals that environmental services has a strong relationship to malaria. Furthermore, Brundtland (2003) in his study addresses environmental crises affecting children's health. He stated that poor environmental sanitation such as indiscriminate dumping of refuse and lack of the sewage system is associated with malaria disease (Ye et al., 2006; Konradsen et al., 2003; Brundtland, 2003).

In rural Gambia Lindsay et al. (2003) averred that better housing structure is associated with lower levels of malaria. Anaemia and other related diseases are low compared to poorly constructed mud-houses. According to National Agency for Food and Drug Administration and Control (2001) malaria has a direct association with water and sanitation problem. This association has an impact on high mortality rates among the children under-five years (Lindsay et al., 2003). Furthermore, Gamage-Mendis et al. (1991) conducted a study in a malaria endemic setting in Sri

Lanka. The study found out a strong relationship between malaria prevalence and the nature of the houses.

In Egypt, Chandler found out cases of *Oscar* was trim down due to the provision of the bore hole, latrine, and improved water supply and better refuse disposal methods (cited in Ityavyar & Gusau, 1990). Similarly, in Costa Rica, the building of public toilets helped to cut by 50% the cases of casualty resulting from diarrhoea and enteritis Schliemann in (Ityavyar & Gusau, 1990). Studies by Van Zijl and by Azurin and Alveros in some emerging countries similarly highlight the importance of sanitation on health. The provision of sanitary facilities for human waste disposal can reduce the incidence of cholera, malaria and other vector diseases by 76% (Ityavyar & Gusau, 1990).

#### **2.4 The Concept of Household Behaviour**

Household according to National Population Commission (2006) comprises all the persons who reside in a housing unit, the households are the simple housing component in which economic manufacture, consumption, tradition, child rearing, inheritance, and shelter are structured, controlled and carried out (NPC 2006). Behaviour, on the other hand, is considered as a series of action and peculiarity made by human beings or system in combination with their physical environment as well as other life form organisms. Behaviour according to Levitis et al. (2007) is the range of actions and mannerisms made by organism systems, or artificial entities in conjunction with themselves or their environment. It includes the other systems or organisms around as well as the physical environment (Levitis et al., 2007). It is, therefore, the response of the system or organism to various stimuli or inputs,

whether internal or external, conscious or subconscious, overt or covert and voluntary or involuntary.

According to (McInerney, (2002) household behaviour refers to the range of behaviour exhibited by people in which influenced by culture, attitudes, emotions, values, ethics, authority and or coercion. The behaviour of humans (and other organism or even mechanisms) falls within a range with some behaviour being common, some unusual, some acceptable, and some outside acceptable limits. In sociology, behaviour, in general, is characterised as having no meaning, being not directed at other people, and thus is the most basic human action (McInerney, 2002). Human household behaviour is seen, therefore as experienced throughout an individual's entire lifetime. It includes the way they act based on different factors such as genetics, social norms, core faith, and attitude. Behaviour impacted by certain traits each household member has. The traits vary from person to person, household to household and can produce different actions or behaviour from every individual. Social norms also impact behaviour. Thus, the household behaviour is greatly influenced the attitudes we use on a daily basis.

The underlying assumption in this study is that human behaviour determined by personal beliefs or perceptions about the disease and the strategies available to decrease its occurrence. However, Hochbaum (1958) assumed that human behaviour influenced by interpersonal factors affecting health behaviour. Therefore, the household behaviour is used to describe the process of how people interpret and response to health care seeking practices. Conversely, in this case, household

behaviour illustrates the actions undertaken by households that increases the prevalence of malaria or on the other hand contributes to its control and prevention.

#### **2.4.1 Sociological Explanation of Household Behaviour on Health**

In general, for the most social scientists behaviour is largely learned and well understands from other people. For the social scientist's way of life and human tradition most generally looks upon as a cohesive set of ideas, beliefs and knowledge that live in a different realm of biology (Laland, 2008). Researchers assumed culture is the main influence on human behaviour. Household behaviour about health has been defined as any action embark on by a person consider himself to be healthy for the reason of preventing disease or detecting it at an asymptomatic stage (Laland, 2008). There are constraints to this idea including the lapse of self-defined household health behaviour and leaving out of activities carried out by people with recognized illnesses that are directed at self-management, delaying disease succession and getting better general well-being.

Godin and Kok (1996) define household health behaviour as obvious behavioural patterns, human behaviour and habits that relate to household health maintenance, to household health restoration and health development. A valuable broader meaning of household behaviour about health would comprise any action undertaken for the purpose of preventing or detecting disease or for improving health and well-being. Some studies (Fredrickson et al., 2013; Laland, 2008; Godin & Kok, 1996) have looked at the relationship between the performance of household health behaviours and a variety of health outcomes. Such studies have demonstrated the importance of a diversity of household behaviours for both morbidity and mortality. Research into

the leading causes of premature death in the western world (e.g. Cancer) has emphasized the importance for the prevention of behaviours such as smoking, alcohol consumption and human sexual behaviours (Laland 2008). Several authors (State et al., 2013; Kim & Hunter, 1993) have pointed out that household health behaviours may have a positive impact on quality of life of the human population. This study centred on household behaviour on malaria control, hence the next subsection is on the overview of sociological explanation for disease perception from the perspective of attitude and behaviour.

#### **2.4.2 Attitude and Behaviour: A Sociological Explanation on Disease Perception**

Attitudes defined as a learned predisposition to respond in a consistently favourable or unfavourable manner (Ajzen & Fishbein, 1977). According to Wyer, (1965) attitudes is an expression of favour or disfavour towards a person, place or events. The popularity of the attitude construct in sociology and the social sciences can deduce from a large amount of theoretical and empirical literature. Its popularity is because attitudes are supposed to have an impact on, and even predict behaviour (Kraus, 1995). Still, empirical research on the attitude and behaviour link has been yielding contradictory results. In an early literature, Wicker (1969) concluded that it is more likely that attitudes will be unrelated or only slightly related to behaviours that attitude closely linked to the action. Ajzen and Fishbein (1977), however, attributed the weak relationship between attitudes and behaviour found in the previous literature to the incompatibility between the attitudes measured and the related behaviour. The results of the later reviews by Schuman and Johnson, (2014), Kim and Hunter (1993) and Kraus (1995) diverged from Wicker's (1969) results. They found that attitudes were rather consistent with the future behaviour. Kraus



(1995) pointed out that attitudes account on average as there is no significant attitude and behaviour relationship could be established.

According to Munro et al. (2007) four constructs such as perceived benefit, perceived barriers, perceived susceptibility and perceived seriousness can be used to explain household behaviour about understanding and definition of disease.

**Household Perceived Seriousness:** household belief about the seriousness or severity of illness often based on information or knowledge, it may come from beliefs a household has about the difficulties of a disease would create or the effects it would have on his or her life in general (McCormack, 1984). For example, most of the people is said to view the flu as a relatively minor ailment. People get it stay home and get better. However, if people have HIV/AIDS could land them in the hospital. It may also happen in the case of malaria as household respond to health seeking behaviour only if they perceived the seriousness of malaria and its possible consequences to their life in general.

**Household Perceived Susceptibility:** Personal risk or susceptibility is one of the most powerful perception in promoting household to adopt healthier behaviour. The greater the household perceived risk, the greater the likelihood of household engaging in health behaviours to decrease the risk. According to Das, de Wit, Vet, and Frijns (2008) people perception about the vulnerability is what prompts men who have sex to use condoms. Similarly Chen, Fox, Cantrell, Stockdale, & Kagawa-Singer (2006) stated that it is what prompts people to vaccinate against hepatitis B to decrease the risk of the disease. Correspondingly (Belcher, Sternberg, Wolitski,

Halkitis and Hoff 2005) averred that it is what motivates people to use sunscreen to prevent skin cancer. It is, therefore, assumed that if the household had perceived the vulnerability of malaria may likely to motivate them to seek for health care services for disease prevention.

However, it is opposite in some cases when people believe they are not at risk or have a low likelihood of vulnerability; unhealthy behaviour tends to result. This is found out by Rose (2010) and Maes and Louis (2003) with older adults and HIV prevention behaviour. Adults do not perceive themselves as prone to HIV and therefore not practice safe sex protection. This same scenario happened to Asian American college students who perceived HIV as non-Asian disease and they are not susceptible to it. This is what makes their low safer sex practising behaviours (Winfield & Whaley, 2002).

What we have seen so far is that a household perception of increased risk linked to household health behaviour and also decreased the risk to unhealthy household behaviours. However, this is not always the case. Perception of disease risk among college student is linked to healthier behaviours even when the perception of risk is high (Courtenay, 1998). Although those students consider themselves at risk for HIV because of their unsafe sex behaviours, they still do not practice safer sex behaviour. This may likely be in the case of malaria as household perceived the disease risk but do not adopt health seeking behaviours. Similarly, another instance in which perception of threat linked to behaviour change is found in a cancer study. According to Mullens, McCaul, Erickson and Sandgren (2004) cancer is a severe disease with a high risk of recurrence. It is the perception of the threat recurrence that increases the

likelihood of behaviour change in people previously treated for the disease. In the same way, same thing happens when people perceived a threat of developing diabetes (Weitkumat et al., 2003).

However, as the perception of increased risk does not always lead to behaviour change, as found with college students, neither does a perception of increased threat. This is the scenario with older adults and safe food handling behaviours. Older adults are among the groups most vulnerable to food borne illness (Hanson & Benedict, 2002). Even though they perceived a threat of disease from food borne sources, they still do not use safer food handling behaviours.

**Household Perceived Benefit:** This is about household's opinion of the value or usefulness of a new behaviour in decreasing the risk of developing disease. Household tends to adopt behaviours when they believe the behaviour decrease their chances of developing disease. Household perception about the benefit of the programme plays a significant role in the adoption of behaviours. It is found in the study of breast cancer. We hold opinion that the earlier breast cancer found, the greater the chance of survival. It is also known that a breast self-exam when regularly done, can be an effective means of early detection (Frank & Swedmark 2004). They have to believe there is a benefit in adopting the behaviour. It is precisely what was found to be true among black women who believed breast self-exam is beneficial (Graham, 2002).

**Household perceived Barrier:** since behaviour change is not something that comes easily to the most household, perception about barriers addresses the issue of

behaviour change. This is an own household evaluation of the obstacles in the way of adopting a new behaviour. According to Janz and Becker (1984) this is the most significant factor or construct in determining behaviour change. For a new behaviour to be adopted, a person needs to believe the benefits of the new behaviour outweigh the consequences of continuing the old behaviour (Centre for Disease Control & Prevention, 2004). It enables household barriers to overcome and new behaviour to be adopted.

In trying to increase breast self-examination practices in women, it would seem obvious that the threat of breast cancer would motivate the adoption of this early detection practice. Certainly breast cancer is a severe disease, one of which women are at risk and for which the perception of threat is high. However, even with all of this, the barriers to performing breast examination exert a greater influence over the behaviour than does the threat itself (Umeh & Rogan Gibson, 2001). Some of those barriers according to Umeh and Rogan include difficulty with starting a new behaviour or developing a new habits and fear of not being able to perform examination correctly. Looking into the human attitude, behaviour and their perception of disease and health the next section discuss empirical studies using behaviour construct. Those empirical studies and their results highlighted the need to use behaviour in the study of malaria control and prevention.

## 2.5 Empirical Studies on Behaviour across Diverse Disciplines

Although many studies have been carried out to investigate different issues using human behaviour by researchers across many areas of knowledge, empirical studies on human behaviour in malaria control is limited especially in the Nigerian context. For this reason, it is imperative to further research on the human behaviour on malaria control so that findings from other studies using human behaviour can be generalized on the context of malaria control and prevention. Human factors and households behaviour is one of the major contributors to the success and failure of many programmes (Boadu, 2002). This section is going to present articles and papers that used human behaviour and other related factors to study many social problems or subjects.

Maheu-Giroux and Castro (2013) conducted a study in Tanzania to examine the successful vector prevention management through bed net to control the mosquito. The study found that a situation of limiting the spread may likely transform people's risk perception. However, the study was small to six randomised cluster sampling. An examination of the Maheu-Giroux and Castro (2013) reports that although successful programmes on malaria reduce significantly if tackle people's behaviour and knowledge change. The study recommends further research using the quantitative and qualitative technique by employing health behaviour and knowledge theories (Maheu-Giroux & Castro, 2013).

Literature indicates that there is a positive relationship linking knowledge of malaria and educational position. Akaba, Otubu, Agida and Onafowokan (2013) reveals the poor knowledge utilisation as a barrier for successful attempt in solving malaria and

its preventives measures in pregnancy (Akaba et al., 2013). In another study Chaponniere, Cherup and Lodge (2013) assesses the significance of health education services in a small rural district in Cameroon and reveals that there is a link between health information and healthy behaviours as well as illness prevention. However, the study was small among rural community the author perhaps too quick to propose that knowledge among the community is a significant factor in the behaviour regarding prevention and treatment of various disease and illness (Chaponniere *et al.*, 2013).

Furthermore, Ediau et al., (2013) carried out a study to assessed peoples knowledge, perception and awareness regarding Insecticide Residual Spray (IRS) in Soroti town, Uganda. The study is a cross sectional investigation involving 770 samples of selected households in rural and municipal centres. The study shows without prejudice the role of household behaviour and other human factors have for the success of the program or policy aim to address or solved problems facing society generally. Ediau conceivably too quick to suggest that proper societal involvement and mobilization shall established for successful disease control (Ediau et al., 2013).

In another study, Fredriksen and Kagia (2013) found that constant economic and financial development cannot be determined by better or strong macroeconomic policies, enhanced business atmosphere, stable political rule and guiding principle. In their piece of writing '*Attaining the 2050 Vision for Africa: Breaking the Human Capital Barrier*' Fredriksen and Kagia (2013) provide an in depth analysis on the relevance of increasing the value of human resources, knowledgeable and educated people to enlarge the size and value of skills, and expand the environment for

creating new job, manufacturing industries, and technological chance that will give way for the region to compete with global economies (Fredriksen & Kagia, 2013).

Studies established that socio-economic position such as distance to reach health services, lack of good road network, lack of effective means of transportation among other human factors act as a powerful barrier for the conduct of health seeking behaviour. Ferdous (2013) conducted a study to investigate the reasons that improve health seeking behaviours by the parents of under-five children with diarrhoea in village of Bangladesh. The study found out those socio-economic factors as influential barrier that control the behaviour of parents of children with age below five to look for proper treatment (Ferdous, 2013).

Evidence suggests that human tradition and their practices not only have effect on their health, but it is too affecting all their dealings including health illness and disease (Ferdous, 2013; Joshua, 2013). Joshua (2013) reveals that a number of these traditions are harmfully affecting and threatening the life of women their children and also the general members of the society. The determinants of disease, health and illness among community members cannot be done except the cultural practices and human behaviour of the population is considered (Joshua, 2013). A lot of cultural and human practices have assisted to spread and enhance the occurrence of some illness and health difficulty. Such human and cultural practices influence the success or failure of certain programmes. For example, human behaviour that banned using some services provided by them with aims of controlling certain diseases within societies is considered negative (Joshua, 2013).

Furthermore, Kalyango et al. (2013) conducted a study among children under five years in eastern Uganda to determine the effect of integrated malaria and pneumonia management. The study reveals that the factors leading to the improvement solely comes from the effort made by the programme to integrated community members and their behaviour in the policy (Kalyango et al., 2013). Moreover, Mezue (2013) carried out a study on the rising problem of hypertension in Nigeria. According to Him strategies employed is the encouragement of population-wide approach with the intention of reaching people to transform their behaviour and lessen the quantity of salt used for meals taking. Practical proof reveals that promoting human behaviour impact on the prevalence of hypertension and cardiovascular disease burden (Mezue, 2013).

Furthermore, Ferrante (2012) conducted an experimental research to look into the factors that served as influential to the occurrence and incidence of offending criminal activities by locals Australians. Findings from the logistic regression analysis of data and information show that people's behaviour on substance misuse have the important influence on the prevalence of indigenous local arrest by criminal justice system in Australia (Ferrante, 2012). As stated in this study criminologist used those human, cultural and risk factors to determine the prevalence of offending by people (Ferrante, 2012).

Similarly, Hay et al. (2009) conducted a study to find out the strength and change of risk seeking during teenage years. Its a consequence of changes in wrongdoing, and its reaction to a complete program aimed at reducing the rate of delinquency. The study uses data from the children at risk programme, and allocates randomly



programmes that targeted children at their early stage of life. The study finds out that the program success in reducing some forms of delinquency is as a result of targeting behaviour of those children (Hay et al., 2009). Still on the importance of behaviour Afroz, Hanaki, Tuddin, and Ayup, (2010) conducted a study in Dhaka, Bangladesh among 456 household and interview was carried out to examine reasons that influence their behaviour on recycling. The study reveals that the household's behaviour and feeling on recycling is one of the important pointers toward sustainable waste disposal management and clearance in Dhaka (Afroz et al., 2010).

Nketiah-amponsah (2010) conducted a survey in three localities of Ghana to study the socio-economic reasons influences the ITN acceptance and use. A finding indicates that people's beliefs and attitudinal factors are a significant reason influencing the use of nets. A cross-sectional research was conducted by Kaur (2009) in Orang Asli people in the area of Raub, Pahang, to find out the factors and causes of malaria in the region. The finding of the study reveals that malaria vulnerability in the area is mostly caused and associated with socio-cultural and behavioural factors.

Do Valle, Reis, Menezes, and Rebelo (2004) conduct a study in Portuguese to examine the behavioural determinants and involvement in recycling activities, and the study was carried out with specific objective of classifying factors able to encourage people to take part in the program and actions of recycling activities. The study used a structured questionnaire to gather information among household reside in a study area. The study reveals that level of education not connected to recycling behaviour. However, the socio-demographic determinant of recycling involvement

point out a weak association involving gender differences and people's recycling behaviour. The projecting consequence of the level of education, age, or family income is ambiguous, but several studies have found a significant positive relationship between these factors and recycling involvement

Similarly, Boadu (2002) averred that human factor is a well-built and dynamic determinant of societal disease and health status. He conducted a study on social class and health status in Ghana and argues that social class such as education and income is the most important determinant of the health condition. According to MacCormack, (1984) environmental alteration by people to suit their need in African continent resulted for creating a host place suitable for breeding mosquito and another vector organism. He describe in his paper '*Human ecology and behaviour in malaria control in tropical Africa*' that policy and approach to malaria prevention and management shall include self-help programs that are affordable, accessible as well as reasonably priced to general members of the society.

In summary, this section highlighted some studies using human behaviour and other similar constructs on different areas in the academic arena. However, those studies highlighted the need to study using behaviour on malaria control. Consequently, this current study investigates household behaviour on fumigation, waste water disposal, perception, and availability as well as the effectiveness of malaria control measures. This is to find out how household behaviour on the variables above influences behaviour on malaria control in the Nigerian context using Zamfara state as an area of reference. The next section discusses accessibility to health provision and household behaviour.

## **2.6 Accessibility to Health Provision and Household Behaviour**

It is widely accepted that for any health care programmes malaria control programme included to have maximum impact on the health levels of the population, it purports to serve, it must be both equitably distributed and efficiently applied (Okafor & Amzat 2007). It is equally true, however, that not many countries have achieved these goals because of the lack of accessibility to health provision which in turn influence household behaviour in seeking those services. The literature (Okafor & Amzat, 2007; Alaba, 2005; Ogbole, 1981) shows serious imbalances across the globe in the distribution of formal health care facilities and services in many third world countries Nigeria inclusive. Further disparities in the distribution of modern health services can be found between the urban centres on one hand and the rural areas on the other which also impact on household health seeking behaviour (Adenipekun, 2013; Okafor & Amzat, 2007; Boadu, 2002; Egunjobi, 2000; Jauro, 1981). Unequal access to health resources is therefore recognized as root causes of health care problems globally.

The literature makes a distinction between physical availability of services and effective accessibility, which is seen as a measure of the household ability, mobility and time to reach a service (Okafor & Amzat, 2007). Other factors, according to Phillips have been identified as intervening between the physical availability of health resources and their effective use, and among them include (a) the household recognized need to use the resource; (b) the household financial ability to use it; (c) the household physical ability to use it; and (d) the household socio-psychological readiness to use it. Much more work has been done to research and address the accessibility issue in the developed world. Adelekan (2001) Bos and Mills (1997),

Ityavyar and Gusau (1990) Ault (1994) have all tried to explain how the above-mentioned access-related factors actually influence household behaviour to explain the utilization rates of those health programs provided. It has been shown at least in the advanced communities and nations, that characteristic of the potential household users, for example their socioeconomic status, as well as characteristics of the health care delivery system, contributes to effective accessibility of healthcare resources which possibly encourage household behaviour to access and use those services (WHO, 2010).

The combination of access variables which affect household behaviour of health resources may be different in the resource depressed societies where scarce health resources must be used cost effectively. Moreover, the issues confronting accessibility and use of modern health care resources in developing countries are made more complex by the existence of pluralistic health care systems in these countries. Study by Munro et al. (2007) indicates that the availability of many health cares' in developing countries is a powerful predictor of household utilization patterns and their behaviours. In summary utilization behaviour of household when ill or when seeking to prevent illness and optimize their health has been a major area of concern over time (Polycarp, 2013).

## **2.7 Theories and Approaches of Human Health Behaviour**

This section deals with the discussion of several theories of human behaviour from different perspectives in order to understand how they influence changes in various courses of action and programmes particularly in human health issues. The focus of this examination is on household behaviour and malaria control, but discussion on

general theories of human behaviour is important in order to understand and provide an overall assumption of those theories and later chose those that are more closely relevant to use as a theoretical guide to this study. This is to provide the foundation upon which the research has taken and constructed. Theory of the health belief model provides frameworks in trying to understand and predict human health behaviour. The theory discusses in detail whether human household engage in a healthy behaviour with a primary aim of reducing or preventing the chance of disease (Hazavehei et al 2007). The assumption is that human health behaviour is more often the influence of attitudes and beliefs.

The theory of planned behaviour is one of the most widely cited and applied behaviour theories. It is one of a closely interrelated family of theories which assume a cognitive perspective to explaining behaviour which centred on a person's feelings and beliefs. The theory of planned behaviour evolved from the theory of reasoned action (Ajzen & Fishbein 1977) which posited to work as the greatest predictor of behaviour. The intention is itself a product of the mixture of attitudes towards behaviour. Other theories, discusses here is the behavioural theory of health utilization which discusses, predict and explain the household use of health care services and programmes. This is to understand the overall human behaviour of households in terms of choices to use health services and the need to promote health care policies and programmes (Kumar 2012; Fonta et al 2010).

Another theory is rational choice theory which explains they believed that since it is not possible for persons to achieve all of the numerous things that they need, they must make choices related to both their objectives and the means for achieving those

objectives (Owumi 2013). It is generally explained by the theory that, individuals must anticipate in advance the outcomes of other courses of action and analyze which, among available actions will be better and better for them. The culture of poverty approach gives detailed explanation of the problems and conditions favorable for developing a culture of poverty which is also influenced human behaviours. Those conditions, according to Lewis (1997) is inequality introduced by industrial capitalist societies. Some of the characteristics are unemployment, low wages, and a failure to provide social, economic organization for the low income human population. Lewis (1997) mentioned that this results to the lack of effective participation and integration of the poor household in the major institution of the larger society. Understanding those theories and approaches enable us therefore to comprehend household behaviours in health programmes and policies established to manage and control malaria.

Other theories of human behaviour found during general reading on theories searched include stages theory of behaviour change by Prochaska and DiClemente (1983). The work of Prochaska and DiClemente (1983) and their colleagues have properly recognized the dynamic and arrangement of staged behaviour transformation. In an attempt to provide explanation these outlines of behaviour, Prochaska and DiClemente (1983) developed a trans-theoretical form of behavioural change, which suggested that behaviour change takes place in five different stages. Usually pre-contemplation is the first stage. At this juncture, there is no objective on the part of the individual to change his or her behaviour in the anticipated time. The second stage is identified as contemplation, where individuals are conscious that a difficulty exists and are gravely taking into consideration some

action to attend to those difficulties. The third stage is portrayed as preparation, and engages both goals to transform some behaviour, frequently minor, and commonly recorded with partial achievement. The number four stage is the action where individuals essentially adapt their behaviour, practices in order to prevail over their predicament or to achieve their objectives. Lastly, the final stage, which is maintenance is a situation where individuals work to thwart deterioration and consolidate to achieve in the action stage (Prochaska & DiClemente 1983).

Another theory discussed includes Social cognitive-behavioural theory by Pandora (1986) and Oldenburg (1999). Social cognitive theory sees human behaviour in terms of a triadic, active and mutual model in which personal factors, behaviour, attitude and environmental influences interrelated. It concentrated on both the emotional dynamics fundamental to behaviour and their ways for supporting behaviour change. It is an extremely difficult theory and embraces a lot of key constructs. Self-efficacy is one of the key concepts. Due to the tricky nature of this theory and many of the constructs contained are extremely not related justified the reason of not chosen it as the framework of this study.

Similarly, personality theory, Rogers (1985) was among the theories viewed by this current study. The theory is on the assumption that explains the behaviour mainly in terms of the established traits or outline of behaviour which are sighted as opposed to change. Another theory is learning and behaviour theory which demonstrated that behaviour can be transformed only if proper and suitable rewards, encouragement, and or lack of encouragement and deterrent. In learning or behaviourist perspectives, these encouragements and incentives are characteristically integrated into planned

and ordered underpinning program. Moreover, social learning theory is similar to learning and behaviour theories in that it centred on precise and exact, quantifiable facet of behaviour (Oldenburg 1999). Learning theories, however, observed behaviour as being formed chiefly by actions surrounded by the environment, whereas social learning theory sighted the human being as a dynamic participant in his or her behaviour, understanding occasions and choosing the options of action support on previous experience (Rogers 1985).

Furthermore, social psychological theory was also looking at during the course of theories findings. The social, psychological theories assumed that the importance is positioned on the portion of the social perspective in which behaviour take place. Those social perspectives comprised social stereotypes, cohesion, attitudes and peoples beliefs, group dynamics, mores and societal norms and prospects. Social cognitive perspectives according to Bandura (1986) merge the characteristics of social, psychological theories with elements of each cognitive behavioural perspective and social learning theory. Social-cognitive approaches highlight the individual's skewed perceptions and understanding of particular circumstances or set of events, and dispute that these required to be taken into explanation if we are to comprehend sufficiently both behaviour and the procedures of behaviour change.

Equally, theory review during the cause of this current research includes the theory of interpersonal behaviour. According to the theory the power of habit is an additional concept that has been established to be imperative in forecasting or changing behaviour. The theory of interpersonal behaviour disputed that as behaviours are recurring they turn out to be progressively more programmed, and



happen to slight conscious control (Laurence & Oliver...). On the other hand social marketing theory is another perspective that has been applied to convey about change of behaviour. The conception of social marketing is stand on marketing opinion and centred on four major key elements. Those fundamental elements consist of the development of manufactured goods, secondly their promotion and consequently place and price. This theory is to some extent relevant, but also away on the focus of this research as it concentrates more on marketing principles (Laurence & Oliver...). In search of the theories relevant to this study socio-ecological model was found. The social, ecological model helps to comprehend the factors that are affecting behaviour and also present directions for making a successful program through community environments. This perspective highlights numerous stage of influence with inspiration that behaviour both form and shape by the social environment through public and community policy, organizational, individual and interpersonal. (Laurence & Oliver...).

Moreover, social modelling theory is discussed and it is found in the work of Albert Bandura, who considers that general knowledge is a consequence of lifting or duplicate what others do. The social modelling theory stresses the significance of external support, and permit learning to take place independently without support or strength. Social practice theory is another perspective that more and more being useful in the investigation of human Behaviour (Bandura 1986). The essential insight of the theory is the acknowledgment that human practices that comprise several ways of doing thing are themselves actions of different consistent fundamentals such as knowledge, norm, values, physical activities, meanings that form different sorts of human action physical and mental activities, norms, meanings, technology use,

knowledge, which form peoples actions or behaviour as part of their daily life (Reckwitz 2002). Another theory review of this present study is cognitive dissonance theory by Festinger, 1957 (Texas & Station 2012). This theory assumes that when people perform something that infringes their vision of themselves, this reason, to a scratchy condition of conflict that stimulates a modification in either behaviour or attitudes.

Evolutionary psychology theory is another theory review by this current research. The theory is of the opinion and suggests that human behavioural inclination are at slightest partially inherited and have been influenced by the course of natural selection. Self perception theory is another theory discussion which emphasizes that we study ourselves in the similar behaviour that we study others, and illustrate conclusions in relation to what we want and what we dislike (Cosmides & Tooby 1989). On the other hand self verification theory centred on people's needs to be identified and understood by others. The major statement is that once people developed tightly and held philosophy concerning themselves, they come to wish that others, look them as they look themselves (Chen, English & Peng 2006). Social exchange theory which found to be closely related to this current study assumes that human interactions are based on logical choice and cost benefit investigation. If one colleague, for example expenses start to overshadow his or her profits, that individual likely to abscond the relationship, particularly if there are high qualities substitute available (Cropanzano 2005).

Respondent Learning theory, Operant Conditioning theory, attribution theory, drive theory, elaboration likelihood model, observational learning theory, schemata theory,

social comparison theory, social penetration theory, social emotional selectivity theory, social justification theory, the theory of household behaviour and terror management theory with assumption that human mortality causes anxiety and dismay, and that a great deal of human behaviour be as a barrier against this dismay. All those theories and model discussed are very important to the study of human behaviour. But those that are closely related and relevant to this current study were chosen to serve as underpinning theories of this research.

## **2.8 Underpinning Theories**

Based on the understanding and readings from the theories, those that are used to underpin this study are chosen. These theories are the health belief model, the theory of planned behaviour and the behavioural theory of health. A criterion for writing theory in research provided by Creswell (2007) is strictly followed to come out with a theory that suits this study. The first criterion by Creswell (2007) is to first define what theory is because in every research, a theory is needed. It facilitates us to constitute our facts, so as to compose justifiably the basic relations involving particular experience within and across the precise area by using solid and concrete sets of information whose possibility can be experienced by individual activities and judgment (Neuman, 2007; Krieger, 2001).

According to Neuman (2007) social and behavioural sciences, believes on conceptual, theoretical and observational empirical point. It is given that theory is a key in complete justification, particularly with regard to social and behavioural guide in the study of human health (Ted et al., 2002). For a better understanding, it is good and important to know what the theory is. According to Krieger (2001) a theory is a

set of organized variables or concepts, description and hypothesis or propositions that present a logical analysis of phenomena by detail connections among variables, with the intention of elucidation natural occurrence (Krieger, 2001). Amzat (2009) argue that a theory is just a common sense view.

This study, therefore, adopts some theoretical stance. The theoretical stance adopts to guide the focus of this study are provided. They are Health Belief Model, Theory of planned behaviour and the behavioural theory of health. This study required the adoption of several theories. Because of the belief and assumption bordered in the field of social science research that, to achieve the objective of providing answers to a research problem is beyond a single theory (Krieger, 2001). It is in the view of this assumption that several theories are needed in order to examine, observed, identify, and understand the problem of malaria in relation to household behaviour.

### **2.8.1 Health Belief Model (HBM)**

One of the theories used in this study is the Health Belief Model (HBM). It was developed according to Nejad et al (2005) by Godfrey Hochbaum and his friends in the 1950s. In order to find out and understand public participation in health screening activities in the United States of America public health service. This was to examine if members of the society decide to involve in healthy activities to eradicate, reduce or prevent the occurrence of disease. Health Belief Model in combination with other theories was used by Amzat (2009) to study home management of childhood malaria and treatment failure among mothers of under five in Offa, Nigeria. It was also used by Hazavehei et al. (2007) to study the control of osteoporosis disease among middle school girl scholars in Garmsa, Iran. Similarly, Family Health International also

applied Health Belief Model (HBM) in various studies of HIV/AIDS, breast cancer, hemorrhagic fever and several other studies of handling food behaviours.

Moreover, Nejad et al. (2005) in combination with reasoned action theory adopts the health belief model as a theoretical stance to understand dieting and fasting among female university student in Australia. In general, sociologists and anthropologists widely used health belief model with other theories to study health and illness behaviour. Health Belief Model (HBM) holds the idea that, believes about perceived threats of a disease or beliefs about vulnerability to illness and perceived effectiveness of the treatment is to be modified variables. This simply shows that the higher perception about the danger of the disease and also the perceived benefits or the outcomes of using that action results to the possibility of taking positive health action. Therefore, with particular reference to this study of the influence of household behaviour on malaria control, the rationale and logic behind Health Belief Model (HBM) is that, if an individual member of the society perceived malaria as a risk to human beings there is possibility for him/her to take health related practices to control the breakout and spread of the disease. However, if he or she, on the other hand, does not perceive malaria as a serious threat to human he/she may likely to pay no attention in taken any action or decision to protect the occurrence or reduce the incidence of the disease.

Applied to this study, the theory expects independent variables household behaviour, to influence and explain the dependent variable malaria control. According to Anderson et al., (2010) Health Belief Model (HBM) lies on the following assumptions;

1. Perceived Seriousness: this is the idea about the harshness of the disease and illness as well as conviction concerning the trouble a disease would generate or the consequence it would contain in life generally.
2. Perceived Susceptibility (Risk): it is belief with the intention of as soon as people are at risk or danger of an infection; they will be more probably to do something to put off disease from occurrence.
3. Perceived Benefits: this is the individual judgement of the importance or effectiveness of a new behaviour in lessening the danger of developing an illness. An individual is likely to accept a technique to manage disease and when they convinced that it is suitable in managing the disease.
4. Perceived Barrier: For the new behaviour to be accepted and implemented, an individual required to have faith on the new actions.

It is in view of the above assumptions that Health Belief Model (HBM) is one of the theories used by medical sociologists and anthropologists in different studies. To evaluate, explain and predict several health and illness behaviour (Anderson et al., 2010). However Health Belief Model (HBM) faces some challenges as stated by Kinderman et al. (2006) in the study of illness belief about schizophrenia. Similarly, the theory fails to explain social variables from health behaviour looking into the fact that human beings as social animals whose actions including that of health is influenced by social variables. Therefore, as the theory fails to cover whole for health, illness and disease prevention, there is a need for another theory. In the case of this study, the Health Belief Model (HBM) is used to examine the household

behaviour generally concerning their knowledge and perception about malaria control.

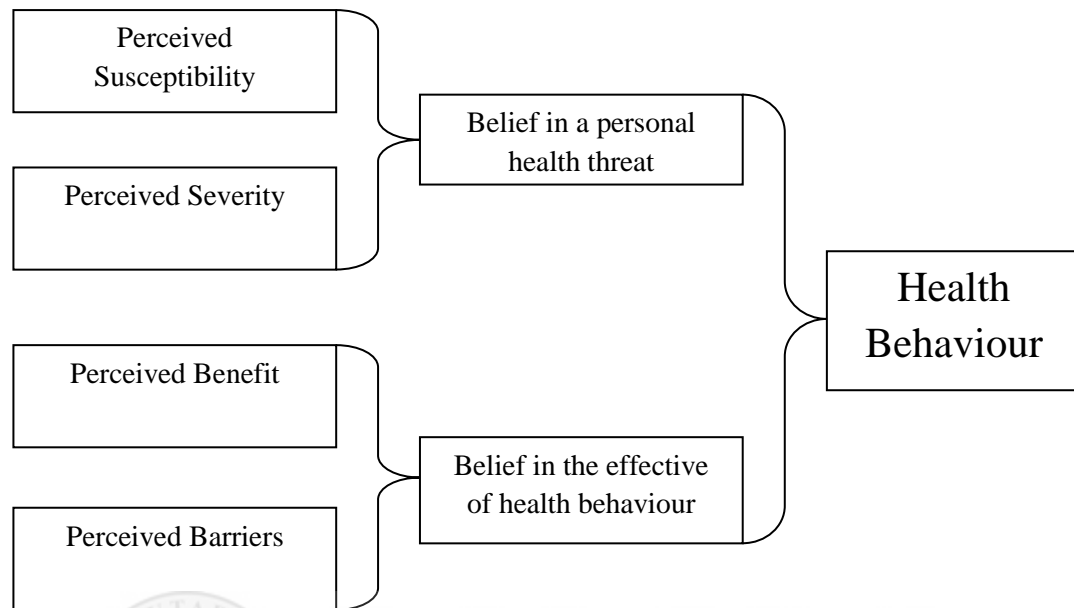


Figure 2.1 Health belief model

Source: Munro et al. (2007).

### 2.8.2 Theory of Planned Behaviour (TPB)

Ajzen developed the Theory of Planned Behaviour (TPB) in 1988. The premise of the theory suggests a model that can determine and assess how human behaviour directed and as well predicts the incidence of a particular behaviour. The Theory of Planned Behaviour is an expansion of the previous Theory of Reasoned Action (TRA). Both of the theories have been developed and adequately used in HIV/AIDS research. The theories centre on an issue that lead to a particular intention to act, or behavioural intention, which the Theory of Planned Behaviour (TPB) rests amid the behaviour and attitudes.

According to the theory of planned behaviour, behavioural intention is strong-minded by the following:

1. Attitudes in the direction of behaviour, determined by the conviction that an exact behaviour will contain a solid effect and the assessment of this consequence.
2. Biased standard norms, or the idea on whether other significant individuals will endorse one's behaviour, in addition to the person inspiration to fulfil with the prospect of others.
3. Apparent behavioural control, strong-minded by the faith concerning access to the resources required to take steps and do something successfully, in addition to the perceived achievement of these resources.
4. Socio-demographic variables and behaviour that state and form attitudes, biased norms and apparent behavioural control. These factors are similar to that of the Health Belief Model (HBM).

The theory of planned behaviour was used by Campbell and Mzaidume (2001) to study health promotion among sex workers in a South African mining community and provided positive results. The theory is also used by Meyer-Weitz et al. (2000) in South Africa to study the support of friends and partners for South African adolescents to attend STD clinics. The theory of planned behaviour approach is also used by Meyer-Weitz and her friends (2000) motivate opinions of management and self-efficacy in bargaining with sexual colleagues or clients to make use of condoms.



The limitation of the Theory of Planned Behaviour (TPB) is a possible over emphasis on these emotional factors, at the same time as underrated structural aspects like inadequate access or availability of resources possessions. Therefore, given such a behavioural theory is added to complement it.

### **2.8.3 Behavioural Theory of Health Services**

The behavioural theory of health care developed in the 1960s by Andersen. The model is intended to forecast and give an explanation of the human behaviour in the use of health services programmes founded on a sequence of empirical studies. It informed to understand why the behaviour of household use or fail to use health services (Andersen, 1995). The progress of this model is influenced and pressure by the current faith in behavioural science discipline predominantly in the field of sociology. Equally, the behavioural theory posits that societal features influence household behaviour. Such as physical condition, services programme at a person and organisational level. Widespread transformation and revolution in medical knowledge and expertise influences behaviour. Shared norms associating to the explanation and behaviour of health and illness frequently act together with individual performer to influence human behaviour to search for and involved in health practices (Estrada, Treviño, & Ray, 1990).

The behavioural theory hypothesized several predisposing factors in which individual and household members influence their behaviour to involve into health seeking practices. However, in the case of this study we are going to look only at those factors that are of relevance in this research. This theory assumes that factors like occupation, family size, education, social status as well as belief and attitude

influence human behaviour to involve into health practices to achieved individual and societal health (Andersen, 1995). The theory belief that the behaviour of individual with less of those factors is more likely to participate less and seek not to adopt health seeking behaviour (Andersen, 1995). For instance Amzat (2011) in a study on the assessment of progress of malaria control found those factors positive. Similarly, Amzat and Omolola (2009) in a survey of community model for malaria in sub-Saharan Africa found some of those factors as significant aspects of influencing behaviour. Especially modern health services initiatives. The theory also assume that individual with optimistic thinking and attitudes toward the health programmes and who think that sickness required necessary medical consideration be further expected to look for and involved in health behaviour (Taylor & Biglan, 1998).

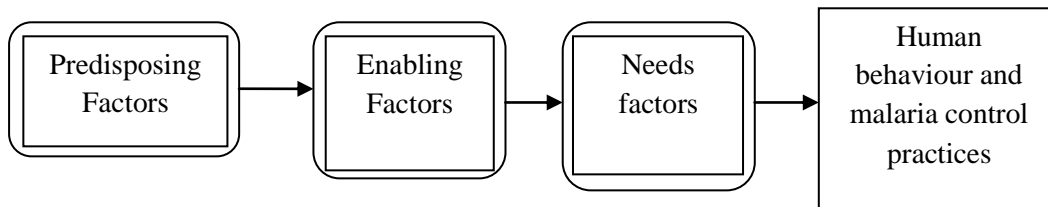
According to the behavioural theory even though those factors discuss earlier have their influence on individual behaviour in one way or the other. But individual use, seek or involve into health seeking practices only when the services and programmes are available or if they have resources at their disposal to do so (Andersen, 1995). Behavioural theory emphases on the enabling factors which serve as a determinant of whether individual or household members permit or barred to use those services and involved in such behaviours. Those factors according to this theory determined in terms of individual or household location (rural or urban areas), household features, socio-economic background as well as the social standard of doing things. Those are more closely related to influence household behaviour in health care seeking behaviour. For example local norms and belief concerning how medicine is practising can influence individual or household members health behaviour in the community (Estrada et al., 1990). The rural/urban differences largely influence the

accessibility and availability of health programmes and services in terms of human personnel and resources.

Moreover the theory is of the opinion that direct access to health facilities and presence of programmes could influence individual behaviour. In general the predisposing factors (belief and attitudes, social status, family size, education, employment etc), the enabling factors (urban or rural location, household features, socio-economic background etc) as well as the need factors (perception of disease) combine to influence the household behaviour.

The behavioural theory is widely acknowledged as one of the most structure and most used human behaviour model on health care services. This theory was used by Abu-Mourad et al. (2008) in Gaza Strip, Palestine to examine the patient's use of primary health services. Furthermore, Zhang (2007) used the theory in his doctoral thesis of preventive health services among adults in Australia. According to Taylor and Biglan (1998) the behavioural theory is today extended and transformed to used in the study of traditional medicine. It is also used in home management of diseases particularly in the traditional African societies (Taylor & Biglan, 1998).

It is in view of the hypothetical assumptions of the theory that researchers in the area of medical sociology suggested its relevance. They used it to the understanding of the behavioural aspects in disease and control (Amzat, 2011). Therefore, behavioural theory of health care fits as the relevant theory of this study to understand the influence of household behaviour on malaria control and prevention in Zamfara state north-west Nigeria. Below is the diagram of behavioural theory.



*Figure 2.2* Behavioural theory of health

Source: Andersen (1995).

#### **2.8.4 Rational Choice Theory (RCT)**

Another theory relevant to this study is Rational Choice Theory (RCT). The theory started off and developed in the field of economics (Scott, 2000). The economics regularly used Rational Choice Theory (RCT) to study foresee and understand market behaviour (Scott, 2000). An account or some forms of Rational Choice Theory (RCT) have developed and acquire a high distinction in another discipline apart from economics. The theory gets a general recognition ranging from sociology, geography, political science, psychology and education (Scott, 2000).

The theory of Rational Choice in sociology was developed by sociologist George Homans, who in 1961 placed the straightforward framework for exchange theory, which he grounded in traditions drawn from developmental, social psychology (Owumi, 2013). Through the 1960s and 1970s, additional theorists (Blau, Coleman, and Cook) extended and made this framework a greater and facilitated to improve a more proper ideal of rational choice. For many years, the rational choice theorists have become gradually and carefully work out in mathematical form. Marxists too,

have come to realize and see rational choice theory as the foundation of a Marxist theory of class and exploitation (Owumi, 2013 & Ulen 1999).

The theories of economics see the methods in which the manufacture and sharing, of goods and services, are planned through money. In sociology, rational choice theorists (like George Homans) have claimed that the same overall principles can be used and apply to understand or comprehend human behaviour and relations where time, material, agreement, and esteem/respect are the resources being exchanged (Owumi, 2013). According to this theory of rational choice, individuals are encouraged by their subjective needs and ends and are motivated by individual desires. Cited in Polycarp (2013), Rational Choice Theory (RCT) believed that since it is not possible for persons to achieve all of the numerous things that they need, they must make choices related to both their objectives and the means for them (Owumi, 2013; Polycarp, 2013 & Ulen, 1999). It is believed that individuals must anticipate in advance the outcomes of other courses of action and analyze which, among available actions will be better and best for them. Given the above, the rational individuals take the course of action that is more likely to provide them with the highest and utmost satisfaction.

One important element and general assumption in rational choice theory are the belief that all action is basically (fundamental) “rational” in character. This differentiates it from other methods of theory since it rejects the existence of any types of action additional than the purely rational and calculative (Hechter & Kanazawa, 1997). It maintains that all societal action shall understood as rationally motivated. Furthermore, essential to all systems of rational choice theory is the

notion that complex social phenomena can be clarified and understood in terms of the individual activities that lead to that phenomena. This is what rational choice sociologists termed as methodological individualism, which believes that the fundamental unit of social life is an individual human action (Owumi, 2013; Scott, 2000; Ulen, 1999).

The Rational Choice Theory (RCT) is believed to be an important escort leading to the setting of public and social policy (Ulen, 1999). The theory applied by Yankuzo (2012) to study the socioeconomic determinant of the utilization of vaccination services in Gusau metropolis, Nigeria. The rational choice theory also used in the study of the choice of health care services in the treatment of malaria by Owumi 2013. According to Hechter et al. (1997) any argument that takes actors and their aims as basis, and then developed in relation to the explanation of how the given actors examine the goals leads to systematic trends in perceived social behaviour is considered as rational choice (Hechter et al., 1997). In rational choice theories, individual are seen as encouraged by the desires, wants or aims that express their likings. The rational choice theory applied in understanding the health seeking behaviour and different health care practices (Hechter et al., 1997).

To comprehend the significance of rational choice theory to this sociological study of the influence of household behaviour on malaria control, the theory is used to understand the following fundamental questions; first what decides the choice of available control measures? Second, does the people's culture touch their health? Third, what would you do differently if the services are not available? Lastly, why would people choose alternative preventive care? The importance here is that how

people make choices in disease prevention, a significant part of human conduct. According to Scott (2000) the rational choice theory formed around the belief that human actions is primarily 'rational' and that people determine the possible or expected cost and benefits of every action before determining what to do (Scott, 2000). The rational choice sociologists are united on the foundation of the following philosophies as follows;

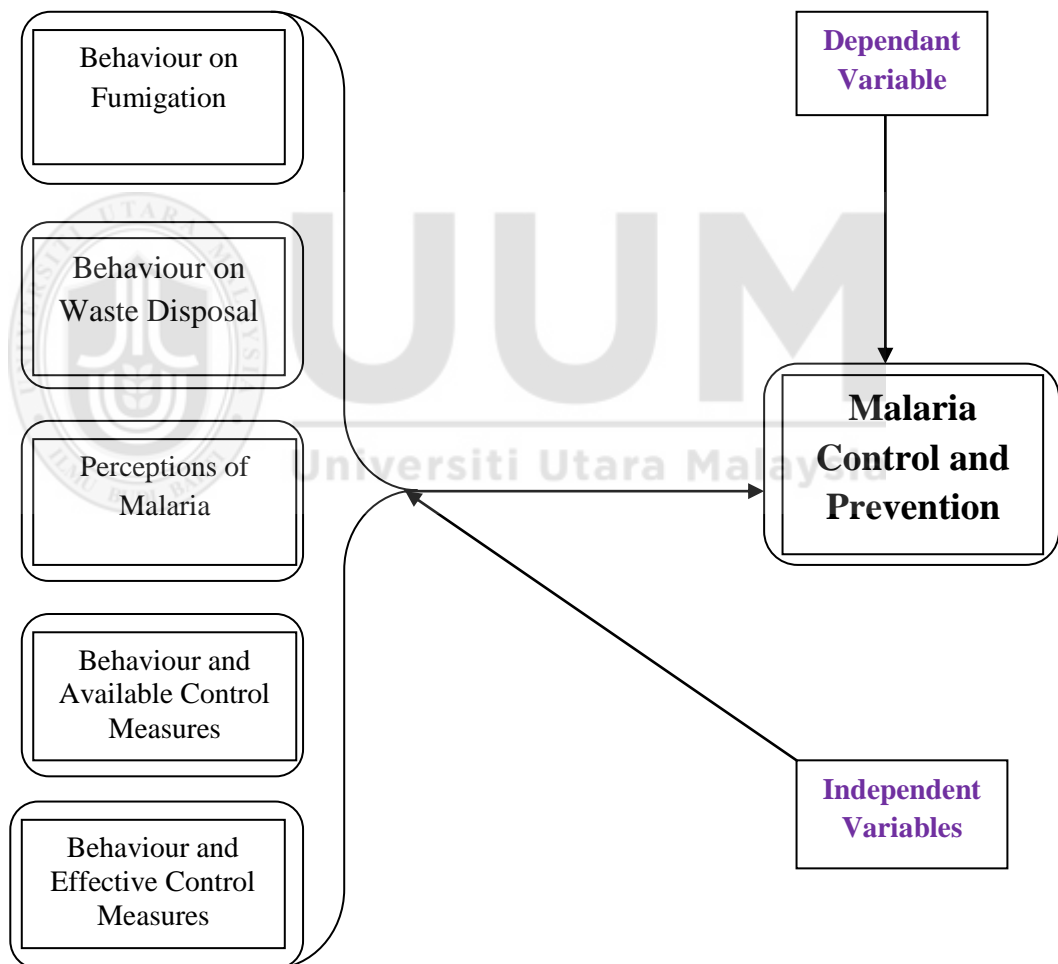
1. Human beings are seen as rational being who act reasonably
2. People are attentive decision makers whose activities are meaningfully influenced by the cost and benefits.
3. Most rational choice sociologist's concentrate on social rather than individual actions.

In line with the theoretical assumption provided by rational choice theory, that person determines the possible cost and benefits of every action before determining what to do, it is postulated that this theory would provide an explanation of the influence of household behaviour on malaria control in Zamfara state north-west Nigeria.

## **2.9 Theoretical Framework**

The health belief model is applied to be the overall framework of this study. The four constructs such as perceived benefit, perceived barriers, perceived susceptibility and perceived seriousness contained in the framework used to explain household behaviour about understanding and definition of disease. Those constructs integrate numerous assumptions of several theories explaining household behaviour and

perception on malaria control and prevention. In line with empirical and theoretical evidence discussed above this current study comes out with an appropriate research model. The assumption of this present study is that the variables contained in this model must be taken care of for effective malaria control and prevention. The research model illustrates the five independent variables directly to dependent variable malaria control (see Figure 1.1 below). Those variables and their items are investigated and empirically validated by this current study.



*Figure 2.3* Research model

The above framework demonstrates the role of household behaviour on environmental fumigation, waste disposal control, perception on malaria as well as



availability and effectiveness of control measures to malaria control. The importance of the relationship between health and environmental fumigation has long been established. This was particularly noticed at the turn of the last century, 20th century, by the seminal contributions of Rene Dubos (1968), Thomas Mckeown (1976), John B., and Sonjo Mckinlay (1975) cited in Ityavyar and Gusau (1990). In their separate findings, these scholars arrived at conclusions now widely accepted. According to them, the environmental fumigation has a more profound impact on the health of individuals.

Similarly, the framework established the role of waste disposal control and its relationship with malaria. Literatures indicate that there are several other studies showing specific effects of certain environmental measures on morbidity and mortality in different settings. In Egypt, Chandler in (Ityavyar & Gusau, 1990) found that cases of *ascaria* were reduced by the provision of borehole, latrine, improved water supply and better refuse disposal methods (cited in Ityavyar & Gusau, 1990). Similarly, in Costa Rica, the building of privies helped to reduce by 50% the cases of death resulting from diarrhea and enteritis Schliemann in (Ityavyar & Gusau, 1990). Studies by Van Zijl and by Azurin and Alveros in some developing countries equally underscore the significance of environmental sanitation on health. According to Azurin and Alveros, the provision of sanitary facilities for human waste disposal can reduce the incidence of cholera, malaria and other vector diseases by 76% (cited in Ityavyar & Gusau, 1990).

Perception about the disease is one of the powerful instruments in promoting household to adopt healthier behaviour. The greater the household perception about

the risk of the disease, the greater the likelihood of household engaging in health behaviours to decrease the risk of the disease. According to Das, de Wit, Vet, and Frijns (2008) people perception about the vulnerability is what prompts them to engage into health care seeking practices. This finding is supported and guided by health belief model.

Furthermore, the above model shows the influence of available and effective control measures on malaria control. This is also explaining by behavioural theory for health services. This theory assumes that factors like occupation, family size, education, social status as well as belief and attitude influence human behaviour to involve into health practices to achieved individual and societal health (Andersen, 1995). The theory belief that the behaviour of individual with less of those factors is more likely to participate less and seek not to adopt health seeking behaviour (Andersen, 1995).

## **2.10 Hypothesis Development**

Based on the theoretical and hypothetical assumptions that have been confirmed and validated by previous researchers empirically (Belcher et al., 2005; Maes & Louis, 2003; Campbell & Mzaidume, 2001; Courtenay, 1998; Ajzen, 1988; Ajzen & Fishbein, 1977), hypothetical assumptions of this current research have been formulated for further experimental investigation and validation. The current research contains three constructs that are to be tested and validated quantitatively. Those constructs include behaviour with respect to environmental fumigation, behaviour with respect to waste disposal, and household perceptions of malaria as independent variable and malaria control as the dependent variable. It is as a result of

such that the hypotheses of this current study have been formulated for further examination.

The first hypothesis posits that a relationship exists between household behaviour with respect to fumigation of environment and malaria control. Ityavyar and Gusau (1990) as well as Owoeye and Omole (2012) affirmed that human behaviour with respect to the environment has additional deep impacts on the physical conditions of individuals and has shown exact effects of environmental behaviours on morbidity and mortality in diverse settings. Atieli *et al.* (2009) found that sanitation practices and the nature of the environment have profound impacts on malaria prevalence and mosquito density. This is a perspective that this current study also examines. Coleman *et al.* (2009) indicated that a strong relationship exists between malaria and the nature of environmental conditions. This study argues that countries and nations that are malaria-free or with fewer malaria crises have taken adequate care of environmental fumigation. Household behaviour with respect to fumigation of environment has been found to influence malaria control practices. That is to say, if household members and authorities show adequate concern for fumigation practices malaria cases are likely to be reduced and that the opposite is also true. The above statement justifies the formulation of the first hypothesis shown above.

The second hypothesis postulates that a relationship exists between household behaviour with respect to waste disposal and malaria control. Improper household behaviour related to waste disposal is the leading cause of malaria (Owoeye & Omole, 2012; Ityavyar & Gusau, 1990). Haque *et al.* (2010) found that environmental factors like pools of stagnant water, bushes, heaps of garbage and

poor housing conditions encouraged the incidence of disease. Alemu et al. (2011) proposed that sanitation practices (such as proper waste disposal) should put in place in targeting vector breeding sites. The aim of doing so is providing a lasting solution to malaria that hampers the quality of life and health status of the people living in malaria endemic settings. Perterson et al. (2009) found a significant relationship between sanitation activities and malaria for poor housing conditions that encouraged mosquito breeding. Thus, the hypothesis of the relationship between waste disposal and malaria were formulated and will be tested in this study.

The last theoretical statement of this current study posits a relationship between household perceptions and malaria control. Chen et al. (2006) found that perceptions about hepatitis prompted people to vaccinate against hepatitis B in an effort to decrease the risk of the disease. Das et al. (2008) found that the greater the household perceived risk, the greater the likelihood of the household engaging in health behaviours to decrease the risk. Halkitis and Hoff's (2005) study concluded that perceptions about cancer motivated people to use sunscreen to prevent skin cancer.

To better understand the relationship between household perceptions and the malaria control health belief model (Courtenay, 1998) revealed that perception of increased risk was linked to household health behaviours and also to decreased risk of unhealthy household behaviours. Mullens, McCaul, Erickson and Sandgren (2004) found that the perception of threat recurrence increased the likelihood of behaviour change in people previously treated for the malaria disease. Janz and Becker (1984) proposed that perceptions about the disease are one of the strongest measures in

prompting people to adopt healthier behaviours. The following hypotheses are proposed to achieve the objectives of this study. They are:

**H<sub>1</sub>:** There is a relationship between household behaviour with respect to fumigation of environment and malaria control

**H<sub>2</sub>:** There is a relationship between household behaviour with respect to waste disposal and malaria control

**H<sub>3</sub>:** There is a relationship between household perceptions and malaria control

## **2.11 Conclusion**

This chapter critically examined the related literature of this study. It reviews some studies related to human behaviour, malaria control and prevention in different geographical locations across the world. This chapter also discussed the underpinning theories, theoretical framework and hypothesis development for this study. The next chapter three of this study is methodology.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Introduction**

The previous chapter discussed the review of literature and theories related to this study. This chapter focuses on research methodology used for this current study. The chapter discusses research paradigm, research design, research settings, population and sampling, instrumentation, pilot test and results as well as a method of both quantitative and qualitative data collection and analysis then concludes.

#### **3.2 Research Paradigm**

This study utilized a mix mode approach to explore and find out the influence of household behaviour on malaria control. The use of both the quantitative and qualitative methodologies is necessary to encompass the different aspect of human household behaviour and malaria control. According to Maheu-Giroux (2013) to address human behaviour and their responses to malaria control and management, a mixed methodology is necessary. According to Bryman and Bell (2006), the paradigm most commonly utilized in social science research is positivists; post-positivist, interpretative and critical social theory. The quantitative methodology uses in this study share its philosophical foundation with the positivist paradigm (Bryman & Bell, 2007). The positivists arose from the philosophy identified as logical positivism and is based on prediction, rules of logic and measurement (Sekaran, 2003).

The qualitative methodology shares its philosophical foundation with the interpretative paradigm that supports the view that there are many truths and multiple realities. This paradigm focuses on the holistic perspective of the person and the environment which is today widely used by social science researchers (Sekaran, 2003). Therefore, this research found it necessary to combine the quantitative and qualitative that is a positivist and the interpretative paradigm respectively. The blending of both paradigms provided the researcher with the ability to analyze the scientific data statistically while also recognizing the complex social and emotional factors that influence human household behaviour and malaria control. The following sections elaborate and describe the methodological paradigms applied in this study.

### **3.3 Research Design**

The current study employed a quantitative and qualitative method (explanatory mixed methods research design) to answer the research questions and also to achieve the objective of the study. This method of study is used during the research to understand and find out the extent of issues that not be solved or answer using one method. Creswell (2007) reported that combining quantitative and qualitative method in a research offers a widespread understanding of the scope and subject matter of the study compare to using either quantitative or qualitative technique alone. In this current study first, second and third research question is answer using a quantitative approach while questions number four and five are answered using the qualitative method. Activities involved during the research include the questionnaire distribution, collection and analysis of quantitative part of the study and interview with respondents for the other side of qualitative approach respectively. Table 3.1

provides the summary of the research questions that answer quantitatively and those that answer qualitatively.

Table 3.1

*Synopsis of Research Design*

N	Research Questions	Research Objectives	Method
1	What is the relationship between household behaviour on fumigation of the environment and malaria control and prevalence in Zamfara state, North West Nigeria?	To examine the relationship between household behaviour on fumigation of the environment and malaria control in Nigeria	Quantitative
2	What is the relationship between household behaviour on waste disposal and malaria control and prevalence in Zamfara state, North West Nigeria?	To examine the relationship between household behaviour on waste disposal and malaria control and prevalence	Quantitative
3	What is the relationship between household malaria perceptions and malaria control and prevalence in Zamfara state, North West Nigeria?	To examine the relationship between household malaria perceptions and malaria control and prevalence in Nigeria	Quantitative
4	How does household behaviour with respect to available control measures influence malaria control in Zamfara state, North West Nigeria?	To identify how household behaviour with respect to available control measures influences malaria control in Zamfara state, North West Nigeria; and	Qualitative
5	How does household behaviour affect the effectiveness of malaria control measures in Zamfara state, North West Nigeria?	To explore how household behaviour affect the effectiveness of malaria control measures in Zamfara state, North West Nigeria.	Qualitative

Source: The Researcher

### 3.4 Research Settings

The decision by researcher on where the research should conducted and carried out is very critical in conducting a successful study. According to Whetten (1989:492) *“location of study not only place a limitation on the propositions generated from a theoretical model, but also set the boundaries of generalizability and as such*



*constitute the range of the theory*". Therefore, Zamfara states in North West Nigeria were chosen as research settings.

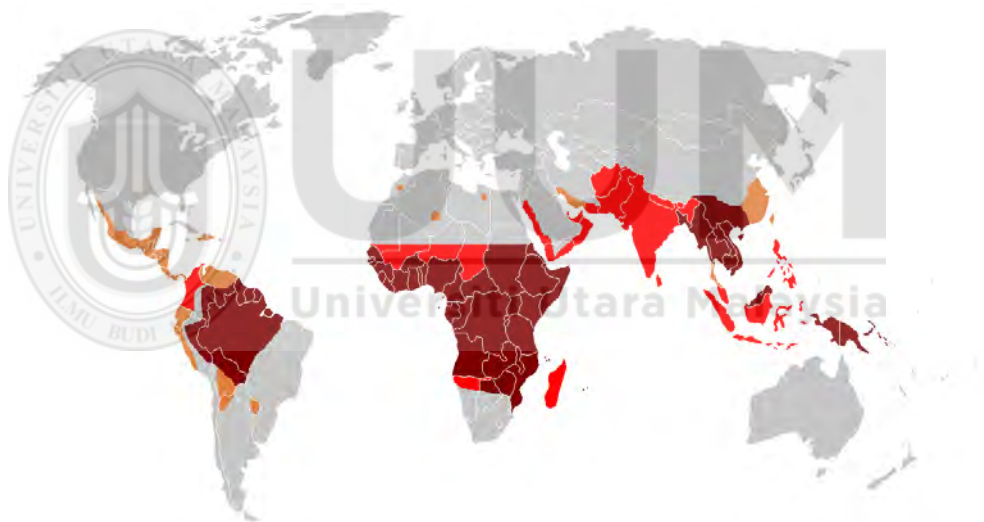
### **3.4.1 Zamfara State North West Nigeria as a Setting of the Study**

Nigeria situated in West Africa and shares land boundaries with the Republic of Niger in the north, Benin to the west and the Republic of Cameroon and Chad in the east. Nigeria has over five hundred (500) ethnic groups, but among them three (3) ethnic groups, namely Hausa, Yoruba and Ibo are dominant with the largest majority. Nigeria is the populated Black nation-state in the world, the most greatly populated country in Africa and seven most populous states in the world. According to National Bureau of Statistics (NBS), Nigeria has a population of 164, 294, 516 based on 2011 projection figure.

Environmental sanitation and waste management, including sewage treatment, deforestation, climatic change or global warming, serious oil spills are the foremost environmental difficulties in the country. This causes or results to the born of various diseases. One of such diseases is malaria. Waste management including all other environmental problems is the foundation of many problems, especially in the major cities of Nigeria. The lifestyles of the majority of Nigerians communities are behaviours of haphazard disposal of waste, abandoning of waste along or into the canals, sewage systems that are a station for water flows.



*Figure 3.1* Map of Africa showing the location of Nigeria  
Source: World Atlas



*Figure 3.2* Map of the world showing malaria-endemic region  
**Source:** Draft from Wikipedia free encyclopedia on 18<sup>th</sup> August 2013

**Map Description:** The brown and red colour in this map shows a higher occurrence of malaria and drug resistance respectively. While the ash colour shows the no malaria zones or regions in the world.

### **3.4.2 Background of Zamfara People**

The well-known people of the northern part of Nigeria are the Hausas, who largely dominated the area in terms of population. The centralized system of government in the northern region also has traditional and Islamic ways of treating various diseases and illness (Babalola, 2009). Since in the 15th century, at the time that Islam religion was gradually brought into the Northern part of the country (Nigeria) through commercial activities between Arabian merchants until the Islamic reform (jihad) of Shehu Usmanu Dan Fodio in 1804 as well as the establishment of the Sokoto Caliphate after the Islamic reform (jihad), Islamic way of curing disease run together with a Hausa medical traditional system (Fredrickson, 2004; Etkin et al., 1990).

The medical practitioners of Hausa traditional medicine include, borne setters (masu dori), practitioners like barbers, those who carry out surgical and blood operations (wanzamai). Others are practitioners in charge with illness credited to spirit (yan bori). There is also practitioners' using herbal treatment and concoction for various diseases (bokaye). Islamic scholars (mallamai) also offer cure for certain diseases perceived to be an only Allah's intervention can bring remedy (Fredrickson, 2004). The Islamic scholars (mallamai) work relies on writing texts on prophetic medicine, which is treatments using medical mineral. It comprised collection of the tradition of the holy prophet (Hadith) and some piece of the holy Qur'an related to illness which pressure the supremacy of prayer in curing diseases (Wyatt, 1980). Presently people in northern Nigeria used both the two preventive methods (Hausa and Islamic). That is, treatment using herbs and other traditions and belief in Allah alone, is the source of illness and only from Him cure comes ((Fredrickson, 2004; Wyatt, 1980).



Figure 3.3 Map of Nigeria showing the location of Zamfara state

Source: World Atlas

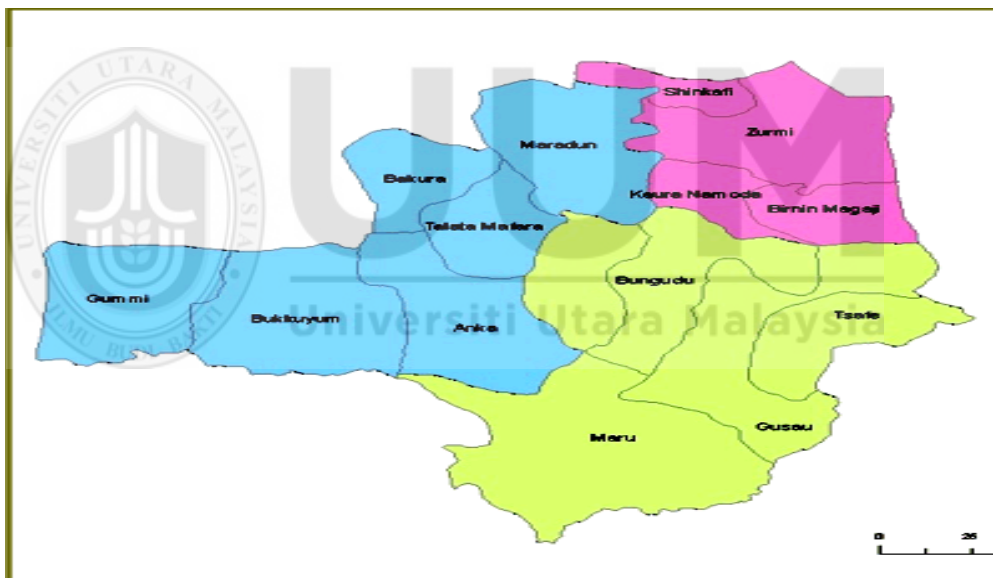


Figure 3.4 Map of Zamfara showing local government areas

Source: World Atlas

### 3.4.3 Malaria in Zamfara and justification for Choosing the Area

The area of study is chosen because of malaria incidences in the state. According to Abdullahi (2013) a medical practitioner stated that northern part of Nigeria (Zamfara included) has a high rate of mortality that is mostly caused by malaria (Abdullahi,

2013). Moreover, Zamfara state commissioner for health stated during the state malaria control annual operational plan (2014) that almost all people of Zamfara are at risk of getting malaria. Mostly affected are pregnant women and children below the age of five and household heads bears the greatest economic and social consequences as a result (state malaria data, 2012). The state Zamfara is chosen by the researcher because of the following reasons. First, because of the prevalence of the malaria in the state that makes the inhabitant of the area to be at risk. Secondly, it is an enabling environment that allows the researcher to gather all required information needed.

### **3.5 Units of Analysis**

The unit of analysis of this research is household heads and malaria control stakeholders. According to National Population Commission (2006) household comprises of a person or a group of people living together typically under the same house, who share the similar source of food and identify themselves as a societal unit. A head of household is persons who head this social unit and regarded in this current study as a unit of analysis in the quantitative aspect of this study. While household heads and malaria control stakeholders constituted the qualitative unit of analysis for this study.

### **3.6 Population and Sampling**

#### **3.6.1 Population**

Population is a total element involves in a study. Mathematically, it is usually represented as  $N$ . It is also a collection of data whose properties are analyzed. The population is the complete collection to be studied; it contains all subjects of interest.

The population includes all members of a defined group that we are studying or collecting information on for data driven decision. The population represents all possible outcomes that are of interest in a particular study (Yates et al 2008). The population of this study is household heads in Zamfara State. According to National Population Commission (2006) the population of household heads is 592,106. Each household is a social unit consists of a person or a group of people living together in a same compound with a head of household.

### **3.6.2 Sample**

The sample of this study is 384, but it has increased to 500 (refer to the end of Appendix A for a table of determining sample). This is because Adomi (2007) stated that peoples in Nigeria are reluctant to fill the questionnaire and return to the researcher. Therefore, in case of low response this study increases the sample to 500 which bring a further degree of confidence. Increasing the sample to 500 is justified by Salkind (1997) who suggested that sample should increase up to 40 percent.

### **3.6.3 Sampling Frame**

A sample is small part or quantity, intended to show what the whole is like. Mathematically sample is represented as  $n$ . According to statisticians a sample is a ration of a population, serving as the root for estimates of the characteristics of the whole population. According to Zikmund (2003) a sample is described as a subset or a portion of a larger population. Using a subset or a small portion from the part of the general population is regarded as a sampling procedure. A sampling frame has been defined before drawing or selecting a sample of the target population from which the sample is drawn or selected. According to Baker (1999) a sampling frame has been

described as a list of all elements in a whole population. In the other word listing of the entire elements or units contains in a larger population from which the sample will be drawn and selected is regarded as the sampling frame. Malhotra et al. (1999) reveals that developing accurate and proper sampling frame is a critical task a researcher may likely to taste its difficulty during the research exercise.

#### **3.6.4 Sampling Procedure**

Since this research is covered the entire local government in Zamfara state, a sampling procedure is needed for equal distribution of research instruments. To ensure the equal distribution of research instrument among the target population of this study (household heads) in Zamfara state north-west Nigeria a stratified non random sampling procedure is applied in this current study. Stratified non random sampling is sampling design applied when a population is categorized into layers, strata or classes. The basic characteristics of stratified sampling are that all the strata and sub category of the population should be represented and included in the sample (Cooper & Schindler, 2009; Saunders et al., 2009).

Some reasons justified the used of stratified non random sampling in this study despite the fact that finding cannot be generalized (Bryman & Bell, 2007; Zikmund, 2003). The first reason behind choosing a stratified sampling method was because the sampling frame could not be accessed. Similarly, looking at the large population size of household heads (592,106) in this study, stratified non random sampling procedure was used to take care of sampling error. Also, among the basis of applying this sampling method is its ability to provide homogeneity within the heads of the household heads and heterogeneity across the local government areas in Zamfara

state north-west Nigeria covered by this study (Sekaran & Bougie, 2010; Samouel & Page 2007). This type of sampling was also used in this research because of the time, financial and other resource constrain of the researcher.

There are several established procedures to apply when using stratified sampling. At the beginning of the procedure a population of the study is defined and the population of this study is 592,106 household heads (see 3.5.1). After defining the population the next is to describe the strata. The strata of this study logically are Zamfara state in north-west Nigeria. Fourteen Local Government Areas (LGAs) in Zamfara state are located. The next procedure is to share the sample across the fourteen LGAs in Zamfara state north-west Nigeria.

To determine the sample size of this study a table for determining sample size from a given population provided by Krejcie and Morgan was used. As stated earlier the sample of this study is 384, but it is increased to 500, base on the report from the 2006 National Population and Housing Census in Nigeria. This sample frame was required to represent the population of this study. This method is used to determine the representativeness of sample size in this current research to ensure the minimization of the sample error and also provide the precision and level of confidence.

Due to the peculiarity of the state that consists of rural and urban features, stratified non-random sampling is used. Zamfara state consists of fourteen local government areas. These include Gusau, Kaura Namoda, Talata Mafara, Gummi, Tsafe, Shinkafi, Bungudu, Maru, Anka, Bakura, Maradun, Bukkuyum, Birnin Magaji and Zurmi.



These local governments are divided into urban, semi urban and rural stratum according to their features. The table below describes the sample distribution across the fourteen LGAs strata.

Table 3.2

*Sample Distribution*

Category	Local Govt Area	Sample Distribution	Total
Urban	Gusau	36	108
	Kaura Namoda	36	
	Talata Mafara	36	
Semi-urban	Shinkafi	36	107
	Gummi	36	
	Tsafe	36	
Rural	Bungudu	36	285
	Maru	36	
	Anka	36	
	Bakura	36	
	Maradun	36	
	Bukkuyum	36	
	Birnin Magaji	36	
	Zurmi	36	
		<b>500</b>	

Source: The Researcher

### 3.7 Instrumentation for Quantitative Analysis

The data source of this study is a primary source of gathering information. The questionnaire is adapted to answer research questions 1, 2 and 3 and also, to achieve the objective of the study. The original items are adapted from past studies. However, these items are changed and modify to suit the content of the current study to measure the research constructs. The content of the questionnaire contained all variables and propositions of the study. Factor analysis is used to have fitted and to avoid duplication of items with the same measure. Statistical Packages of Social Sciences (SPSS) is used for the analysis of validity and reliability.

### **3.7.1 Questionnaire**

Structured questionnaires consisting a series of questions adapted from previous studies were prepared to answer research questions under quantitative study. The questionnaires is sectionalized based on the constructs under investigation and divided into five sections. Section A consists of 21 items that measure household behaviour on environmental fumigation. Section B measures household behaviour on waste disposal using 38 items. Section C also has 18 items which were used to measure household perception on malaria. Section D comprises 10 items that were employed to measure malaria control and section E consists of 8 demographic variables.

### **3.8 Scales Dimension and Development**

The 5-point Likert scales were used in this study in the designing of research instruments with anchors ranging from strongly disagree to strongly agree. The 5-point scale is unique type dimension process that allows the respondents in a given research to feel truly neutral about a particular topic of discussion. According to Dawes (2008) the midpoint introduced by this scale keep away from forcing respondents to choose the negative or positive responses (Dawes, 2008). The variables contains in the questionnaire instruments of this present study are coded by items showing statement on each item. The constructs name, statement and original source of the refine instrument were provided.

#### **3.8.1 Household Behaviour on Fumigation**

Respondents during this current study were requested to describe how true the statement in the questionnaire is describing their feelings on environmental

fumigation using 21 items selected from both health belief model and Marc (2011) care and repair behaviour on the net. The Cronbach's alpha statistics for household behaviour on fumigation scale is .898 and .900 items standard values, suggesting an adequate reliability value of the items to measure the intended construct (Hair et al 2003). Table 3.3 presents the items used to measure household behaviour on environmental fumigation and their original source.



Table 3.3

*Items Distribution to Measure Behaviour on Fumigation*

Variable	Code	Statement	Source
Behaviour on Environmental Fumigation	BF1	Fumigation as measures of malaria control is not used by household to control malaria	Forsythe, Liu, Shanno & Gardner, (2006)
	BF2	Fumigation of environment is not used by household because it is too expensive	
	BF3	Fumigation of environment is difficult to household because resources required is not available	
	BF4	Fumigation is not utilized by household because it is new which require starting new behaviour	
	BF5	Members of the household is not comfortable with fumigation	
	BF6	The household does not undertake fumigation services because they are full of other activities	
	BF7	Household have another choice important than fumigation	
	BF8	The household does not fumigate because of ignorance of where and how doing it	
	BF9	Time consuming is what makes household to not make use of fumigation services	
	BF10	Lack of information about the importance of fumigation is what makes it less use of the household	
	BF11	The Household environmental condition is not conducive for fumigation	
	BF12	Household belief about not developing malaria is what make them to not make use of fumigation	
	BF13	Feeling not at risk of malaria is what make household to not adopt fumigation	
	BF14	Fumigation is not necessary because of the believe that it does not prevent household members from future malaria occurrence	
	BF15	Household not understand the importance of fumigation with regard to malaria control	
	BF16	Household does not concern with fumigation	
	BF17	Ineffectiveness of fumigation is what affect it use by household	
	BF18	Household members does not regularly fumigate their environment	
	BF19	Believe about not dying as a result of malaria is what make household to not engage in fumigation services	
	BF20	Fumigation services/activities is very dangerous to household members	
	BF21	Fumigation of environment is not affordable to household members	

Source: Field Survey

### 3.8.2 Household Behaviour on Waste Disposal

In order to measure household behaviour on waste disposal questions used by Zamfara state malaria control office was adapted. The question was formed by Marc

Boulay (2011) and used to study net care and repair. Other items were also adapted from health behaviour constructs by Russell. The Cronbach's alpha value and items standard value for household behaviour on the waste disposal scale was .834 and .832 respectively justifying sufficient validity of the items to measure the construct. Therefore, 38 items were used as shown in Table 3.4 below

Table 3.4

*Items Distribution to measure Behaviour on Waste Disposal*

Variable	Code	Statement	Source
Behaviour on Waste Disposal	BW1	Waste disposal facilities is not available	Russell Glasgow Boulay (2011)
	BW2	There is no place reserved for dumping waste and discarded materials	
	BW3	Refuse in my house is carried out by water and filled the waterway passage	
	BW4	Refuse is dump on the street	
	BW5	Refuse is dump inside the waterway	
	BW6	Household members dump refuse anywhere they like	
	BW7	There is no provision for household to gather garbage from houses	
	BW8	Household lack purchasing power to own waste disposal vans	
	BW9	There is no concern by household members on where to dump refuse	
	BW10	It is costly to dump refuse properly	
	BW11	Proper sanitation and dumping of refuse is time consuming	
	BW12	Busy nature of household doing other activities is the reason for not dumping waste properly	
	BW13	There is other thing important than disposing waste properly	
	BW14	Household members lack the resources to dispose waste properly	
	BW15	My financial status will be in danger if I use the little I have for disposing waste	
	BW16	Doing waste disposal to gather garbage is a new behaviour to me which required a new starting point	
	BW17	There is no community concerned to make sure waste is dispose properly	
	BW18	I am forgetting to dispose waste properly	
	BW19	There is no action to gather and dispose waste regularly	

Table 3.4 (Continued)

Variable	Code	Statement	Source
	BW20	There is no household involvement in any activity regarding waste disposal	
	BW21	The level of disposing waste generally is very poor	
	BW22	There is shortage of proper waterway system which serve as conducive environment for breeding mosquitoes	
	BW23	The waterway system available is open gutters very easy to be filled with discarded materials	
	BW24	There is no proper way for waste gushing water from toilet/bath rooms	Russell E.
	BW25	The type of bathrooms/toilets use by household members does not have facilities for proper waste water passage	Glasgow
	BW26	Waterway system not properly manage by household members	Boulay (2011)
	BW27	Household members filled waterway passage with discarded materials	
	BW28	Behaviour and practices to make waterway clean and proper sanitation is low	
Behaviour on Waste Disposal	BW29	There is carelessness by the household in the provision of proper water for water passage	
	BW30	Household members does not clean waterway passage because it is time consuming	
	BW31	Lack of facilities is what makes household to clear stagnant water	
	BW32	There is no stagnant water clearance because of the busy nature of household	
	BW33	The system of toilet/bathrooms is traditional conducive for holding waste water	
	BW34	There is presence of old building structures with poor network of water passage in my area	
	BW35	I do not clear stagnant water because to me it is not cause any harm	
	BW36	Household members fails to remember the situation of waterway in the area	
	BW37	There is no activity in the area in charge of clearing stagnant water	
	BW38	There is no community commitment to ensure proper passage of water to avoid presence of stagnant water in the area	

Source: Field Survey

### 3.8.3 Household Perception on Malaria

On the household perception 18 items were used to examine respondent's feelings about their perception on malaria in Zamfara state North West Nigeria. This present study adapted questions to measure the household perception from health belief constructs and in some cases questions derived from the theory of planned behaviour provided by Russel E. Glasgow... and Francis et al. (2004). Scale of household

perception has the value of .845 reliability value. Table 3.5 show items with their code number, statement and source.

Table 3.5  
*Items Distribution to Measure Household Perception*

Variable	Code	Statement	Source
Perception on Malaria	PM1	There is no chance of developing malaria in life time	Francis et al (2004)  Russel E. Glasgow...
	PM2	There is no feeling at risk as a result of malaria in life time	
	PM3	Malaria is not a serious disease	
	PM4	Malaria is serious just if compare to other disease	
	PM5	It is not possible to contact malaria easily	
	PM6	The high risk of malaria is not encouraging behaviour to adopt preventive measures	
	PM7	Perception about susceptibility to malaria does not prompt me to seek for treatment	
	PM8	There is no change on household career as a result of malaria	
	PM9	There is no shock when thought of malaria	
	PM10	There is no feeling of life change as a result of malaria	
	PM11	Malaria is not a severe disease as far as I am concern	
	PM12	Malaria has no major consequences in life	
	PM13	Malaria is not causes difficulties to me and those close to me	
	PM14	Malaria control activities does not prevent me from future problems	
	PM15	I have nothing to gain by doing malaria control activities	
	PM16	Malaria control services is not effective	
	PM17	The price of control services is not affordable	
	PM18	Malaria control services does not decreases the chances of people dying from the disease	

Source: Field Survey

### 3.8.4 Malaria Control

Ten items were used to measure household responses of general behaviour on malaria control. The questions used to measure household behaviour on malaria control adapted from Marc Bouley (2011) and Russell Glasgow. The item's reliability statistics shows the.895 Cronbach's alpha value and .894 for Cronbach's alpha value based on items standardization. This justifies that the items are fit enough to measure the intended construct they are suppose to measure as suggested by Nunnally (1994). Table 3.6 presents the instruments, codes their statement and source used to measure household behaviour on malaria control.

Table 3.6

*Items Distribution to Measure Household Behaviour on Malaria*

Variable	Code	Statement	Source
Behaviour on Malaria Control	MC1	There is a major environmental concern in the area	Marc Bouley (2011) & Russell Glasgow
	MC2	Poor behaviour on environmental issues increases the prevalence of malaria	
	MC3	Level of knowledge does not influence household behaviour on malaria control	
	MC4	Household cultural values influence their behaviour on malaria control	
	MC5	There is no household commitment on fumigation	
	MC6	There is no motivation for household members on bad water treatment	
	MC7	The general behaviour of household members on waste disposal is poor	
	MC8	There is no cooperation by household to control malaria	
	MC9	There is no team work by household members to control malaria	
	MC10	There is no assistance by household members to control malaria	

Source: Field Survey

### 3.9 Pilot Test

A pilot survey is conducted to test and check the length, sequence and consistency of the research instrument. The content of the questionnaire and its clarity are tested during the investigation. The pilot test is necessary to discover any weakness in wording and format so that correction is made before the actual study so that to ensure validity and reliability of the instruments before the actual study.

#### 3.9.1 Validity of Instruments

Validity according to the American Educational Association, American Psychological Association and National Council on Measurement in Education (1985) is referring to how well a test measures what it is supposed to measure. Validity discovers that the measure seems to be considering the intended concept under study. To avoid the level of doubts this study strictly adheres to measure the



validity of the instrument both in terms of predictive, construct and context validity. Cronbach's alpha was used in this research to measure the validity of instruments.

### **3.9.2 Reliability of Instruments**

Reliability test of instruments in this current study conducted purposely to minimize a large set of variable into interpretable, convenient and understandable set of factors. AERA, ASA, and NCME (1985) see reliability as step to which an assessment instrument yields stable and consistent result. Reliability in this regard, therefore, is to ensure that the instrument measures are restricted from error. To ensure the reliability of the instrument, this present study makes use of Cronbach's Alpha of SPSS to test the reliability of the instrument. This study accepted 0.06 values as recommended by Sekaran (2003) to determine the reliability of instruments.

### **3.9.3 Result of the Pilot Test**

A pilot study was conducted to determine the reliability and validity of measures. During the pilot test 60 questionnaires distributed among household heads in Zamfara state, particularly in Gusau. Out of those 40 questionnaires was returned. Data collected in the pilot first entered into excel. The missing value is filled and then transfer to SPSS (Statistical Packages of Social Science). Therefore, SPSS version is used and analyzes validity and reliability. Cronbach's Alpha coefficient is employed in the pilot study to find out the internal reliability of scale items via the investigation of the average inter-item correlation. According to Nunnally (1994) all Cronbach's Alpha coefficients above 0.60 is believed to be good enough for item reliability. In this pilot test, Cronbach's Alpha is the approach used to assess the

reliability of household behaviour on malaria control. The behaviour on fumigation scale consisted of 21 items, and its Cronbach's alpha value is .900 (see Table 3.7), which is considered to be a satisfactory reliable.

In respect of behaviour on waste disposal, the construct has the total number of 38 items. The results in that case established that the Cronbach's Alpha value based on standardized items is .832 which is considered sufficient base on Nunnally (1994) recommendation. Similarly, household perception on malaria construct has the total number of 18 items. Cronbach's Alpha value based on standardized items shows the significance of .845 levels, which is enough to justified acceptable level of validity and reliability as suggested by Nunnally (1994). Finally, general behaviour on malaria control latent construct has the number of 10 items in its totality. The reliability statistics reveal the Cronbach's Alpha value of .894 which is considered an acceptable value for testing the reliability of instruments. Table 3.7 shades more light.

Table 3.7

*Result of Pilot*

Construct	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Behaviour on Fumigation	.898	.900	21
Behaviour on waste disposal	.834	.832	38
Perception on malaria	.845	.845	18
Malaria control	.895	.894	10

Source: Field Survey

### 3.10 Quantitative Data Analysis

Smart PLS statistical software 2.0 was used to describe and test the strength and association between variables in the research model. There are several reasons that motivated the researcher to employ PLS path modelling which is also a justification for chosen the software for analysis in the present study. Those reasons are justified as follows:

1. One of the most important reasons for choosing PLS path modelling for quantitative data analysis is being it user friendly and also friendly to the present study. Compared to other statistical software's for data analysis such as AMOS, smart PLS provides to the client the power to predict the relationship between variables in the model (Hair et al 2009).
2. According to Chin (1998), despite the fact that PLS path modelling share related features to conventional regression method, however, smart PLS has the further significance of assessing the association among variables and connection between indicators and their related latent constructs at the same time (Chin 1998).

Quantitative data analysis started by first enters data collected to excel software later transfer to SPSS. The SPSS is used to screen and clean the data collected which make the data fitted for PLS analysis. The stages follow during the analysis include bootstrapping process. Specifically, missing value analysis, normality test and multicollinearity test are observed. Others include non-response bias, common method variance test, the assessment of model, individual item reliability; internal consistency reliability; convergent validity and discriminate validity. Other processes

include assessment of variance explained in the endogenous latent variables ( $R^2$ ); assessment of effect size ( $f^2$ ) and the assessment of predictive relevance ( $Q^2$ ).

### **3.11 Qualitative Design**

Qualitative research is a method of investigation engaged in different academic disciplines, traditionally in sociology, and many other social and administrative sciences. Qualitative research aims to collect an in-depth understanding of social behaviour and the causes of such behaviour. The qualitative research technique explores the why and how not just what, where and when. According to Kalthum (2008) qualitative research provides a means to access immeasurable proofs about social phenomena. It is also offered a chance to discover the outcomes of the study and transmit or link them to literature.

Sekaran (2003) discourse that qualitative research design incorporate extensive use of verbal and developing full information on comparatively few cases. It has also provided accurate information from social event and provide conclusions from the available data. This comparative power makes qualitative research great and most importantly, its ability to complement the quantitative counterpart, especially in the mixed mode study like the present one. Recent studies similar to those that used a mixed method includes; Das et al (2013), Mubyazi (2012), Akachi et al (2011), Hlongwana et al (2009). The methods are used to answer research questions 4 and 5.

#### **3.11.1 Reasons for Qualitative Method**

Qualitative research design according to Creswell (2007) is used in a situation where knowledge, information, data, facts are not available or insufficient about the

phenomenon under investigation, for example if there is an absence of valid and reliable measures of variables available. Based on this justification qualitative research is believed to be the solution that researcher employs to explore on the topic under investigation. In this present study qualitative study is used purposely for the following grounds based on Creswell (2003):

- 1 To disclose and make details of the phenomena and to achieve in-depth understanding of the research subject. In this current study it was set to achieve in-depth understanding on the situation of availability and effectiveness of malaria control measures and their influence to household behaviour.
- 2 To consider the importance of research questions in the practical and realistic situation
- 3 To enhance the strength of research findings and also to attain a better off clarification of result from the study.

### **3.12 Instrumentation for Qualitative Analysis**

#### **3.12.1 Semi-structured Interviews**

Semi-structured interview is used to answer research question four (4) and five (5). Semi-structured interview is conducted to explore the influence of household behaviour on available and effective malaria control measures in Zamfara state North West Nigeria. The interviews are conducted with 20 respondents that participated in the study. Among the interviewee are household members across the state and malaria control stakeholders. Various agencies, department NGOs at the local and international level are successfully interviewed, but their names withheld due to

confidentiality issue. Due to the high profile and tight schedule of some interviewees, the length of interview differs greatly among the participant. However, none among the interview conducted last less than 15 minutes. All interviews are recorded and afterwards transcribe, coded based on themes derived from each research question.

### 3.12.2 Respondents for Semi-structured Interview

Interview respondents that participated in this present study are selected. Those selected include experienced household heads and some stakeholders handling the malaria issues. Such as World Health Organization office in Zamfara state, Zamfara state malaria control office, international partners/donors and some selected Non-Governmental Organization (NGOs) working on malaria in Zamfara. These respondents are selected because of the assumption that they are in a position to provide comprehensive information on the issue of household behaviour on available and effective malaria control measures.

Table 3.8

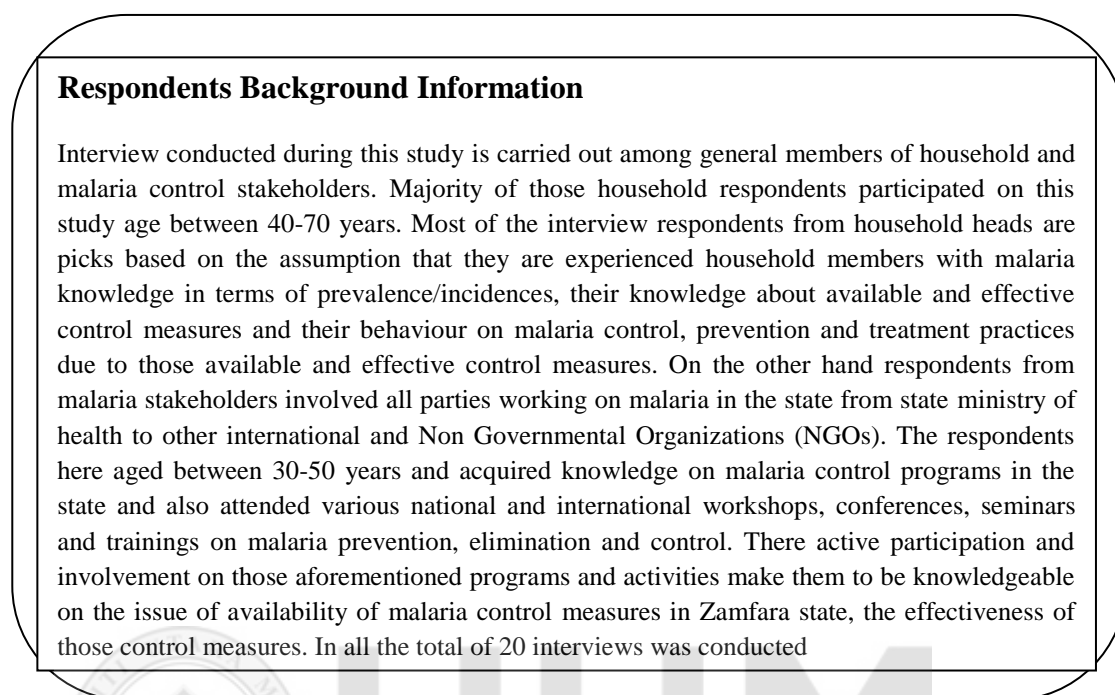
*Categories of Interview Respondents*

Organizations	Number of Respondents
Household Heads Members	12
Malaria Control Stakeholders	8
<b>Total</b>	<b>20</b>

Source: The Researcher

Table 3.8 provides the total number of an interview conducted with respondents in this current study. To make it very specific and clear, informative and profile background of the participants of the study is briefly provided. A brief background of the qualitative respondents shows their relevance as participants of this current study to provide information to be of great importance to answer research question four

and five and also to achieve the objectives under those questions. The information is presented in the following figure.



*Figure 3.5 Respondents background information*

### **3.13 Qualitative Data Analysis**

Data analysis refers to interpretation and presentation of data collected. Qualitative data analysis lacks separate rules or guide as known in the quantitative method. The choice of method of analysis is, therefore, a matter of interest which depends solely and guided by research question (Creswell, 2007). Nvivo software package is used to assist the researcher in data arrangement. The task of analysis lies on the investigator's shoulder. Therefore, this study record data transcribed and types it in Microsoft word to make it readable and interpretation of the result is provided.

### **3.14 General Data Collection Procedures**

Data collection for this study started after all the corrections and an observation raised during proposal defense was addressed and certified by supervisor, reviewers

and graduate school. The whole field exercises are carried out from July to November 2014. Quantitative data collected through questionnaire administration to the respondent's household heads members. Before the commencement of the field work an introduction letter was requested from Ghazali Shafie Graduate School of Government (GSGSG). The introduction letter was presented to Zamfara state research ethical committee of the ministry of health. The committee directed the community leaders to allow and possibly assist the researcher to access targeted population.

### **3.15 Conclusion**

This chapter highlights some key methodological procedures adopted by this study. The chapter discussed research paradigm, research design, research setting, population and sampling, instrumentation, pilot test and results as well as a method of both quantitative and qualitative data collection and analysis then concludes. The next is Chapter four, the influence of fumigation, waste control and perception on malaria control and prevention.



## CHAPTER FOUR

### INFLUENCE OF FUMIGATION, WASTE CONTROL AND PERCEPTION ON MALARIA CONTROL

#### 4.1 Introduction

This chapter discusses the results of quantitative data using Partial Least Squares (PLS) path modelling. The chapter discusses the response rate, non response bias analysis, common method variance test and data screening and preliminary analysis. Under data screening missing value analysis, normality test and multicollinearity test are discussed. The chapter also examines respondent's demographic information and descriptive analysis of the latent constructs and assessment of measurement model. In the evaluation of the model, individual item reliability; internal consistency reliability; convergent validity and discriminate validity are discussed respectively. Furthermore, the chapter discusses the assessment of the significance of the structural model. Under it an evaluation of variance explained in the endogenous latent variables ( $R^2$ ); assessment of effect size ( $f^2$ ) and the assessment of predictive relevance ( $Q^2$ ) is discussed respectively. Then, the chapter presents a summary of the findings. Cross tabulation analysis to support hypothesis result and influence of social factors and household behaviour on malaria control are presented.

#### 4.2 Response Rate

Based on the Krejcie and Morgan (1970) table for determining sample, the sample of this study is 384. However, due to the fair of low response the study sample has increased to 500 as suggested by Salkind (1997). The totals of 500 questionnaires are

distributed to household heads across the 14 local government areas in Zamfara state Northwest Nigeria. To achieve high response rates, this study employed research assistants. Part of their assignment is to assist the respondents to fill the questionnaires and also to gather completed instruments from the respondents (Traina, MacLean, Park, & Kahn, 2005; Sekaran, 2003). The response rate for this study based on Jobber's (1989) explanation stood at 76% response rate, and this shows the 24% non-response rate. Therefore, the response rate of this study is considered fit for the analysis in this research as recommended by Sekaran. Sekaran (2003) suggested that a minimum of 30% response rate in survey research is enough for the analysis.

#### **4.3 Non-Response Bias**

Non-response bias is a condition where persons selected for the sample are reluctant or unable to partake in the study. Non-response bias is a biased that comes when respondents vary in significant ways from non-respondents (Lambert & Harrington, 1990). However, the non-response rate is not an issue in this current study. Because the study's response rate is 76% rate as stated earlier, which, according to Sekaran (2003) is considered, fit for the analysis in this research. Due to the response rate of 76% and non-response rate of 24%, the issue of non-response bias does not emerge to be a major concern in this study (Kreuter et al., 2011; Jordan et al., 2011).

#### **4.4 Common Method Variance Test**

Common method variance (CMV) is the degree of a bogus relationship among variables. Normally, common method variance is a study to measure each variable. There is a consensus among scholars that CMV may lead to wrong conclusions about

relationships between variables by increasing or reducing findings (Conway & Lance, 2010; Podsakoff et al., 2003). Some technical solutions provided to limit the effect of common method variance is carried out by this study (Mackenzie & Podsakoff, 2012). Assessment minimization is one of the key solutions put in place as respondent is informed to feel free in filling the questionnaire. Respondent inform that there is no correct or incorrect answer and assured that the information gathered will be solely for the purpose of academic research and confidentiality is highly guaranteed. Unclear statement in the research instrument are taken care and any difficulty arises concerning information in the questionnaire were solved through the support of research assistants. For further improvement, this study makes use of the straightforward, precise and short statement. This is done in this study to reduce biases in the process and also improve scales of the items.

Harman's single factor analysis suggested by Podsakoff and Organ (1986) are carried out together with technical solution mentioned above to look at CMV. In this method usually all constructs under investigation is subject to proving factor testing. This is done in order to determine the number of factors that is needed to describe the inconsistencies in the variable as stated by Podsakoff and Organ (1986).

In compliance with Podsakoff and Organ (1986), all items in this research are also subject to main component factor analysis. The outcome of the investigation produced four factors explaining a cumulative of 62.7% variance amid first major factor explaining 27.7% of the whole inconsistency which is lower than 50% rate. This shows that no single factor handles the majority of inconsistencies in the

predictor and standard variables. Therefore, CMV is not a fear in this study. For that reason is unable to increase the association among variables assessed in this study.

#### **4.5 Data Screening and Preliminary Analysis**

Before the actual data analysis of this study, preliminary data screening is conducted. The main purpose is to discover a potential breach of any relevant assumption concerning the analysis technique used in this research. According to Hair et al. (2007) data screening is very critical, but on the other hand assists the researcher to know very well the data at hand before the actual analysis. Hence this study strictly adheres to preliminary data screening.

The 409 return instruments are coded and entered into Excel than to the SPSS. Missing value analysis, normality tests, and multicollinearity test, were firmly conducted before applying multivariate analysis process, suggested by Hair, Black, Babin and Anderson (2010). The following table provides summary of the trials, their results and purposes of conducting such analysis.

Table 4.1

*Summary of Data Screening Analysis*

Type of Analysis	Purpose of Analysis	Results of Analysis
Missing value	The purpose of the missing value analysis is to validate data. In this study missing value analysis allow the researcher to uncover missing data patterns using SPSS software with main objective to compute data missing, draw more valid conclusions and remove hidden bias to make the data clean and set for PLS analysis	The entire missing point is .16% that is below 5% for statistical inference. This study uses median to replace data missing points
Normality	The purpose of normality is to verify, confirm and prove the normality of data information already gathered.	Normality analysis result portrays that data gathered from the current research go along a standard pattern because all the bars on the graph is within the normal curve. See fig. 4.5.2
Multicollinearity	The purpose of multicollinearity in this study is simply to find out a condition whereby exogenous latent constructs turn to be very extremely correlated.	Multicollinearity analysis reveals that correlations between the exogenous latent constructs is satisfactorily less than the recommended edge values that imply that the exogenous latent constructs is independent and not extremely correlated.

Source: From Result Analysis

**4.5.1 Missing Value Analysis**

This study contains 35,583 data sets in the original SPSS data points. Out of those 35,583 data points, 55 are missing randomly. The entire missing point is .16%. The missing points by constructs show that behaviour on fumigation has 12 missing points while behaviour on waste disposal has 25 missing points. At the same time, perception of malaria and malaria control behaviour has 15 and 3 missing points respectively. Researchers like Tabachnick and Fidell (2007) agreed that 5% and below is not a significant value.

Therefore, there is no considerable percentage of missing values in the data points of this study that allowed to make a valid statistical inference with .16%, which is lower than approved 5% or below. Researchers have agreed that replacing missing values is best done using median if the missing points is below 5%, hence this study use median to replace data missing points (Tabachnick & Fidell, 2007). Table 4.2 shows the total and percentage of missing values.

Table 4.2

*Percentage of Missing Values*

<b>Construct</b>	<b>No. Missing Value</b>
Behaviour on Fumigation	12
Behaviour on Waste Disposal	25
Malarial Control	15
Perception on Malaria	3
<b>Total Percentage</b>	<b>.16%</b>

Source: Field Survey

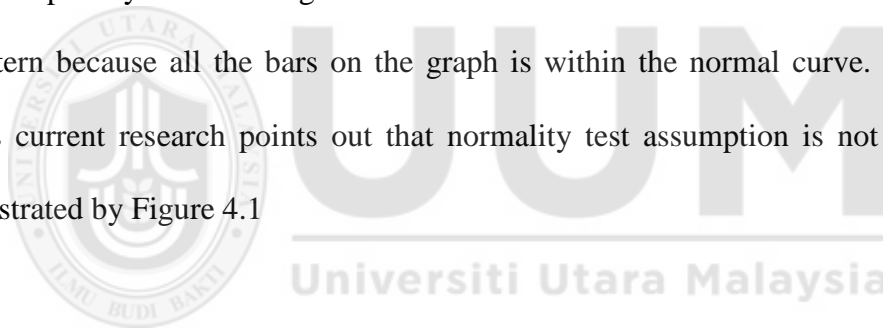
#### 4.5.2 Normality Test

Studies by Reinartz, Haelein and Henseler (2009) have traditionally thought that PLS-SEM present a precise and correct model of assessment of abnormal conditions with a very extreme situation, though this statement may possibly become bogus. A study by Hair et al. (2012) recommended that a normality test for data collected should be conducted by researchers. Chernick (2008) stated that a highly distorted data information can blow up the bootstrapped standard error assessment and in consequences miscalculate the statistical importance of the path coefficients respectively.

Tabachnick and Fidell (2007) emphasized the use of graphical means for normality test. Therefore, the current research is making use of the graphical technique to

verify, confirm and prove the normality of data and information already gathered. It is recommended by Field (2009) that a sample of a significant size of 200 and above is better to look at the shape distribution graphically instead of seeing the value of the skewness statistics. Furthermore, Field (2009) highlight that significant sample size reduces the standard errors, which, as a result, pump up the skewness statistics. This is enough to justify the basis for using graphical not statistical means of normality test.

In this research, a histogram and normal probability plots are observed to guarantee that normality statement not tainted as suggested by Field (2009). The following figure portrays that data gathered from the current research followed a standard pattern because all the bars on the graph is within the normal curve. Accordingly, this current research points out that normality test assumption is not tempered as illustrated by Figure 4.1



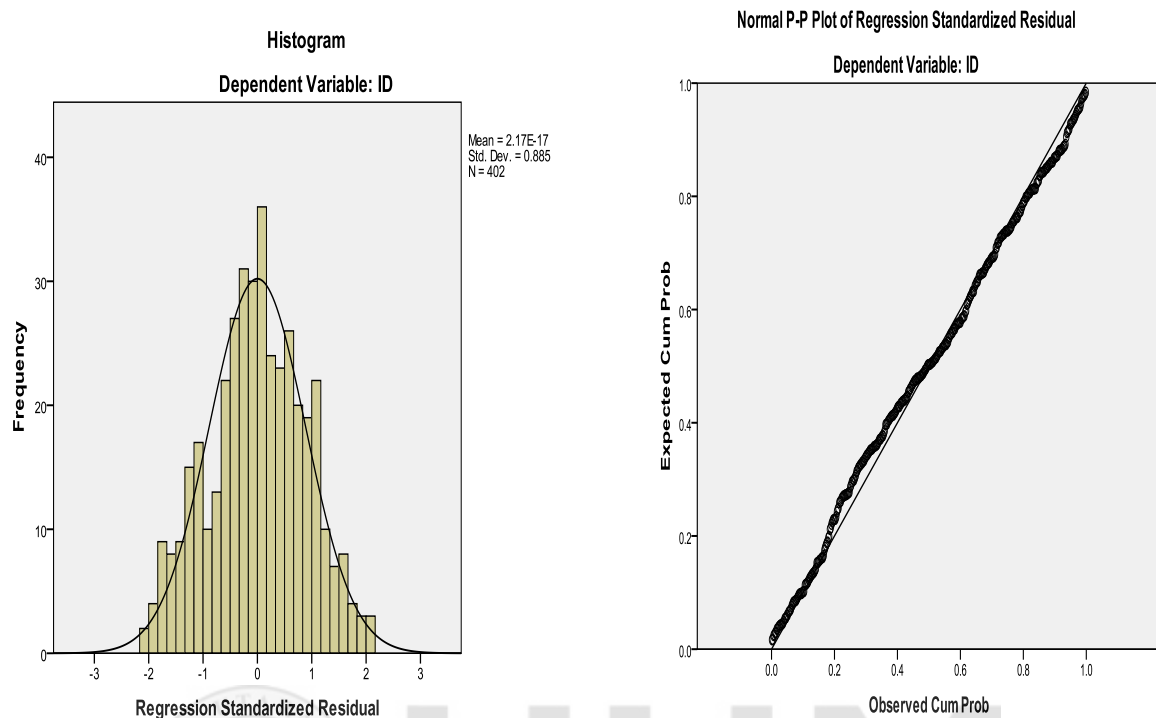


Figure 4.1 Histogram and normal probability plots

#### 4.5.3 Multicollinearity Test

Multicollinearity simply means a condition whereby exogenous latent constructs turn to be very extremely correlated. According to Tabachnick and Fidell (2007) the existence of multicollinearity with the exogenous latent constructs can largely distort the assessment of regression coefficients and their statistical relevance analysis. Multicollinearity, in particular, produces large standard errors of the coefficients, which in reverse make the coefficients statistically irrelevant (Tabachnick & Fidell, 2007).

This study adopts two means to discover multicollinearity as suggested by Lai (2012). At the beginning, the correlation matrix of the exogenous latent constructs is observed. A correlation coefficient of 0.90 and beyond shows multicollinearity



among latent constructs as highlighted by Hair et al (2010). Table 4.3 illustrate the correlation matrix of all exogenous latent constructs

Table 4.3

*Square Root of AVE and Correlations of Latent Variables*

<b>Construct</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1. Behaviour of Fumigation	<b>.712</b>			
2. Behaviour on Waste Disposal	.626	<b>.715</b>		
3. Malarial Control	.672	.648	<b>.720</b>	
4. Perception on Malaria	.813	.577	.664	<b>.709</b>

Note: The diagonal (in bold) are the square root of the AVEs; non-diagonal elements are latent variable correlations.

Source: Field Survey

Table 4.3 shows that correlations between the exogenous latent constructs is satisfactorily less than the recommended edge values of .90 and above, which imply that the exogenous latent constructs is independent and not extremely correlated.

Meanwhile, after the assessment of the correlation matrix for the exogenous latent constructs, Variance Inflated Factor (VIF) acceptance rate and condition index is studied to understand and solve the issue of multicollinearity. According to Hair, Ringle and Sarstedt (2011) multicollinearity issues arise if tolerance rate is below .20 and if VIF value is greater than 5. Table 4.3a, b and c demonstrated clearly the tolerance rate and VIF values for the exogenous latent constructs (BF, PM and BW) respectively.

Table 4.3a

*Collinearity Test*

	<b>Collinearity Statistics</b>	
	Tolerance	VIF
(Constant)		
Behaviour on Waste Disposal (BW)	.671	1.490
Perception on Malaria (PM)	.671	1.490

Table 4.3b

*Collinearity Test*

	<b>Collinearity Statistics</b>	
	Tolerance	VIF
(Constant)		
Behaviour on Fumigation (BF)	.610	1.640
Behaviour on Waste Disposal (BW)	.610	1.640

Table 4.3c

*Collinearity Test*

	<b>Collinearity Statistics</b>	
	Tolerance	VIF
(Constant)		
Perception on Malaria (PM)	.338	2.955
Behaviour on Fumigation (BF)	.338	2.955

Source: Field Survey

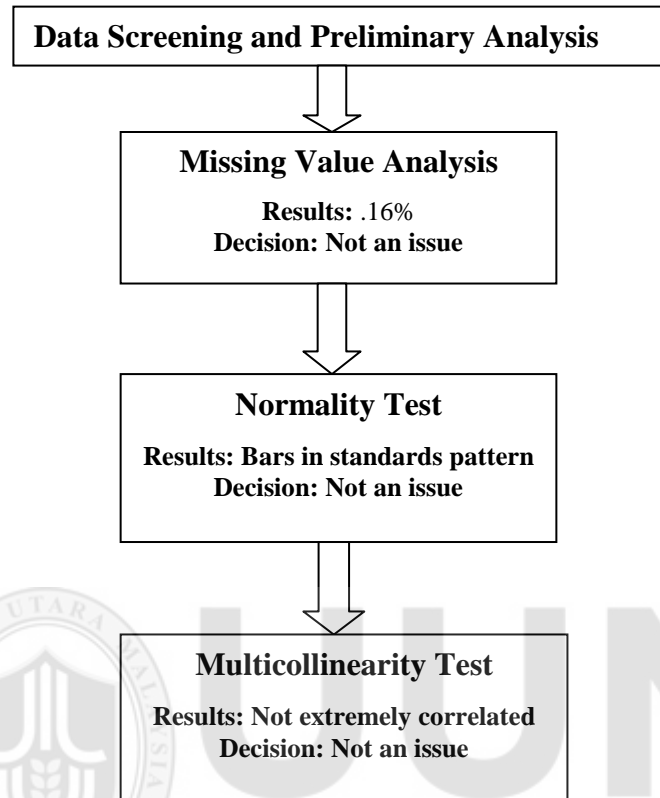


Figure 4.2 Process of data screening test

Source: PLS-SEM Analysis

The above figure shows the process and steps carried out for data screening and preliminary analysis. The figure also provides the results of each process and decision under it. In general the data screening and preliminary analysis reveal that data of this study are screened, clean and satisfy to carry out for further investigation.

#### 4.6 Respondents Demographic Information

This section reports the respondent's demographic information in the sample. The demographic variable in this current study are gender, age, income, educational status, occupation, religion and tribe. In the analysis of respondent's information,

missing values are not replaced. This study choice not to replace missing cases because of the doubt it may create. This is illustrated in Table 4.4.

Table 4.4  
*Sample Characteristics*

		Frequency	Missing	Total
Gender	Male	334		402
	Female	67	1	
Age	[30-40]	197		402
	[41-50]	104		
	[51-60]	63		
	[61 above]	34	4	
Income (in '000 naira')	[10-20]	74		402
	[20-30]	136		
	[30-40]	71		
	[40 above]	84	37	
Educational Status	Non-formal education	81		402
	Primary education	12		
	Secondary education	178		
	Tertiary education	115		
	Others	0	16	
Occupation	Civil service	85		402
	Business	184		
	Farming	87		
	Others	41		
Religion	Islam	373		402
	Christianity	18		
	Traditional	8		
	Others	3	0	
Tribe	Hausa	345		402
	Yoruba	19		
	Igbo	23		
	Others	12	3	

Source: Field Survey

Table 4.4 provides overall results of the demographic variables of this current study from SPSS analysis output. To make it easy for the reader this study provides a specific discussion on each demographic variable. Refer to Appendix D for simple frequency and percentage and also a pie chart diagram of the demographic

characteristics of the respondents. On the respondent's gender, the study shows that 334 of the respondents representing 83.1% are males. The remaining percentage comprises the other information about the respondents' gender. At the respondents' age, the study shows that 197 of the respondents are within the range of 30-40 years. This age category takes 49% of the total while other age background shares 51%. This study shows that the greater part of household heads in Zamfara state North West Nigeria that engage during this study are grouped within the most vibrant and productive age group. Refer to table 4.4 and Appendix D for detail information.

Moreover, on respondent's monthly income, the current study shows that 136 earned 20-30 thousand Naira monthly. This represents 33.8% of the respondents, while other income background responses have 66.2%. Furthermore, on the respondent's level of education, this study shows that 178 (44.3%) of the respondents received a secondary education while remaining respondent's educational background has 55.7%. It is explained in this present study that the majority of the respondents that participated in the research are able to receive education up to secondary school level. See table 4.4 and Appendix D for the complete analysis result on the profile of the respondent educational status and background.

On respondent's occupation, analysis from the present study also indicates that 184 of the respondents representing 45.3% engage in business. Refer to Table 4.4 and Appendix D for the frequency and percentage of the rest of respondent's background on occupation. Similarly, result from the analysis shows the distribution of respondents based on their religion. Majority 373 (92.8%) of the respondents are Muslims. On the respondent's tribal status, this study reveals that the majority of the

respondents 345 (85.8%) is from Hausa tribe. Table 4.4 and appendix D provides a detail explanation on the background of each demographic variable characteristic.

#### 4.7 Descriptive Analysis of the Latent Constructs

Descriptive analysis of the latent variables is the main discussion dominated this section. Descriptive statistics that comprise means and standard deviations for the latent constructs are calculated. The latent constructs include behaviour on fumigation, behaviour on waste disposal, malaria control and perception of malaria. The entire latent constructs of this research are considered using a five-point Likert scale from 1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree to 5 – Strongly Agree. For the proper understanding of the descriptive analysis in this study refer to Table 4.5

Table 4.5  
*Descriptive Statistics*

Construct	N	Mean	Standard Deviation
Behaviour of Fumigation	402	3.774	.883
Behaviour on Waste Disposal	402	3.904	.848
Malarial Control	402	3.837	.838
Perception on Malaria	402	3.676	.921

Source: Field Survey

Table 4.5 presents the descriptive statistics of the constructs. The table shows that the mean and standard deviation of construct behaviour on fumigation is 3.774 and .883 respectively. It implies that respondents tended to have above moderate level and not up to the highest level in terms of their behaviour on fumigation. Similarly, behaviour on waste disposal has 3.904 and .848 of mean and standard deviation, respectively. It explained the level above moderate and level below highest of household behaviour on waste disposal. Moreover, the analysis shows that 3.837 and

.838 are the mean and standard deviation of malaria control, representing above a moderate level of behaviour. Furthermore, the result also shows the above moderate level of perception of malaria with 3.676 mean and standard deviation of .921.

#### **4.8 Assessment of PLS-SEM Path Model Results**

Despite the fact that PLS is the latest SEM method, PLS SEM has been occupied by an increasing number of researchers from diverse disciplines. From strategic management, management information system, organizational behaviour and many other art and social science disciplines. However, several authors indicate that using PLS path models with fake data, is not appropriate for model justification. This is because it cannot distinguish valid models from invalid ones as highlighted by Hair, Ringle and Sarstedt (2013). Looking at the growing uncertainty on the inappropriateness of PLS path modelling in model validation, this research looked at the possibility of overcoming them. This issue is solved after following the procedure established by Ringle, Henseler and Sinkovics (2009).

According to Ringle, Henseler and Sinkovics (2009), there are two procedures to follow in order to report and evaluate the results of PLS-SEM. According to Hair et al., those two procedures include the assessment of the measurement model and evaluation of the structural model. Under the assessment of the measurement model, individual item reliability; internal consistency reliability; convergent validity and discriminate validity are assessed. The second stage is the assessment of the structural model. Under it variance explained in the endogenous latent variables ( $R^2$ ); effect size  $f^2$  and predictive relevance ( $Q^2$ ) were also assessed and evaluated. These two procedures are summarized in the following figure 4.3. The figure shows the

procedures of each step of the analysis, and it is complying strictly by the present study to evaluate the report and ascertain the results of PLS-SEM path analysis.

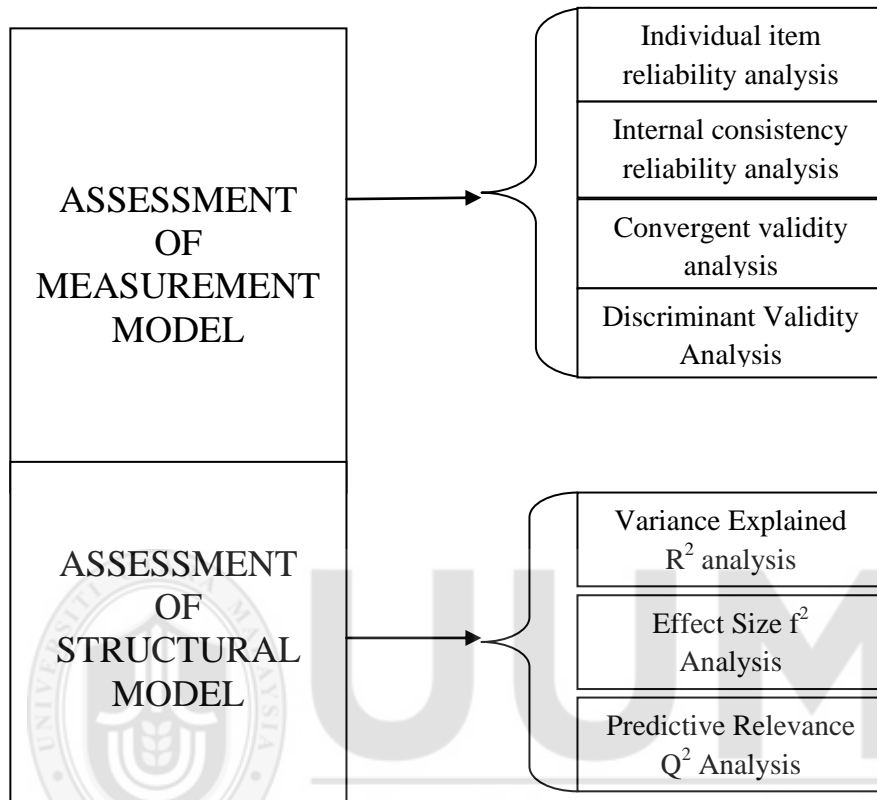


Figure 4.3 Assessment of PLS-SEM path model

Source: PLS-SEM Analysis

#### 4.9 Assessment of Measurement Model

The measurement model refers to the relation between observable indicator variable or factors and latent variables (factors). According to Hair et al. (2014) assessment of the measurement model, entails determining the individual item reliability, internal consistency reliability, convergent validity and discriminate validity. See the table below for the summary of the tests, purposes and results of the analysis conducted in this section for the assessment of measurement model.



Table 4.6

*Summation of Assessment of PLS-SEM Path Model Analysis*

Type of Analysis	Purpose of Analysis	Results of Analysis
Individual Item Reliability	Attempt to predict their behaviour is the main purpose of individual item reliability. In this study, the method of measuring individual item reliability is observing the external loadings of every variable evaluated.	The result shows the total 87 items, 62 items is removed as they offered loadings less than the brink of 0.40. Consequently, just 25 items are taken and displayed in the present model because they contained the required loadings.
Internal Consistency Reliability	The purpose of internal consistency reliability is to evaluate how well the items under examination is planned to determine the same construct generates similar outcomes.	Each of the composite reliability of the constructs in this study is greater than least required points of .70.
Convergent Validity	The essence of convergent validity is to see the extent of which two measures of constructs that, in theory, connected, should, therefore, be connected. The major purpose is to produce facts of this study ability to surely connect with other instruments that measure for similar constructs.	The result reveals that all the AVEs loading values of the constructs in this study show a rate greater than .50 on their respective constructs. This indicates that there is satisfactory convergent validity.
Discriminate Validity	The main purpose of discriminate validity is to test whether concepts or a dimension that is believed to be not related is, in fact, not related.	The result indicates that all indicator loadings in this study are more than the cross-loading, signifying adequate discriminant validity for additional investigation.

Source: PLS-SEM Analysis

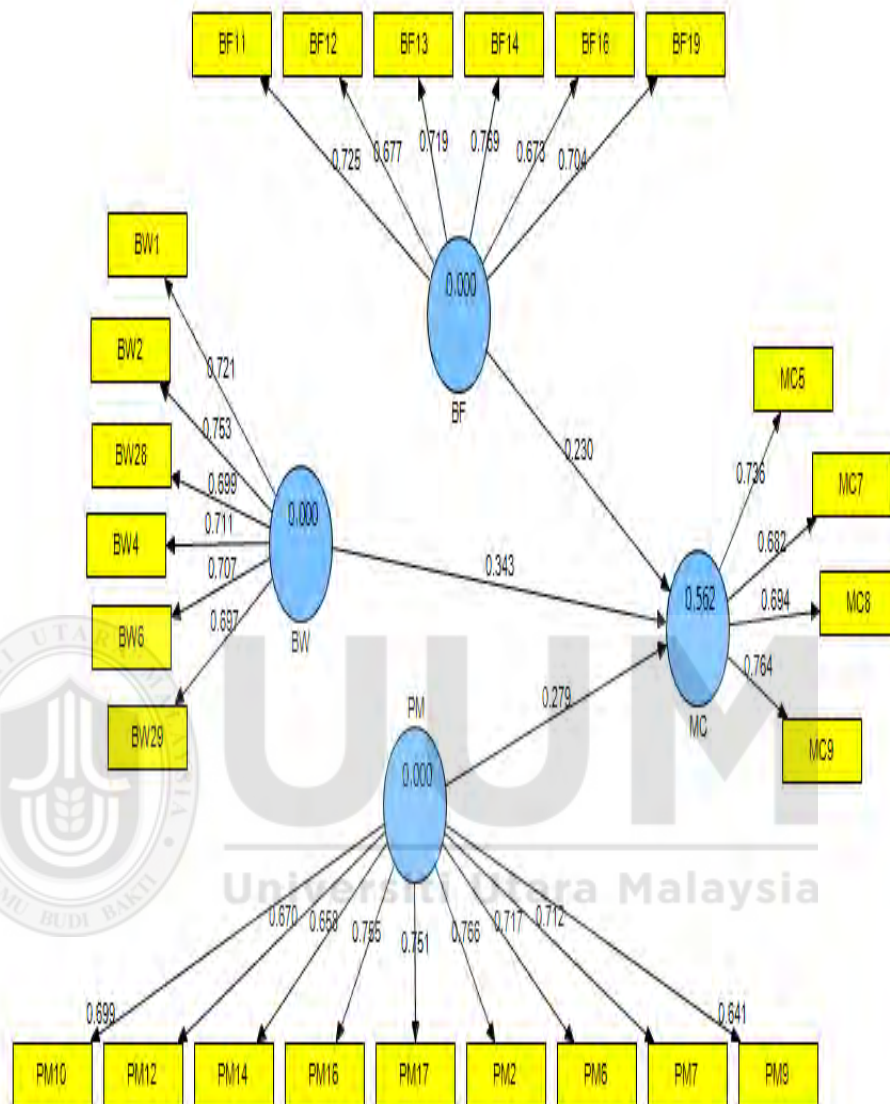


Figure 4.4 Measurement model

#### 4.9.1 Individual Item Reliability

In social science research, erratic dimensions of people's attitude or intentions will clearly obstruct efforts to forecast their behaviour. According to Hair et al. (2011), the methods of measuring individual item reliability are through observing the external loadings of every variable evaluated. Hair et al. (2014) similarly highlighted

that item with loadings below 0.40 should be deleted. To comply with rules and regulations, out of the total 87 items, 62 items are removed as they offered loadings less than the brink of 0.40. Consequently, just 25 items are taken and shown in the present model because they contained the required needed values (see figure 4.4 measurement model for more understanding).

#### **4.9.2 Internal Consistency Reliability**

According to Sun et al. (2007), internal consistency is a technique of analysis use to evaluate how well the items under examination are planned to determine the same construct generates similar outcomes. Similarly, Bijttebier et al. (2000) stated that internal consistency reliability is an assessment of how adequately the items on the investigation determine the same constructor idea. If all the items on a test determine similar construct or thought, then the analysis has internal consistency reliability. Peterson and Kim (2013) averred that Cronbach's alpha coefficient and composite reliability coefficient are widely used criteria for determining the instrument internal consistency reliability. Looking at those two methods this study finds composite reliability coefficient as more suitable to determine internal consistency reliability of instrument modified. The composite reliability coefficient is used based on the following two reasons.

The first reason of choosing composite reliability coefficient is that Cronbach's alpha may overestimate or underestimates the scale reliability. The second reason justifies using composite reliability coefficient is that it is offering a less biased approximation of reliability than Cronbach's alpha coefficient. The reason that the later believe all items give the same to its constructs without taking into account the

exact contribution of individual loadings (Peterson & Kin, 2013; Hair et al., 2011 2010).

The composite reliability with internal consistency reliability value of .70 and above should consider as acceptable for a sufficient model. An internal consistency reliability, value less than .60 signifies the lack of reliability and therefore not accepted (Hair et al., 2011). Both Peterson and Kin (2013), Hair et al. (2011) recommended that the composite reliability coefficient should be at least .70 and above. Table 4.7 shows the Items loadings, internal consistencies and Average Variance Extracted (AVE) of the constructs. The composite reliability coefficient of each construct hangs between .860, .863, .811 and .901 respectively. Each of the composite reliability of the constructs in this study is greater than least required points of .70. This is enough to justify that latent constructs in this study have sufficient internal consistency reliability, as recommended by Hair et al. (2011). Table 4.7 illustrate more.

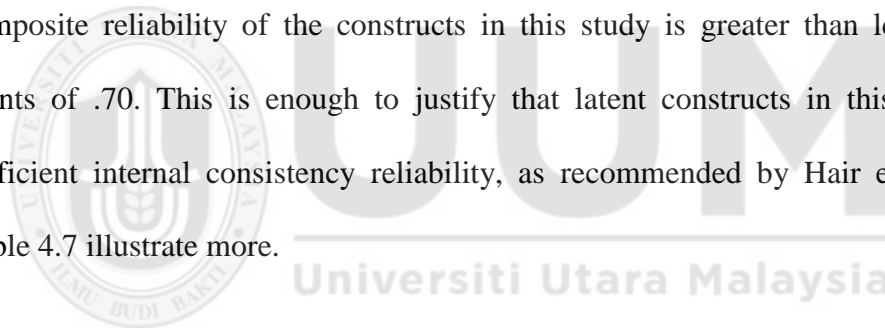


Table 4.7

*Items Loadings, Internal Consistencies and AVE*

<b>Constructs</b>	<b>Items</b>	<b>Loadings</b>	<b>CR</b>	<b>AVE</b>
Behaviour on Fumigation	BF11	0.725	.860	.507
	BF12	0.677		
	BF13	0.719		
	BF14	0.769		
	BF16	0.673		
	BF19	0.704		
Behaviour on Waste Disposal	BW1	0.721	.863	.511
	BW2	0.753		
	BW28	0.699		
	BW29	0.697		
	BW4	0.711		
	BW6	0.707		
Malarial Control	MC5	0.736	.811	.518
	MC7	0.682		
	MC8	0.694		
	MC9	0.764		
Perception on Malaria	PM10	0.699	.901	.502
	PM12	0.670		
	PM14	0.658		
	PM16	0.755		
	PM17	0.751		
	PM2	0.766		
	PM6	0.717		
	PM7	0.712		
	PM9	0.641		

Source: Field Survey

**4.9.3 Convergent Validity**

Convergent validity is a factor frequently used in sociology, psychology, and other behavioural sciences which simply means the extent of which two measures of constructs that in the theory connected should, therefore be, connected. According to Hair et al. (2007) this type of validity can recognize if two related constructs match with one another. Examining Average Variance Extracted (AVEs) is recommended by Fornell and Larcker (1981) to assess the convergent validity. According to Chin (2012), the average variance extracted loadings of each construct should be .50 and

above, to have a sufficient convergent validity. Looking at Chin (2012) suggestion all the AVEs loading values of the constructs in this study shows rates greater than .50 on their respective constructs (see Table 4.7). It indicates that there is satisfactory convergent validity and as a result, it is not an issue in this study.

#### **4.9.4 Discriminant Validity**

Discriminant validity simply means that a situation to test whether concepts or dimensions that is believed to be not related is, in fact, not related. According to Duarte and Raposo (2010) discriminant validity entails the degree to which particular construct is not consistent with other constructs. Fornell and Larcker (1981) recommended employing Average Variance Extracted (AVE) to determine discriminant validity which is complied by this study. Fornell and Larcker (1981) highlighted that discriminant validity is realized by evaluating the correlation between the latent constructs with square roots of AVEs. Similarly, another standard is established by Chin's (2012) to determine discriminant validity by evaluating the indicator loadings with other reflective indicators. Fornell and Larcker (2012) recommended that employing AVEs of .50 values and above should be considered as a minimum score of determining discriminant validity. Based on this assertion discriminant validity attains using the square root of the AVEs to be more than the relationship between latent constructs. As shown in Table 4.7 the AVEs value is greater than the correlation between constructs, which notify the attainment of the satisfactory score required.

Moreover, discriminant validity can be determined by evaluating the indicator loadings with cross-loadings. To attained sufficient discriminant validity, all the indicator loadings should be greater than the cross-loadings (Chin, 1998). Table 4.8

evaluated the indicator loadings with other reflective indicators. All indicator loadings in this study as shown in Table 4.8 are more than the cross-loadings, signifying adequate discriminant validity for additional investigation. Table 4.8: Measurement items loading and cross loading, provide more detail information.

Table 4.8  
*Measurement Items Loading and Cross Loading*

<b>Constructs</b>	<b>Items</b>	<b>BF</b>	<b>BW</b>	<b>MC</b>	<b>PM</b>
Behaviour on Fumigation	BF11	<b>.725</b>	.427	.426	.572
	BF12	<b>.677</b>	.490	.441	.552
	BF13	<b>.719</b>	.468	.494	.641
	BF14	<b>.769</b>	.415	.532	.639
	BF16	<b>.673</b>	.426	.459	.524
	BF19	<b>.704</b>	.452	.503	.536
Behaviour on Waste Disposal	BW1	.438	<b>.721</b>	.462	.374
	BW2	.477	<b>.753</b>	.463	.419
	BW28	.371	<b>.699</b>	.440	.407
	BW29	.459	<b>.697</b>	.472	.441
	BW4	.432	<b>.711</b>	.483	.407
	BW6	.505	<b>.707</b>	.457	.428
Malaria Control	MC5	.471	.523	<b>.736</b>	.428
	MC7	.379	.456	<b>.682</b>	.400
	MC8	.585	.383	<b>.694</b>	.610
	MC9	.478	.508	<b>.764</b>	.455
Perception on Malaria	PM10	.567	.416	.417	<b>.699</b>
	PM12	.569	.319	.371	<b>.670</b>
	PM14	.488	.348	.487	<b>.658</b>
	PM16	.633	.500	.554	<b>.755</b>
	PM17	.609	.458	.473	<b>.751</b>
	PM2	.643	.384	.465	<b>.766</b>
	PM6	.604	.420	.479	<b>.717</b>
	PM7	.591	.404	.512	<b>.712</b>
	PM9	.473	.405	.436	<b>.641</b>

Source: Field Survey

#### 4.10 Assessment of Significance of the Structural Model

After the assessment of the measurement model, the subsequent task of this section is to look at the evaluation of the significance of the structural model. Structural model

corresponds to the path relations between exogenous and endogenous latent constructs or variables. Key criteria for the assessment of the structural model is the assessment of variance ( $R^2$ ), assessment of effect size ( $f^2$ ), and predictive relevance ( $Q^2$ ). These are the measures and threshold steps applied in this research for testing the significance of structural model (Hair et al., 2011). The bootstrapping method is employed by this current research using a figure of 4999 bootstrap samples and 402 cases to measure the significance of the path coefficients as suggested by Hair et al. (2014, 2012 & 2011) respectively. Figure 4.5 shows the assessment of the full structural model. Table 4.9 below provides the summary of analysis conducted to assess structural model their purposes and results.

Table 4.9  
*Summation of Analysis on Structural Model*

Type of Analysis	Purpose of Analysis	Results of Analysis
Assessment of Variance ( $R^2$ )	The purpose of $R^2$ analysis is to test the percentage of differences in the dependent variable that can be described by predictor variable	The endogenous latent variable (MC) demonstrates the satisfactory $R^2$ value of 56%.
Assessment of Effect Size ( $f^2$ )	Analysis of the effect size is to quantify the strength of the association among two variables with the main purpose of determining if the distinction is valid or if it is as a result of change of factors	All the three constructs in this study have considered with small effect sizes
Assessment of Predictive Relevance	Among the purpose of predictive relevance analysis in PLS is to assess how adequately a structural model predicts cases of omitted data.	The result shows the value of 0.287 which provides a predictive relevance of the research model.

Source: PLS-SEM Analysis



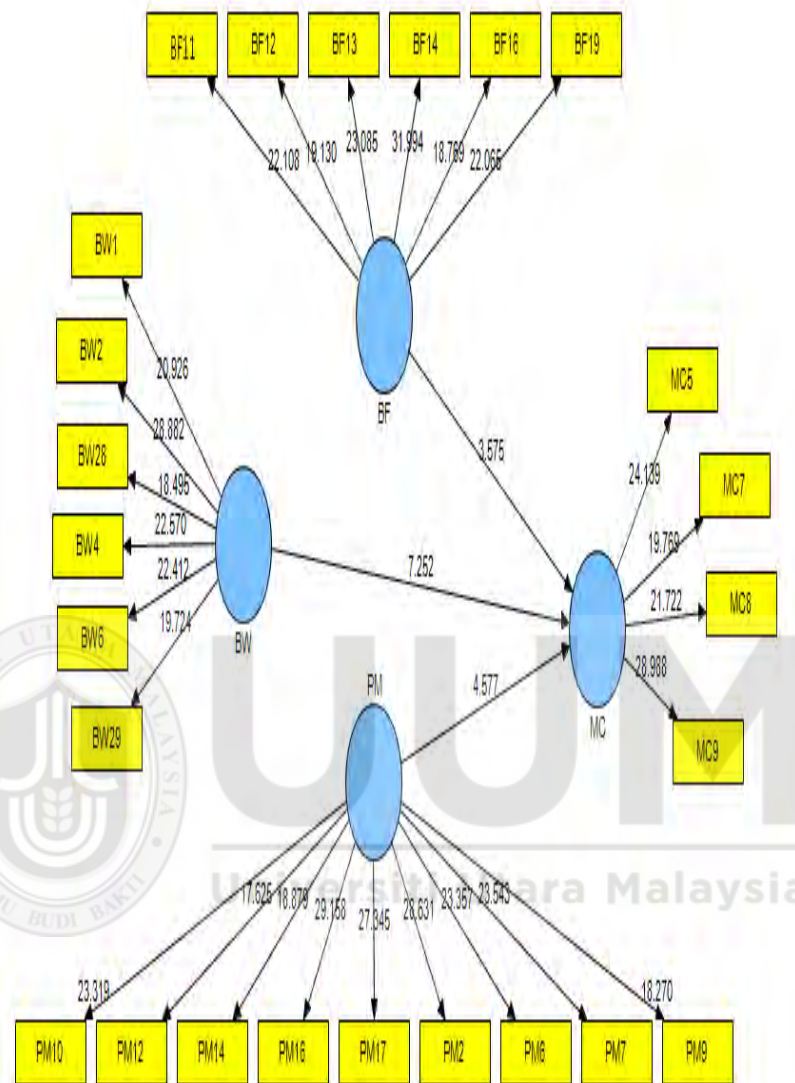


Figure 4.5 Full structural model

Based on a significance value of  $p < 0.01$ , the outcomes demonstrate that all the three hypothesized assumptions significantly supported. To begin with, Hypothesis 1 ( $H^1$ ) predicts that household behaviour on fumigation of environment influence malaria control. The result of this study revealed a significant relationship between the behaviour of fumigation and malaria control as the outcome showed ( $\beta = 0.230$ ,  $t = 3.575$ ,  $p < 0.001$ ) and based on decision Hypothesis 1 is supported. Similarly,

Hypothesis 2 (H<sup>2</sup>) assumes that household behaviour on waste disposal influence malaria control. The results of this study confirmed that there is a positive relationship between household behaviour on waste disposal and malaria control. The following outcomes shows ( $\beta= 0.343$ ,  $t= 7.252$ ,  $p<0.001$ ) and the decision supported Hypothesis 2.

Hypothesis 3 (H<sup>3</sup>) predicted that household perception of malaria disease influences malaria control. Result from this present study points out that there is a significant relationship between household malaria perception and malaria control. The results show that  $\beta= 0.279$ ,  $t= 4.577$ ,  $p<0.001$ , this indicated that Hypothesis 3 is supported. The following Table 4.10 presents the path coefficient, t-value, beta, P-value, standard error and hypothesis testing.

Table 4.10  
*Path Coefficient and Hypotheses Testing*

Hypotheses	Relationship	Beta	Std. Error	t-value	p-value	Decision
H1	Behaviour of Fumigation -> Malarial Control	0.230	0.064	3.575	0.000	Supported
H2	Behaviour on Waste Disposal -> Malarial Control	0.343	0.047	7.252	0.000	Supported
H3	Perception in Malaria -> Malarial Control	0.279	0.061	7.252	0.000	Supported

\*\*\* $p<0.001$

Source: Field Survey

#### 4.10.1 Assessment of Variance Explained in the Endogenous Latent Variables (R<sup>2</sup>)

According to Hair et al. (2011), the R<sup>2</sup> value is one of the most significant standards used for measuring the structural model in PLS-SEM. Hair et al., further averred that this criterion is called the coefficient of determination (Hair et al., 2012). The R-squared value corresponds to the percentage of differences in the dependent variable

that can be described by predictor variable (Elliott & Woodward, 2007). According to Hair et al. (2010) even though the adequate level of *R*-squared value rely on the perspective of the research, but Falk and Miller (1992) recommend that *R*-squared value of 0.10 is fit enough for suitable level.

Table 4.11

*Variance Explained in the Endogenous Latent Variables*

<b>Latent Variables</b>	<b>Variance Explained (R<sup>2</sup>)</b>
Malaria Control (MC)	56%

Source: Field Survey

As pointed out in Table 4.11, the research model in this current study describes 56% of the total inconsistency in malaria control (MC). This puts forward that the three tests of exogenous latent variables, that is behaviour on fumigation (BF), behaviour on waste disposal (BW) and perception of malaria (PM) collectively together explain 56% of the discrepancy of the malaria control. Consequently, looking at Falk and Miller's (1992) the endogenous latent variable (MC) demonstrates satisfactory  $R^2$  value. According to Chin's (1998) the *R*-squared value of 56% is regarded as a moderate value which is acceptable *R*-squared values.

**4.10.2 Assessment of Effect Size ( $f^2$ )**

Effect size ( $f^2$ ) is a numerical conception that quantifies the strength of the association between two variables. According to Callaghan, Ringle et al. (2009), the higher the effect size, the greater the height difference between variables. Statistic effect size ( $f^2$ ) assist in determining if the distinction is valid or if it is as a result of a change of factors (Selya, Rose, Dierker, Hedeker, & Mermelstein, 2012). Effect size ( $f^2$ ) calculated as the increase in  $R^2$  of the latent construct to which the path is linked,

about the latent construct's percentage of unexplained variance (Chin, 1998). Accordingly the following formula should be used in the assessment of the effect size ( $f^2$ ).

$$\text{Effect size: } f^2 = \frac{R^2_{\text{included}} - R^2_{\text{excluded}}}{1 - R^2_{\text{included}}}$$

This formula is illustrated by Cohen (1988) that 0.02, 0.15 and 0.35 values as weak, moderate and strong effect size respectively. Table 4.12 of this study indicated the effect sizes of each construct of the structural model.

Table 4.12  
*Effect Sizes of the Latent Constructs ( $f^2$ )*

Construct	R-squared Included	R-squared Excluded	f-squared	Effect size
Behaviour on Fumigation	.562	.545	.039	Small
Behaviour on Waste Disposal	.562	.506	.128	Small
Perception on Malaria	.562	.536	.059	Small

Source: Field Survey

The Table 4.12 points out the values of the effect sizes of the constructs in this study that is behaviour on fumigation, behaviour on waste disposal and perception of malaria respectively. To be specific construct behaviour on fumigation has the effect size of .039, while construct behaviour on waste disposal has an effect size of .128 and subsequently, construct perception on malaria have an effect size of .059 values, respectively. Therefore, in line with Cohen's (1988) on assessing the effect size among variables shows that, all the three constructs in this study (behaviour on fumigation, behaviour on waste disposal, perception of malaria) have been considered with small effect sizes each as indicated by Table 4.12

#### 4.10.3 Assessment of Predictive Relevance

Predictive relevance is the final stage used to assess the structural model. Predictive relevance refers to analysis to assess whether the structural model can predict the latent endogenous construct. To evaluate the predictive relevance this study employed blindfolding measures used by Stone-Geisser to evaluate the predictive relevance of research model. According to Duarte and Raposo (2010) another method of testing predictive relevance is through use of goodness-of-fit in the PLS structural equation modelling. Therefore, due to the reflective nature of all endogenous latent constructs blindfolding procedure is applied to test their predictive relevance. This method is applied because of the assumption of scholars (Duarte & Raposo, 2010; Hair et al, 2010) that this process of blindfolding is useful to endogenous constructs with a reflective measurement model as it is in this study (Duarte & Raposo, 2010).

To measure the predictive relevance of the research model, this study, particularly employed a cross-validated redundancy assessment. According to Hair et al. (2014) predictive relevance is a standard used to assess how adequately a structural model predicts cases of omitted data. Several scholars (Hair et al., 2014; Hair et al., 2013; Chin, 2012; Chin, 1998) affirmed that a structural model with predictive relevance  $Q^2$  statistics higher than zero is regarded to have predictive relevance. Similarly, a research model that contains more positive values is also assumed to have further additional predictive relevance. Table 4.13 shows the result of the predictive relevance of the structural model of this study.

Table 4.13

*Predictive Relevance ( $Q^2$ )*

<b>Total</b>	<b>SSO</b>	<b>SSE</b>	<b>1-SSE/SSO</b>
Malaria Control (MC)	1608	1145.9825	0.287

Source: Field Survey

Table 4.13 reveals the cross-validation redundancy measures of malaria control variable. The table shows the 0.287 which is above the zero as recommended by Chin (1998) which provides a predictive relevance of the research model.

#### 4.11 Summary of Findings

After discussing all the results of this current study, right from the initial data screening and preliminary analysis up to the discussion of descriptive analysis for the measurement of structural model this section presented the main result of the recap of all hypothesis tested as shown in Table 4.14 below.

Table 4.14

*Summary of Hypothesis Testing*

<b>Hypothesis</b>	<b>Statement</b>	<b>Findings</b>
<b>H<sub>1</sub></b>	There is a relationship between household behaviour on fumigation of environment and malaria control/prevalence	Supported
<b>H<sub>2</sub></b>	There is a relationship between household behaviour of waste disposal and malaria control/prevalence	Supported
<b>H<sub>3</sub></b>	There is a relationship between household perception/behaviour and malaria control/prevalence	Supported

Source: Field Survey

#### 4.12 Cross tabulation Analysis to Support Hypothetical Results

This section of the analysis presents a cross tabulation and referencing analysis of the major items of this present study. Those major items refer to the items contains in the

quantitative instruments that obtained the threshold values requires for measuring items consistency and reliability. The major essence and purpose of this cross tabulation analysis is to use it to understand the summarized hypothesis results (see table 4.14 above) and also to enhance the research findings of this study.

Therefore, items that offered the needed loading of this study is used to cross tabulated with some demographic information or characteristics. Though not all the items that reach the brink values is considered for cross tabulation, but the aims are to highlight on how the analysis using smart PLS arrived at supporting the hypothesis of this study and also answer the research questions. The cross tabulation and referencing analysis are conducted according to the items based on research questions, objectives and also the hypothesis. All items that reached the threshold value of research model are cross tabulated. Due to the space and words limit this study presents at least one cross tabulation on each research question to support the hypothesis result as shown in the following section.

#### **4.12.1 Cross Tabulation on Research Question One**

This subsection carries out the analysis of some of the items contains in the research question number one and some demographic background of the respondent. The aim is to show how the overall result analysis concluded on testing the hypothesis arrived at the final result and also answer the research question and achieved the objective of the study (refer to chapter one for research questions, objectives an hypothesis). In this case at least one item each is cross tabulated with one demographic variable. This is also to see the pattern of thinking, perception and behaviour of each category of the respondents in relation to the hypothesis.

Table 4.15

*Cross Tabulation between Respondent's Gender and BF 11*

BF 11	Gender		Total
	Male	Female	
Strongly Disagree	25 (7.5%)	6 (9.0%)	31 (7.7%)
Disagree	42 (12.6%)	8 (11.9%)	50 (12.5%)
Neutral	21 (6.3%)	14 (20.9%)	35 (8.7%)
Agree	152 (45.5%)	23 (34.3%)	175 (43.6%)
Strongly Agree	94 (28.1%)	16 (34.3%)	110 (43.6%)
Total	334 (100%)	67 (100%)	402 (100%)
Chi-Square			.003

Note: BF 11 stands for household environmental condition is not conducive for fumigation

Source: Field Survey

Table 4.15 shows the cross tabulation of respondent's gender and the opinion of the respondents on household environmental condition is not conducive for fumigation (BF11). As shown by the table, a total of 334 male respondents provide their perception of household environmental condition is not conducive for fumigation BF11. This compares with a total of 67 respondents who happened to be females. The total of 175 respondents, agreed on BF11 representing 175%. Out of them 152 (45.5%) are males while 23 (34.3) are females. Similarly, 110 respondents (43.6%) strongly agreed on BF11 of which 94 (28.1%) and 16 (34.3%) are males and females respectively.

Though the overall result of this study indicated that male respondents is far more than that of their female counterparts (see table chapter 4, table 4.6) and the majority of them are of the opinion that household environmental condition is not conducive for fumigation. The chi-square statistics show .003. This shows that their opinion supported the assumption that relationships exist between household behaviour on fumigation and malaria control which in consequences increases its prevalence among the society.



#### 4.12.2 Cross tabulation on Research Question Two

As discussed in the preceding subsection, this one also highlighted on some of the items measuring variable on research question two and some demographic features of this current study. The analysis is to provide the important and to some extent a comprehensive show up to support the final stage of PLS analysis that is hypothesis testing. Therefore, this offer an imperative attempt to look at the overall result using cross tabs, which also enhance the research findings of this study.

Table 4.16

*Cross Tabulation between Education Status and BW 2*

BW 2	Education Status				Total
	Non-Formal	Primary	Secondary	Tertiary	
Strongly Disagree	1 (1.2%)	1 (8.3%)	9 (5.1%)	11 (9.6%)	22 (5.7%)
Disagree	4 (4.9%)	1 (8.3%)	13 (7.3%)	23 (20.0%)	41 (10 %)
Neutral	6 (7.4%)	2 (16.7%)	16 (9.0%)	8 (7.0%)	32 (8.3%)
Agree	34 (42.0%)	4 (33.3%)	58 (32.6%)	41 (35.7%)	137 (35.5%)
Strongly Agree	36 (44.4%)	4 (33.3%)	82 (46.1%)	32 (27.8%)	154 (39.9%)
Total	81 (100%)	12 (100%)	178 (100%)	115 (100%)	386 (100%)
Chi-Square					.004

Note: BW 2 stands for there is no place reserved for dumping waste and discarded materials

Source: Field Survey

This is a cross analysis/referencing between this current study education status and household belief about there is no place reserved for dumping waste and discarded materials. The table indicates the respondent's base on their level of education and 81 of the respondents have no formal education, 12 acquired primary education 178 obtained secondary educations while 115 of the respondents have education up to the tertiary level. This indicates that the majority (39.9%) of the respondent based on their level of education status holds the opinion that places reserved for dumping refuse and other discarded materials largely not available in their respective areas. Chi-square statistics shows .004 which, in support of the hypothesis that there is a

relationship between behaviour on waste disposal and malaria control and prevalence.

#### 4.12.3 Cross Tabulation on Research Question Three

This subsection continues with a cross tabulation analysis between some items with required threshold values in this question that used to measure the variable. As indicated in the previous subsection, the essence is to give a detail analysis using cross tabulation to show how final analysis on PLS produces the final result of this current study.

Table 4.17

*Cross Tabulation between Occupation and PM 7*

PM 7	Occupation				Total
	Civil Service	Business	Farming	Others	
Strongly Disagree	8 (9.4%)	15 (8.2%)	5 (5.7%)	0 (.0%)	28 (7.1%)
Disagree	12 (14.1%)	25 (13.6%)	8 (9.2%)	2 (4.9%)	47 (11.8%)
Neutral	19 (22.4%)	17 (9.2%)	6 (6.9%)	3 (7.3%)	45 (11.3)
Agree	24 (28.2%)	54 (29.3%)	29 (33.3%)	14 (34.1%)	121 (30.5%)
Strongly Agree	22 (25.9%)	73 (39.7%)	39 (44.8%)	22 (53.7%)	156 (39.3)
Total	85 (100%)	184 (100%)	87 (100%)	41 (100%)	397 (100%)
Chi-Square					.009

Note: PM 7 stand for perception about susceptibility to malaria does not prompt me to seek for treatment

Source: Field Survey

Table 4.17 presents cross tabulation analysis between respondent's occupation and their opinion that perception about susceptibility to malaria does not prompt them to seek for the treatment. The chi-square result of .009 shows the significant value between respondent occupation status and PM7.

#### 4.12.4 Cross Tabulation on General Behaviour on Malaria Control

This section deals with section of the questionnaire that asks general opinion and behaviour with regard to malaria control, prevention and related practices (see appendix A, section D of the questionnaire). Some of those items use to measure malaria control that offers a required value is taken here for cross tabulation with some demographic variables in order to see how the overall result analysis enhance the research findings.

Table 4.18

*Cross Tabulation between Age and MC 5*

MC 5	Age				Total
	30-40	41-50	51-60	61-above	
Strongly Disagree	12 (6.1%)	9 (8.7%)	1 (1.6%)	2 (5.9%)	24 (6.0%)
Disagree	26 (13.2%)	6 (5.8%)	2 (3.2%)	1 (2.9%)	35 (8.8%)
Neutral	28 (14.2%)	6 (5.8%)	2 (3.2%)	1 (2.9%)	37 (9.3%)
Agree	59 (29.9%)	62 (59.6%)	36 (57.1%)	12 (35.3%)	169 (42.5%)
Strongly Agree	72 (36.5%)	21 (20.2%)	22 (34.9%)	18 (52.9%)	133 (33.4%)
Total	197 (100%)	104 (100%)	63 (100%)	34 (100%)	398 (100%)
Chi-Square					.000

Note: GB 5 stands for household commitment on fumigation

Source: Field Survey

Table 4.18 shows the cross tabulation of respondents age and opinion of the respondents that there is no household commitment on fumigation. As shown by the table, a teeming number of 169 (42.5%) respondents on age agree with there is no household commitment on fumigation. This compares with a total of 133 (33.4%) respondents who happened to be strongly agree that there is no household commitment on fumigation. Out of those strongly agree with the statement 72 of them age between 30-40, 21 age between 41-50, 22 age between 51-60 and 18 are age 61 and above. Chi-square result also indicated the significant result of .000. This also supported the hypothesis, one of this current study.

#### **4.13 Influence of Social Factors and Household Behaviour on Malaria Control**

Though there is no objective set to achieve by this study with regard to the influence of social class factors in malaria control, but it is paramount important to highlight some of the role social factors play in determining the behaviour of household members on malaria control practices. One of the fundamental roles of medical sociology and sometimes referred as health, sociology is its ability to investigate the critical role social factors play in determining the health behaviour of the society. Medical and or health, sociology indicate the relevance of social class factors that it is not only promote, and in some instances cause the risk and illness behaviour but also increase the possibility of disease prevention and health management. To bond this study within the philosophy of sociology of health, sociological investigation between some social class variables and constructs of this study were conducted. Those social class factors include; gender, age, educational status, occupation, religion and income. Analysis of variance statistical methods were employed to investigate the role of those social class factors in the household behaviour on malaria control and prevention.

Table 4.19

*Household Gender and Behaviour on Malaria Control*

Constructs	Gender	N	Mean	Levene's Test for Equality of Variances	
				F	Sig.
MC	Male	334	3.4880	1.114	.292
	Female	67	3.5597		
BF	Male	334	3.8124	4.782	.029
	Female	67	3.5821		
BW	Male	334	3.8985	.787	.375
	Female	67	3.9129		
PM	Male	334	3.7056	3.713	.055
	Female	67	3.5041		

Source: Field Survey

Table 4.19 shows analysis of variance between gender and constructs of this study. The constructs are malaria control, behaviour on fumigation, behaviour on waste control and perception of malaria. The table indicates the influence of gender on health related behaviour on malaria control. The result reveals that there is no significance between social class variable gender and construct malaria control with significance of .292 values. This shows that there are no significant differences between male and female with regard to general behaviour on malaria control practices. It has been shown by this study that there is no significance difference between male household head and female household head, which systematically allowed one group to the detriment of the other with regard to malaria control practices in Zamfara state North West Nigeria.

Result from the current study indicates the significant differences between gender and behaviour on environmental fumigation for malaria control. The finding shows the significance of .029 values. This informed that male household respondents of this current study participated more on fumigation services for malaria control than

the female household head. The study provides the role of gender on health related behaviour on environment fumigation to the prevention and control of malaria. The results show that male household heads are more encouraging and contributed more on environmental fumigation services on malaria control. These analyses reveal that female household failed to carry out fumigation services for malaria control which influences malaria prevalence. Therefore, social variation between male and female household heads on environmental fumigation significantly influences their behaviour on health seeking practices to control malaria.

Analysis of gender and behaviour on waste disposal construct illustrates that there are no significant differences between the two as the result shows .375 significance level. The result indicates that there is no variation between male household respondents and their female counterpart on waste disposal practices. The findings also show that there is a significant difference between household gender and their perception of malaria as the result shows the significance level of 0.055. The result demonstrates the role household gender play for household perception, their behaviour and attitude on malaria control practices. Therefore, the household gender division is among the vital social class factors that influences household to carry out health seeking behaviour for malaria control.

Table 4.20

*Household Age, and Behaviour on Malaria Control*

		Sum of Squares	df	Mean Square	F	Sig.
MC	Between Groups	2.358	3	.786	2.190	.089
	Within Groups	141.766	395	.359		
	Total	144.124	398			
BF	Between Groups	12.886	3	4.295	5.731	.001
	Within Groups	296.027	395	.749		
	Total	308.913	398			
BW	Between Groups	16.587	3	5.529	7.988	.000
	Within Groups	273.417	395	.692		
	Total	290.004	398			
PM	Between Groups	18.632	3	6.211	7.719	.000
	Within Groups	317.803	395	.805		
	Total	336.434	398			

Source: Field Survey

Table 4.20 shows the analysis of variance between age and malaria control practices. The results from the analysis reveals that there are no variation or differences between household heads age and general malaria control practices. Findings from the research illustrate the significance value of .089 which is above the threshold level of 0.05 values, therefore indicating no significant value. Therefore, there are no differences between age class and household health seeking behaviour on malaria control practices. With regard to this study, no age category between the divisions among household age differences found to be detrimental to the other. This means that the age of the respondent does not have any effect on the behaviour of malaria control.

Analysis of the variation between respondent's age class and their behaviour on environmental fumigation shows a significance difference. Findings from the current study demonstrate the result of .001 significance level, which is less than 0.05 threshold values and therefore, indicates the differences between social variable age

and household behaviour on fumigation of environment construct. This concludes that respondent's age has a social effect on their behaviour on environmental fumigation and malaria control practices in Zamfara state north-west Nigeria. The characteristics of respondent's age influence the attitude and behaviour in terms of the application of several measures such as mosquito coils, insecticides sprayed, nets for the purpose of disinfecting the environment from a mosquito that cause malaria.

Similarly, analysis between social class, age and household behaviour on waste disposal shows the significance of 0.000 levels. This indicates that there is significant variation between respondent's age and their behaviour on waste disposal control construct. The difference between respondent age and construct behaviour of waste disposal control play a key role in malaria management services. Based on these findings, it illustrates that respondent age effect their behaviour to comply with ample provision of waste disposal services such as good public hygiene, efficient waterway passage and adequate sanitation provision. There is also a relation between respondent's age and behaviour of improper waste disposals such as poor public hygiene, lack of sewage disposal, deprived housing conditions and lack of sanitation practices.

Furthermore, result from analysis of variance to show the effect of social class in this study reveals that, there is a significant difference between respondent's age and their perception of malaria constructs. A finding from the analysis shows the 0.000 significant levels. This shows that age of the respondent of this study affect how they define, understand and perceive malaria. Age of the respondent's play a key role in household perception on malaria. This influences their behaviour to engage in health



seeking behaviour. What has been seen so far is that there is a link between respondent's age and their perception to decide to involve in healthy activities to eradicate, reduce or prevent the occurrence of disease.

Table 4.21

*Household Education Status and Behaviour on Malaria Control*

		Sum of Squares	df	Mean Square	F	Sig.
MC	Between Groups	3.713	3	1.238	3.423	.017
	Within Groups	138.092	382	.361		
	Total	141.805	385			
BF	Between Groups	19.302	3	6.434	8.822	.000
	Within Groups	278.605	382	.729		
	Total	297.907	385			
BW	Between Groups	17.583	3	5.861	8.517	.000
	Within Groups	262.889	382	.688		
	Total	280.472	385			
PM	Between Groups	20.827	3	6.942	8.998	.000
	Within Groups	294.725	382	.772		
	Total	315.553	385			

Source: Field Survey

Analysis of variance between respondent's education status and malaria control constructs shows that there is a significant difference between the two as the results indicate reveal the significance value of 0.017 levels. This result is less than the threshold level of 0.05 which signifies the significance difference between education status and general behaviour of malaria control. It has been found by this study that social disparities in education attainment are well recognized in malaria practices. Therefore, education as a mechanism to endows household members with the means to become effective and vibrant members in order to achieve control of their health by providing a healthy behaviour, consequently influence the household behaviour on malaria control practices.

A significant difference exists between household, educational status and their behaviour on environmental fumigation. Result from variance analysis between

respondent's educational attainment and the behaviour on fumigation construct shows the result of 0.000 significance level. This social disparity in terms of education attainment and health behaviour with regard to fumigation services as illustrated by this current study play a critical role in the influence of household behaviour on malaria control. It is, therefore, concludes that level of education is the very fundamental factor that influence the behaviour of household members on general fumigation services of malaria control. Poorly educated households often characterized with negative behaviour on health seeking practices that fail to carry out malaria control and prevention services effectively.

This current study conducted an investigation to find out the influence of education status and household behaviour on waste disposal control. It is discovered that there is a significance difference respondent level of education and behaviour of waste disposal control construct. Result from the variance analysis shows a 0.000 significance level. Interpretation of this result shows that the education level of the household is a key factor, influencing household behaviour on waste disposal control. This finding shows that households with less educational level characterized by an acute shortage of garbage disposal facilities with the attendant huge piles of garbage on the streets. This kind of behaviour exemplifies on how household with less educational attainment failed to carry out effective waste control services to prevent and control malaria. On the other hand, household with highest educational level provided and live in areas with the effective provision of waste control services. This summarized that educational attainment is an important factor that influences the behaviour to control malaria and consequently household with less educational

qualification contribute negatively or failed to carry out effective waste disposal control.

Similarly, an analysis to investigate the effect between education status and household perception on malaria was conducted. Finding from variance analysis shows that there is a significant difference between level of education and household perception on malaria as an outcome of the analysis reveal 0.000 significance level. The result indicated that household with less education background has a negative perception about malaria, which also has the effect of their behaviour on control practices. The household perception of those with a high education background permits them to understand and define malaria, which enable them to employ various control measures for the treatment and prevention services. In general, household with lower levels of education fail to carry out effective malaria control and management practices due to their poor perception. Therefore, household educational status is among the social class factors that influences household perception and behaviour on malaria control.

Table 4.22

*Household Occupation and Behaviour on Malaria Control*

		Sum of Squares	df	Mean Square	F	Sig.
MC	Between Groups	3.902	3	1.301	3.695	.012
	Within Groups	138.338	393	.352		
	Total	142.240	396			
BF	Between Groups	15.294	3	5.098	6.826	.000
	Within Groups	293.514	393	.747		
	Total	308.808	396			
BW	Between Groups	3.291	3	1.097	1.507	.212
	Within Groups	286.081	393	.728		
	Total	289.372	396			
PM	Between Groups	16.113	3	5.371	6.705	.000
	Within Groups	314.799	393	.801		
	Total	330.912	396			

Source: Field Survey

Table 4.22 introduces the variance analysis between occupation as a social class factor and constructs of this current study. Result from the analysis point out that there is a significant difference between household occupation status and general malaria control practices. The findings indicate 0.012 significance level between household occupation and general behaviour of malaria control construct. The outcome of this study specifies that household social class in terms of their occupation opportunities is associated with health related behaviour for malaria control and management. Household behaviour among those with better occupation status permits them to provide all necessary provision for malaria control and management practices. The result of the study also shows that household behaviour among those with unfavourable occupational status contribute to the prevalence of malaria due to their failure to effect or carry out adequate measures to control and prevent the disease. This result drives a conclusion that occupational status is among the social class factor that play a fundamental role with regard to behaviour on malaria control.

Analysis between household occupation and household behaviour on environmental fumigation construct were conducted. The aim of this analysis is to find out the social effect between household occupation status and their behaviour on fumigation services for malaria control. Statistical result using analysis of variance demonstrates that there is a significance difference between occupation as a social class variable and behaviour on fumigation construct. The result shows 0.000 significant levels. It is indicated by this study that categories of household, fold within the better occupation services provided more with effective environmental fumigation services

for malaria control purposes. It is also revealing that household with poor occupation status are those failed to provide adequate or effective malaria control services. Thus, class of household influence their behaviour on malaria control practices. This analysis highlighted the role of occupation status on household behaviour of fumigation. Therefore, the household occupational status is among the social class factors influencing the behaviour of malaria control.

But on the other hand variance analysis between household occupation status and behaviour of the waste disposal control prove to be no significant with 0.212 values. This result is below the threshold value of 0.05 significance level. The result indicated that there is no difference between household occupation status and their behaviour on waste disposal practices. This implies that household irrespective of whether they poses a better occupation opportunities or not matter with regard to their behaviour on waste disposal practices. The result illustrates that household at the individual level may tidy their houses and the surroundings, but many of those household will not be able to afford a decent house sewage system, or sustained a hygienic waste disposal mechanism. In their households, they may neatly gather garbage, but lack to provide garbage disposal vans service. This result reveals that there is no significance influence or effect between occupation factor and construct of household behaviour on waste disposal practices.

Finding from this current study indicates a significance difference between household occupation status and their perception on malaria control. Analysis of variance shows a significance value of 0.000 levels, indicating the role occupation specification play on household perception and behaviour on malaria control

practices. These demonstrate that occupation status is among the social class factors that influence household perception and their attitude on health seeking behaviour for malaria control. Lack of understanding of the etiology and definition of malaria among household with deprived occupation status serve as a reason for their failure to carry out effective malaria control measures, which consequently influence the prevalence of malaria.

Table 4.23

*Household Religion and Behaviour on Malaria Control*

		Sum of Squares	df	Mean Square	F	Sig.
MC	Between Groups	2.602	3	.867	2.430	.065
	Within Groups	142.023	398	.357		
	Total	144.624	401			
BF	Between Groups	33.199	3	11.066	15.780	.000
	Within Groups	279.113	398	.701		
	Total	312.312	401			
BW	Between Groups	11.341	3	3.780	5.392	.001
	Within Groups	279.050	398	.701		
	Total	290.391	401			
PM	Between Groups	29.134	3	9.711	12.440	.000
	Within Groups	310.711	398	.781		
	Total	339.845	401			

Source: Field Survey

Table 4.23 is on the analysis between religion as social class variable and constructs of this study. Those constructs include general behaviour on malaria control practices, household behaviour on environment fumigation, household behaviour on waste disposal control and household perception on malaria. Analysis of variance between household religious affiliation and malaria control construct indicate that there is no significance difference between religion and malaria control behaviour. The result from the analysis shows a 0.065 significance level which is above the threshold value of 0.05 levels of significance. Therefore, religion does not play any role on the construct of malaria control in this study.

But a significant relationship exists between household religion and household behaviour on fumigation construct. Result from the variance analysis shows a significant difference of 0.000 values between religion factor and behaviour on fumigation construct. Finding from this study indicates that household with religious understanding shown positive behaviour with regard to fumigation services to control malaria. Religious misunderstanding also make household behaviour, negative on fumigation services which result of their failure to carry out effective fumigation services for malaria control. These indicate that religion play a key role among social class variables that influences household behaviour on health seeking practices for malaria control.

Furthermore, a significance different is found out between household religious affiliation and behaviour on waste disposal control. Finding from the analysis reveals a significant value of 0.001 levels indicating the influence of household religion on the construct of household behaviour on waste disposal control. Religion among household shape their behaviour to conduct regular and efficient waste disposal practices. This behaviour helps those households to carry out effective malaria prevention and control through adequate provision of waste disposal control exercises. On the other of the household religion and behaviour of waste disposal control, some with poor religious understanding failed to carry out waste disposal control which consequently results of high malaria prevalence due to their failure to perform waste control exercises. In this case household religious factor is among the social class variables that influences household behaviour on malaria control.

This current study carries out an investigation to find the effect of household religion and their perception on malaria. Result from the analysis of variance demonstrate that a significant difference of exists between class, of religion and household behaviour and their attitude on malaria control. The findings show 0.000 significance level, which explain that differences exist between religion and household perception on malaria construct. It is also found that religion plays a key role in shaping the behaviour and perception of household heads to carry out malaria control practices. It is similarly, indicated that religious interpretation between some of the household members make it difficult for them to conduct exercises for malaria control. Due their perception influences by a religious factor also lead to the failure to implement malaria control practices. Therefore, household religion and perception play a fundamental role in influencing household behaviour on malaria control.

Table 4.24

*Household Income and Behaviour on Malaria Control*

		Sum of Squares	df	Mean Square	F	Sig.
MC	Between Groups	3.713	3	1.238	3.423	.017
	Within Groups	138.092	382	.361		
	Total	141.805	385			
BF	Between Groups	19.302	3	6.434	8.822	.000
	Within Groups	278.605	382	.729		
	Total	297.907	385			
BW	Between Groups	17.583	3	5.861	8.517	.000
	Within Groups	262.889	382	.688		
	Total	280.472	385			
PM	Between Groups	20.827	3	6.942	2.500	.070
	Within Groups	294.725	382	.772		
	Total	315.553	385			

Source: Field Survey

Table 4.24 introduces the discussion between household income and four constructs of this study. Those constructs are general behaviour of malaria control, behaviour



on fumigation of environment, behaviour on waste disposal control and household perception on malaria. Analysis between household income and general malaria control behaviour shows that a significant difference is found out between income and malaria control construct. The findings indicate 0.017 significance levels shown the effect of household income and general malaria control practices. Outcome from this study highlighted the relevance of household income and their behaviour on malaria control.

Moreover, results of this investigation reveal the significant difference between household income and household behaviour on fumigation services for malaria control. The result indicates the significance level of 0.000 exactly showing the effect the household income on their behaviour to carry out fumigation services for malaria control. The result illustrates that poor household is less able to prevent malaria or afford effective fumigation services due to their income. Evidence from this current study has continued to demonstrate that preventive strategies adopted at curbing the spread of malaria, such as insecticide-treated bed nets, are not reaching the poor people who are also low income earners. The level and nature of their income make their failure to carry out effective fumigation services for malaria control. Household income is one of the critical factors among social class variable that affect the behaviour on fumigation services for malaria control.

Similarly, variance analysis between household income and behaviour on waste disposal shows a significance level of 0.000. The result is of the opinion that the difference is found in this analysis show the effect of household income to the construct of household behaviour on waste disposal control. Finding from this result

informed that household with low income were unable to provide proper waste control services such as (the provision of better water passage, provision of a waste disposal van, provision of reserved places for dumping refuse and its regular evacuation) hence increases their chances to be more vulnerable to malaria. This study also found out that household with good income provide proper waste control services in their areas which reduces their chances of getting malaria. It is from those finding that make the conclusion that household with poor income to contribute negatively to waste control services. Therefore the household level of income influences their behaviour to carry out malaria control activities. This study found no difference between household income and household perception on malaria. The finding shows the significance level of 0.070 which is above the threshold value of 0.05.

#### **4.14 Conclusion**

In this chapter the overall finding on the influence of fumigation, waste control and perception of malaria are duly presented. Specifically, the household behaviour on environmental fumigation has provided a considerable relationship for malaria control and prevalence. Similarly, household behaviour on waste disposal reveals a significant relationship for malaria control in Zamfara state North West Nigeria. With regard to household perception on malaria, results from this study indicated a significant relationship between household perception and malaria control in the study area. To enhance such findings, cross tabulation analysis is made with some items and demographic variables enrich the result tested hypothesis. Finally, a discussion on the influence of social factors and household behaviour of malaria control is also provided. The next chapter discussed the influence of household

behaviour on available and effective control measures (qualitative data analysis and reporting).



## **CHAPTER FIVE**

### **INFLUENCE OF HOUSEHOLD BEHAVIOUR ON AVAILABLE AND EFFECTIVE MEASURES OF MALARIA CONTROL**

#### **5.1 Introduction**

This chapter attempt to provide discussion on the influence of household behaviour on available and effective measures of malaria control. The role of the chapter is to answer research questions four and five of this current study. This chapter discusses the main interview and thematic analysis of the interview. The chapter also provides discussions on household behaviour on available control measures and household behaviour on effective malaria control measures.

#### **5.2 Main Interview**

The main interviews are conducted with malaria control stakeholders and household members in Zamfara state North West Nigeria. The reason for the interview with those people is to provide answers to the research questions using qualitative methods of research with the main purpose to achieve the objectives four and five of this study. These goals achieved only through conducting an interview with respondents believed to be in a right position to answer the research questions and also to achieve the research objectives. Therefore, the interview is conducted with respondents in this study on issues bordering the influence of household behaviour on available and effective measures of malaria control.

### 5.2.1 Interview Protocols

An interview protocol is used in this research. Designing interview protocols are very vital for this research. The main purpose of this is to guide the researcher to conduct the interview successfully without difficulty. Therefore, some tips provided by Stacy A. Jacob (2012) for conducting the interview is adopted and strictly adhered to, during this study. These tips for the interview provided by Stacy A. Jacob (2012) is as follows:

- 1 Start with a script
- 2 Collect Consent
- 3 Use some types of recording device and only take brief notes so we can maintain eye contact with the interviewee
- 4 Arrange to interview respondents in a quiet, semi-private place
- 5 Be sure that both researcher and interviewee block off plenty of interrupted time for the interview
- 6 Have a genuine care, concern and interest for the people you are interviewing.
- 7 Use basic counselling skills to help your interviewees feel heard
- 8 Keep it focused
- 9 Listen, listen and listen
- 10 Finish off with a script

Those tips and protocols mentioned above duly observed during the conduct of this research. Following those protocols in this current study provide the researcher to conduct the interview successfully without much difficulty. Consequently, interview protocol is strictly maintained throughout the field exercise of this study.

### 5.3 Thematic Analysis of Interview

Thematic analysis is a technique for classifying, evaluating, and exploring as well as reporting patterns in the data that simply organize and explained data in detailed evidence (Ibrahim M., 2012; Fereday, J., & Muir-Cochrane E., 2006). This process of thematic analysis involved the familiarizing with data that is transcribing data by reading and re-reading. This is followed by generating initial codes in a systematic way across the entire data set. After searching for themes by gathering all data relevant to each code, the next is to review themes checking in the themes work about the coded. Later defining and naming theme and overall story the analysis tells. Generating clear definitions and names for each theme and finally producing the report. The above, tips and stages provided by Braun V and Clark (2006) for thematic data analysis strictly followed in this research. The following model summarized the major themes and findings of the qualitative part of this study.

The model highlighted the key findings that this qualitative analysis is carried out on. For example, the model shows that household behaviour on the availability of malaria control measures is measured by ACM1, ACM2, ACM3 and ACM4. All those are themes found to be relevant to household behaviour and available control measures to malaria control. On the other hand, household behaviour on effective control measures is considered by ECM1, ECM2, ECM3 and ECM4. Those themes explained household behaviour on the effectiveness of malaria control measures and its influence on malaria control (see the model below). The model shows that household behaviour of ACM influence malaria control and at the same time, available control measures also influence household behaviour of malaria control. Furthermore, the model reveals that household behaviour on ECM has an effect on

malaria control. It is also informed that effective malaria control measures also influence household behaviour on malaria control.

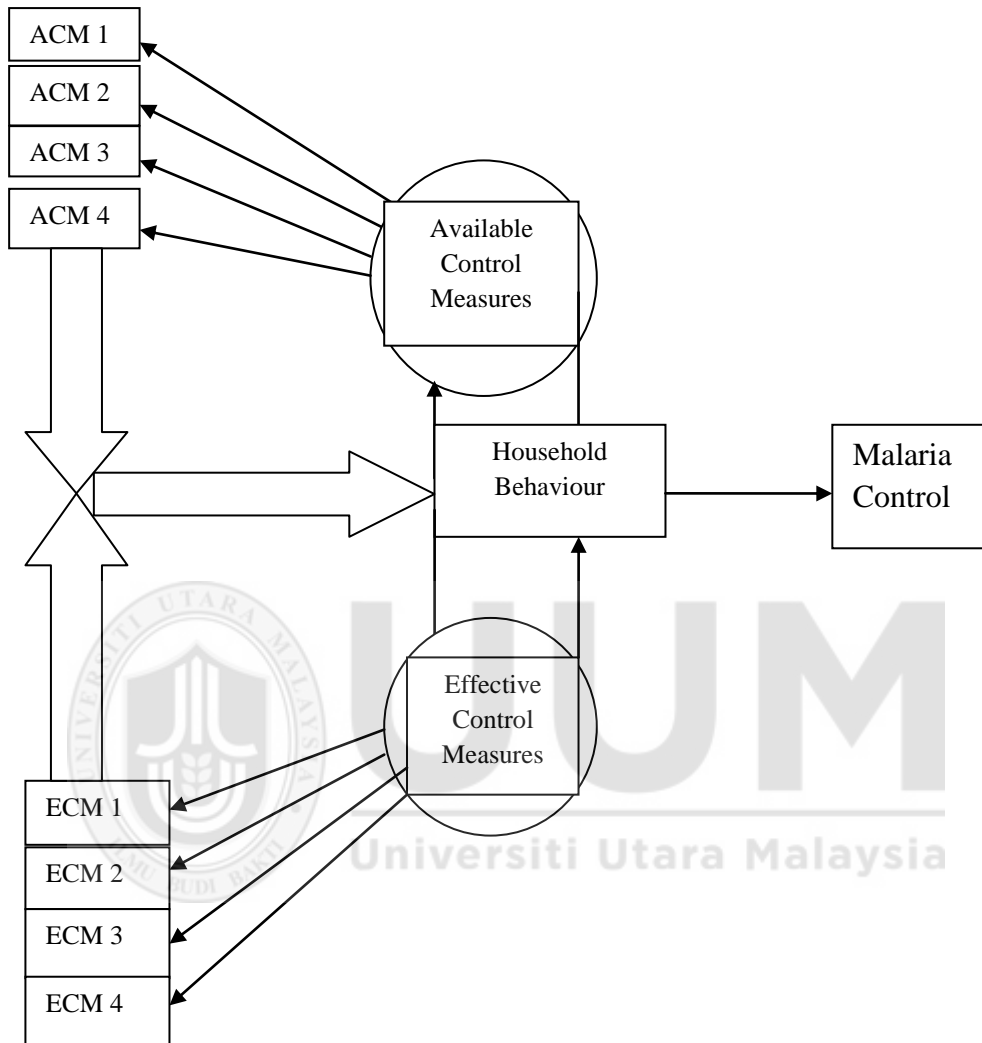


Figure 5.1 Qualitative model summary

#### 5.4 Household Behaviour on Available Control Measures and Malaria Control

After transcribing the recorded version of the interview, this study arranged those into themes for simple thematic analysis of the results. The analysis is on the interview regarding question four of this current research that is household behaviour on available malaria control measures. Table 5.1 summarized the themes as followed.

Table 5.1

*Themes on Research Question 4*

S/N	Codes	Themes
1.	ACM1	Available Control Measures
2.	ACM2	Household Behaviour on ACM and Malaria Prevalence
3	ACM3	Reasons Encouraging/Discouraging Behaviour on ACM
4	ACM4	Location of ACM and Household Behaviour

Source: Field Survey

### 5.4.1 Available Control Measures

Part of the crisis militating against the successful malaria control activities is the issue of being control and preventive measures available. It is when those measures are available, and general members of the society are ready and believed to use them that those that have already been affected cured. Also, prevention is given to those that are not affected. It is in line with this fundamental assumption that this current study, interact with malaria control stakeholders to explore how available, malaria control measures is in the community under investigation. On the other hand head of the household that experience difficult malaria cases also participated in the study with an aim to counter checked the information received from malaria control stakeholders.

On the issue of the availability of malaria control measure a staff from state malaria control program office confirmed in the study that various malaria control measures are available in the state. Among the control measures highlighted by respondent include long lasting insecticide net, environmental fumigation and cleaning. However, he reveals that those long-lasting net provisions has targeted only pregnant women and children attending ANCs and immunization services respectively.



Environmental cleaning and fumigation are taking place only in the main city centres on a monthly basis. The respondent asserted that:

We have preventive measures put in place in the state. One of the preventive measures is the distribution of Long Lasting Insecticide Net (LLIN) which is distributed in a different route. We have ANC route we have fully immunized route; we have even community base which is called community Direct Delivery (CDD) mode of distribution. Where by those nets is being distributed to people for the sake of prevention. Similarly the state government in collaboration with ZESA used to do kind of spray or fumigation which has been on a monthly basis. There is also a cleaning of the environment. In some of the LGAs they used to conduct a weekly I mean monthly environmental sanitation depending on the LGAs, not all the LGAs. (ACM1- Deputy Manager RBM)

Interview with the household head whose wife is attending antenatal care during pregnancy informed to the researcher that there is a malaria control measure usually given to his wife during her ANCs visit. The respondent who is from Gusau local government council reported that:

There is an insecticide mosquito net and anti-malaria drug giving to my wife during her antenatal visit. That is without doubt because sometimes is what encourage people to go to those ANCs visits. That one I think is going on for quite a long period, even for her last pregnancy that is I am talking about two years (ACM1 Household Respondent).

Still on the effort to explore the situation of malaria control measures in the state, this study succeeded in interviewing a pregnant woman in Shinkafi local government to find out if there is control measures given to her during ANC visit. The respondent stated that:

There is a net provision, and there is also a drug that you are asked to swallow at the moment. However, the net is given during the first time of the visit. The entire subsequent visit you are not giving anything, but they are telling us to ensure that you are using those net because it is the protection of both of us that is the mothers and the child we carry. So that is all that I know (ACM1 *Female Household Respondent*)

On the other hand, in the same Shinkafi local government area, the interview was conducted with another pregnant woman, but the one not attending any ANC or modern health care facility during her pregnancy. When ask her about the issue of available control measures for malaria prevention for her protection against malaria and the child she carries, the respondent mentioned that:

I received nothing from anybody with regard to protect myself with mosquito bites. But I heard it people are saying when they go to hospital they received this and that, but on my own case since I married I never been in hospital for pregnancy issues. You see, this is my fourth pregnancy, but I have never been there because my husband don't like and I also don't like and nobody bring anything, I mean meet me here and bring anything for me in the form of protection measures (ACM1 *Female Household Respondent*)

This study understands that as a result of the respondent behaviour of not visiting or attending health care services during her ANCs causes her to lack access to control measures usually given to pregnant women during their ANC period. This has also happened due to her husband's behaviour of being not comfortable with control measures provided or some any other reason. These behaviour showings by the respondent and her husband have implication to malaria control and prevention effort among the societies and communities that they come from. This is because such kind of behaviour increases the prevalence of malaria among people. Because already

pregnant women and children under five is described as the most vulnerable groups to malaria disease episode.

Another respondent further stated that with regard to availability of malaria control measures Malaria Action Plan for States (MAPS) is doing well in providing malaria vaccination drugs for treatment and insecticide net for prevention. According to the respondent all those services are provided free. The interviewee expresses his view as follows:

Honestly in every Local Government Areas of the state (LGAs) MAPS intervene in our activities seriously. They choose hospitals in all the LGAs and they have a good intervention. Here they distributed nets free of charge. ACT 1-4, AA 1-4 there is SP all free. This program is all over the state, it touched everywhere and they introduce the distribution of nets among the community. You see, this is also a strong control measure. You see, you are at your village, but mosquito net will come and meet you, is it? That is' it. Net is only what prevent people from mosquitoes. (ACM1- *Local govt manager SMCP*)

However, in a different direction a household respondent expressed during the study that he usually got insecticide net through his brother who use to provide it to family and community members. In addition, the respondent stated the shortage of those net provisions, as it is not enough for the whole of his family, which make him to use his personal resources to buy for those that do not get. The respondent clearly opined that:

I have an insecticide-treated net and I got it from my brother, Dr X. So it is from him I get it because he used to distribute it to the family members from time to time. But as a result of getting such nets from my brother he encourage me to go and look for some number to balance or make it available to the rest of the family members (ACM1- *Household head*)

Same respondent similarly added that:

I have an insecticide-treated net, but the one myself and my wife got from my brother is not enough for me and the entire family. Therefore, I have to use my money and bought it from the market to reach the rest of the family members. That is how it comes to me some free, some we buy it from the market, yes (ACM1-*Household head*).

Confirming the availability of malaria control measures across the state medical personnel in charge of malaria control services in one facility centre (Tudun Wada ward in Gusau central) expressed that, not all over the places that malaria control services is provided even in the city centre of Gusau. The respondent added that:

We cannot say every hospital and places have such interventions for malaria commodity. For example, here in Tudun Wada we have only six or seven hospitals such as King Fahad, Yariman Bakura, Damba, Dr Karima they are all given the intervention. So anyone that is given the slip to collect the net is only getting it here in the Dr Karima center. Anywhere you are in Tudun Wada ward you can only collect it at that centre (Dr Karima). However, for pregnant women it is given in the places that ANC is taking place. So it is not everywhere (ACM1- *NGO working for malaria control*).

This assertion supported by a household head respondent who reveals to the study the situation of malaria control measures in those facility centres where such provision is taking place. The interviewee supported the assertion and expressed his experience as follows:

Base on my experience of going to the hospital I know that they have a malaria mosquito net that have been shared with people who need it and households. I also know they also give pregnant women's medicine or malaria prevention too. And one of my aunt too who is pregnant, any time when she goes to antenatal, the first time when she goes to antenatal they give her meat. Anytime when she goes to antenatal she is given, they give her malaria prevention tablets that she takes so that to prevent her from taking malaria. So at least with that little experience there are prevention measures on the ground that people are benefiting from those centres. (ACM1-*experience household member*)

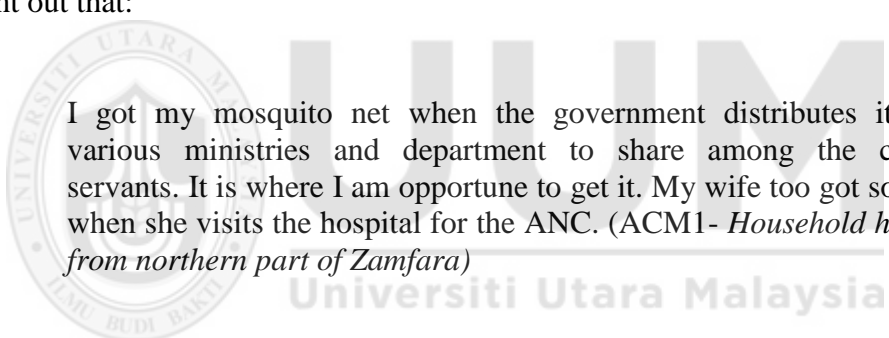
This study also discussed with Deputy Manager Zamfara state Roll Back Malaria Program under the National Malaria Elimination Program coordinated by both federal and state ministries of health. The participant responded clearly on the issue of malaria control and prevention measures and commodity that is available. The participant lamented to the study that:

There are drugs put in place in all facilities centers we have. Honestly we have 263 hospitals that we are supporting, and I assured you that from January 2011 we avoided out stock less than 2.5%. Less than 2.5% I do not know if you understand, what I mean, okay, out of 100%, 97 are in stock. That is out of 100 days 97 days have drugs. Is only 2.5 % that we have out stock and is as a result of this DDIC system that Zamfara state is among the piloting state of the system. This DDIC system will allow them to take drugs in every two months in the central medical store to the health facilities. (ACM1- *Deputy RBM Manager, State Roll Back Malaria*)

The respondent goes further to explain how those commodities are distributed based on DDIC guidelines and principles so that so eased away out stock problem. Because the respondent stated that it is only when those malaria commodities are available that objectives of the Millennium Development Goals (MDGs) will be achieved to eradicate malaria. The respondent stated that:

If they come to health facilities, they take the drugs. If they come they access their average monthly consumption that is the drugs they consume per month if they are taken 100 per month than they collect 200. So they will not come till after two months. So that is how they are doing it on each drug AA 1-2-3-4, SP and RDT that is how they are doing it. So those health facilities, there are drugs all the times. Moreover, you know medicine is one of the recommendations to be provided to control malaria according to MDGs objectives 2005. (ACM1- *Deputy RBM Manager, State Roll Back Malaria*)

In a similar discussion a household head from northern part of Zamfara confirmed that, his old pregnant women got her net during her ANC visit to hospital. While he got his own at the time that the government and some partners distributed the net across the various departments and agencies where he is working. The respondent's point out that:



I got my mosquito net when the government distributes it to various ministries and department to share among the civil servants. It is where I am opportune to get it. My wife too got some when she visits the hospital for the ANC. (ACM1- *Household head from northern part of Zamfara*)

Thus, the respondent lamented the ownership of net between him and his wife; he also pertinently reveals that rest of the members of his household lack net ownership. These indicate that nets provision and distribution is not covering all community members. This is in line with information received from one participant among the partners in charge of the provision and distribution of malaria commodities across the state. In a very coherent manner the respondents reveal that their programmes, did not yet cover the entire Zamfara. The respondent lamented that:

So far we are not covering the entire Zamfara state, but we are covering the substantial number of the facilities centers. So to say for now we have about 213 facilities that we are supplying those anti-malaria drugs. However, gradually we are increasing the number as I told you before. The body is not covering the whole, but we are increasing the number of facilities from time to time. (ACM1- *Direct Delivery and Information Captured (DDIC) Coordinator*)

In another conversation with different respondent but also from state malaria control office, he stressed that malaria control prevention measures are about two ways. The one is net while the other is residual spray. Of interest here is on being those control measures available. The respondent provided some detailed about the situation of the availability of those control measures put in place for malaria prevention where he stated that:

We have the net. We only have the problem of spray because the spray is costly. I know the amount of money budgeted for that during the development of the state annual operational plan for malaria. If we are talking about to carry out indoor residual spray alone in the state, even to sample one LGA, it will cost much money. (ACM1- *Monitoring and evaluation officer SMCP*)

Respondent similarly stated the situation on the availability of other control measure and further added that:

If you go to our health facilities, where we have a global fund supported facilities per LGA all those commodities where available. We gave a net to ANC pregnant women and malaria commodity that include the free RDT test kit and ACT itself. The two types of ACT are all available. So, on prevention measures, the structure exists in those facility centres (ACM1- *Monitoring and evaluation officer SMCP*).

In a related discussion a household respondent, through qualitative interview reveal to this study why it is difficult for them to employ fumigation services as part of the measures for malaria control and prevention. Those situations are mentioned by household member during the interview and stated clearly that:

Among the reason I am not engaged in the fumigation services is because of the nature of my income. Because what I am earning is not enough for me to cater the entire needed fundamental requirement in the household. Therefore, I take fumigation as something that is not required and urgent attention. I know it is important, but the little I have not allowed me to engage in it (fumigation). I know with fumigation the prevalence and malaria incidences will drastically reduce. However, to me only because I do not afford to do it that is why I am not doing it (ACM1-*Household Respondent*).

Another respondent also commented on the issue of available, malaria control measures existing in Zamfara. He mentioned that during this year (2014) budget for state malaria annual operational plan, effort is put in place to ensure those malaria control commodities are available. The respondent averred that:

One of the measures is that we have a malaria budget in the state annual operational plan. We are having in the state and in that one we have some activities that have been carried out for malaria activities and one of the measures that are taken are for the prevention of malaria by ensuring that those prevention measures will be available during the period. Facilities distributed with ACTs, RDTs, test kits and LLIN for the prevention of malaria. This is given to over 50% of the facilities in the state are haven this ACT, RDT, and LLIN given free of charge. (ACM1- *State data bank manager*)

However, in a contrary statement, a household respondent from a rural area of Zamfara state clearly stated that those measures do not exist in rural areas unless in urban centres. The respondent lamented that:



To my knowledge most of the rural community members still are using traditional herbs and concoction for disease remedy including malaria. People even get do die before reaching the places that those services is available. This problem seriously attack my behaviour of health seeking practices (ACM1- *Rural household respondent*)

He further points out that:

Can you use what you don't have? So I do not have it that is why I and my children are not using it when we are sick. So at the time we had the traditional medicine like (*Bedi*) (*radar*) to cook them and take the water like Lipton tea. Sometimes our people are getting into a coma or even die before going to where those services are available. (ACM1- *Rural household respondent*)

This study interviewed the director of public health services of Zamfara state ministry of health whom his department is overseeing the activities of malaria control and elimination across the Zamfara state. The director mentioned more on those prevention measures and their availability in the state. The respondent stated that:

We have this regular supply of this AA drugs and some other drugs from our supporting partners. The *artesunate amodiaquine* drugs than the *artemether amodiaquine* and then another variance..... We have this and, of course, is supplied to the facilities. We have the net usually that we get again from our supporting partners. If you go to store the net are there, and there is a program or activity, you know that take care of the distribution of the net. Previously the net was distributed to target audience, what do I tell the targeted people, which include the pregnant women and under five children. So the net was usually distributed during ANC. But then there is another strategy now expanded to the corporate members in the community and with that of course we have people now, of course, in line with that the faith-based organizations the schools are being targeted among those to be given (ACM1- *Director public health services*).

Furthermore, the director also stated other means available for malaria control that include environmental sanitation. The respondent confirmed in his own statement:

Yes, so far this net distribution, drugs we can say this one are available. Not only this you see we are working hand in hand with the ministry of the environment with Zamfara state environmental sanitation agency, you know concerning the clearance of environmental. As you can see now in Gusau may be weekly you see youth that have been employed by ZESA that is taking charge of this clearance activity. You are here just when I tell somebody that on Saturday the state ministry of health went to participate sanitation activities in Gummi. Game emirate they flush an environmental sanitation program in the LGA now, which aim is clearing the environment, of course this are part and parcel of the control measures toward the malaria elimination in the state. Yes. There are so many; there is indoor spraying, outdoor spraying all that they do for malaria prevention. Even the ministry of the environmental protection agency itself the ZESA you know, this spraying that they go out to do in the communities. So it is also part and parcel that we are working hand in hand, yes. (ACM1-*Director public health services*)

This study shows some divergent information about the availability of malaria control measures even among the stakeholders that are working for the disease eradication in the state. However, a significant number of participants show that there are control measures available to some selected government facilities in the state. While some respondent who are household members displays the presence of control measures, but also not reached all the members of their family.

Though the main aim of this theme as highlighted in its definition is to find out whether malaria control measures are available in Zamfara state. But at the same time some responses from those interviews shows how the presence or being those control measures available influence household behaviour for malaria control and prevention. Some of the responses also reveal how the absence or shortages of malaria control measures serve as obstruction to their effort of malaria control which consequently influences their behaviour in an attempt to engage in malaria control practices. Available control measures are therefore considered as a factor that affect

household to carry out or failed to conduct malaria control and prevention. The next theme discusses household behaviour on available control measures and malaria prevalence.

#### **5.4.2 Household Behaviour on ACM and Malaria Prevalence**

Malaria prevalence, causes frequent suffering to human society and influences tremendously, the unkind and gigantic burden on the human population. It is stated that out of the more than one million deaths caused by malaria worldwide, 90% take place in sub-Saharan Africa (WHO, 2012). Malaria is a public health problem of global concern because of its high economic burden on the nation, the high pervasiveness of morbidity and mortality in children, pregnant women and individuals with weak immune systems justify global malaria concern. The focus of this theme is on household behaviour and malaria prevalence. The theme provides some insight about the role household behaviour on available control measures play to malaria prevalence. This study finds out that household behaviour on available control measures in terms of their use and acceptance increase malaria prevalence. Similarly, the high malaria prevalence, causes many household members to seek for available control measure for disease control and prevention.

Responding to the issue of how household behaviour on available control measures and the prevalence of malaria in Zamfara state, a respondent working with state malaria elimination program as advocacy communication and social mobilization desk officer stated that:

Malaria prevalence is attributed to the person's behaviour. Yeah. Because, you see many of our people do not take adequate care for the prevention of malaria unless the situation becomes worse. We are still noticing during our mobilization program that household up till this time does not recognize or accept to use some malaria vaccination for those affected or use any prevention mechanism for protection (ACM2- *ACSM desk officer*).

Same respondent further stated that:

You know there is the perception of how people define and accept so many things which no doubt as you knows influence their behaviour. The major problem here is that many household heads do not recognize the importance of control measures provided. Many of them perceived it as an attempt to regulate or to introduce family planning. So to be sincere some of them are not very comfortable with those control measures which is the main engine driving their behaviour from using such control measures for malaria control and prevention. I heard some household saying that anyone who sleep under ITN or LLIN if he is a child, he will not produce children during his life period and if he is an adult he will also not produce any children again. Those are all behaviour that make them to not utilize and use those control measures which the result is yielding a high malaria prevalence (ACM2- *ACSM desk officer*).

Another respondent stressed further that some behaviour of the household heads with regard to using available control measures is what cause the high prevalence of the disease. The respondent concludes that:

I blame household heads for the high malaria prevalence. My reason is that the majority of them do not allow their family members to use available control measures provided at our facility centres. Though so of them allow but I am talking about the number of those that do not allow. You know, in terms of number and their percentage. I had some among the household saying it is not only the malaria that they suffer from why their choice to provide only protection and treatment for malaria. Why not on food provision. So you see, if you look at this you can easily understand that he is not ready to use those available control measures and I think this behaviour of not using those control measures for malaria control and prevention is what currently increases its prevalence. But thank God now there are a lot of awareness and sensitization campaign (ACM2- *Local government officer in charge of malaria control*)

Further evidence of the household behaviour on available control measures and prevalence is provided by another respondent working with an NGO. Though the respondent recognized the prevalence of malaria due to the high turnout and complain of people, but he concludes that some household behaviour is responsible for the disease prevalence. Because they are unable to comply with how to access available control measures and it is contributing greatly to the increase of the disease prevalence.

You know malaria is high among pregnant women and children under five. Those people are categorized as most vulnerable group suffering with malaria. As a result special attention is given to them to have free malaria prevention and treatment. But for pregnant women is only for those attending ANCs and for children is only for those receiving immunization services. However, many of the household heads do not encourage or even allow their family to go to ANC during pregnancy or child's immunization. They believe that those malaria control measures is provided for the family planning to limit the number of their family size. To me this constitutes their behaviour on available control measures which in turn increases the prevalence of the disease as we are witnessing now. But we are making effort with assistance of international donors to mobilize those with this behaviour so that to enlighten them on the purpose and importance of those control measures (ACM2- *NGO working for malaria control*).

Interview with the household head reveal to this study how household behaviour on available control measures increases the incidence of malaria. The respondent noted that:

What usually do in cases of any malaria incidence in my household is to first watch the condition and seriousness of the disease. After that I then decide on any other alternative to employ in order to address the situation. But at the beginning of malaria or any related diseases I am not in a hurry to provide any intervention (ACM2-*Household Respondent*).

The respondent states some nature of delay in seeking treatment when suffering from malaria. Those actions and behaviour among household inhibit them to seek available control measures for malaria disease control and prevention, which at the end increases the prevalence of the disease. Another household respondent state some etiological understanding of malaria, which influences his behaviour by using control measures for malaria prevention. The respondent informed of the study that:

What I can see provided as malaria control measures is not the correct one. Because the disease is the consequences of some witchcraft. The illness, called malaria is caused by some witchcraft who is the enemies of people progress. Many people just need to harm you in order to not have a good harvesting during the rainy season. This is the main source of the disease. You see, that is why it is more rampant during the rainy season. To me providing some mosquito net and drugs for malaria protection is not capable to protect someone from witchcraft attack that is malaria. That is why you see as far I concern I do not buzzer myself thinking to apply or use anything provided for malaria control (ACM 2- *Household Respondent*).

Another household respondent stated that:

Malaria control measures do not provide any solution to the problem of malaria. I think malaria is a disease and Allah alone is the one who cause the disease at the time he want and also take it at the time he likes. If that is the case, what makes you worrying yourself looking or using some control measures. Leave everything to Him alone and see because he is the best practitioner. I am discouraging anyone to look for assistance when they are sick but only restricted to my own household members (ACM 2- *Household Respondent*).

The findings reveal that household behaviour on available control measures contributed or have connection with malaria prevalence in the state. Many of the respondents claimed that household heads behaviour and their action taken or shown with regard to control measures add to the high rate and consequences of the disease. However, some of the respondent most of them household heads informed to this study that the high rate of malaria prevalence among them encourages or influences their behaviour on treatment seeking practices.

This current study interview how the trend of malaria prevalence influences household behaviour to use available control measures at their disposal for malaria control activities. Interview with the household head in Gusau local government area reveal to the researcher during the interview that household behaviour on available control measures influences behaviour due the prevalence of malaria which encourages household member behaviour of taking those available control measures.

The respondent stated that:

*Ehh* you see now due to the knowledge of malaria prevalence and its causes among the society, many of the people began to demonstrate various actions available for its control and management. Now a day's people began to understand that high fever, body heat and convulsion, especially among the children, is as a result of malaria. So you see this is what influence people, especially in this community that I know to take many actions as possible as we can for the protection of this disease. So you see this influence our behaviour in terms of taking possible actions at our disposal to protect and treat malaria (ACM2- *Household Respondent*).

On the other hand, another household respondent in the same Gusau local government area provided information on the issue of malaria prevalence and how it influences behaviour, in terms of prevention and treatment seeking. According to him it is malaria prevalence that influences household behaviour. The respondent believed that malaria prevalence provides a critical role in the thinking and behaviour of the human community, especially in the area where the disease prevalence is at the highest rate. The respondent recaps in the following statement that:

Malaria prevalence is serving as a vital factor in influencing household behaviour in malaria control and treatment. For example, as a household your child or any member in the household suffer from malaria disease and in so many instances, people die as a result, will it not be an influencing factor for you to come up with a solution to that problem? Let say for example, or as it is always said in the media and also by many health workers that mosquito bite causes malaria. You see as a result of your experience of the prevalence of the disease and its consequences to you as a household head in particular you have to no doubt, resort to behaviour of let's say avoiding mosquito that cause malaria (ACM2- *Household Respondent*).

Another respondent provided a similar account of what follow next in terms of behaviour influence due to the malaria prevalence. The respondent stated that people are scared and worry too much about frequent malaria cases reported. The



respondent mentions that if you go to the hospital you see many of the visitors has an element of malaria episode. In a short portrait of how this influence behaviour, the interviewee reported that:

In the media I heard about malaria, if I visit a sick person either in the hospital or in the house you hear that he is suffering from malaria. Sometimes if somebody dies, you be told he dies as a result of high malaria. So for that reason many of the people have believed about malaria and its causes. I am telling you this makes me to take extra care and caution for the treatment and protection of the disease. One of the cautions that somebody like myself takes is to ensure that my behaviour and action abide by going on with anything to get out from malaria. Also abstaining from anything that makes me and entire household closer or being infected by the disease (ACM2- *Household Respondent*).

The respondent further stated that:

As a result of this now, you can see the moment you hard any prevention or vaccination about malaria people now start seeking for it unlike before. This action taken to use malaria control measures, especially those provided at some hospitals is because of serious consequences we suffer from the disease. So I am very bold to say malaria prevalence without doubt influences our behaviour on using available control measures (ACM2-*Household Respondent*).

According to the staff working with state malaria control program as monitoring and evaluation officer responded on the issue of household behaviour on available control measures, the respondent summarized in his own word that:

Yes, exactly, you see, as I am talking to you now believe me people are not well ready to comply with the use of control measures. These cases I am telling you are not only in the rural areas including in the city centres. Go and find out the percentage of those attending ANCs and those that are not you will be surprised. Our people use to take their self and family away from those services provided mainly for them. But thank God we understand they have the negative perception on the control measures. But believe me household current behaviour on available control measures has serious impact on malaria control activities (ACM2- *Monitoring and evaluation officer SMCP*).

Still in the discussion on how behaviour and people's attitude influence malaria prevalence cases, many of the household heads stated how they responded to malaria prevalence by showing some behaviour and actions on control measures to be taken. Interview with a participant of this study of Bukkuyum local government stated that household behaviour encourages the malaria prevalence in the area as a result of their action and response to the disease. During the interview, the participant clearly averred that:

In our case here, you see many of the individual, including the household that are taking care of others have the behaviour of showing a lack of much concern about the action to be taken when the disease is serious. So actually people have the behaviour of not taking the proper action at the initial stage till the situation almost become worst. What only make the behaviour of people of taking any necessary action is when things are complicated. So complication and high prevalence are what influence behaviour in terms of treatment, prevention or taking any control measures for malaria (ACM2- *Household Respondent*).

Another respondent from Gummi local government has informed the researcher during the interview with him that malaria prevalence do not necessarily influence any behaviour in terms of actions to be taken concerning malaria control and prevention. Many of the reasons attributed to the cultural and the etiological

definition of malaria and also their perception on available measures in place. The respondent stated that:

The issue of household behaviour increase high malaria prevalence does not make any behaviour influence to my understanding and believe. First of all, even if the person sickness is at the critical stage you have a believe that only what God wish to happen will happen. So even if you rush to provide something that you believe can solve the problem, can you solve what God wishes not to solve? You cannot, and you will never. So that is why we have nothing to influence our behaviour on doing anything to address or solve disease episode (*ACM2 Household Respondent*).

Similar narrations are reported by another middle age respondent in Zurmi local government area council. The participant stated that household members responded to the issue of malaria base on their belief. Their belief and behaviour encourages the malaria prevalence. The respondent stated during the interview with him that:

Our belief about the will of our creator is always in line with our behaviour in doing and responding to so many issues. Whether the disease is serious or not, whether with high prevalence or not in short, no matter the situation, it will not turn or change our behaviour to be contrary to what we believe. I am telling you what influence our behaviour is our believe system guided by our religious teaching and understanding (*ACM2 Household Respondent*).

There is also a divergent view reported by another household respondent in Kaura Namoda local government area council. Behaviour shows by the respondent may positively impact to the decrease in malaria prevalence. The respondent is of the opinion that:

Any right thinking individual will not say this high episode of malaria does not change his behaviour and attitude in terms of action taken for treatment and prevention of the disease. Unless someone who is not showing his position of heading the household or someone who is not showing any form of sympathy to his loved ones or humanity in general. However, to me and the rest of the people like me with the similar assumption, issue of malaria prevalence likely to influence our behaviour for taking or providing available control measures for treatment and prevention purposes. Sometimes I am telling you even because of the love and showing sympathy to those affected. I think even at the individual level you even ask yourself to show behaviour that will add to your effort of providing prevention and treatment (ACM2 *Household Respondent*).

A similar view narrated by household in part of the community of the Anka local government council. The respondent stated during the interview that people's behaviour and attitudes influences the prevalence of disease. Their behaviour in terms of treatment and prevention seeking behaviour believe to be not encouraging. The respondent reported in his own words that:

In this community, we have someone that is seriously sick for over five years. He is not doing anything for himself due to the critical situation he is in. However, this is not changing people thinking and behaviour of taking any other alternative for his critical health situation. So it is usual here people behaviour lies in such a way. You only come from time to time visiting and greeting him. If behaviour remain the same with someone in this injury time what you think about someone who fall a sick just today or for the last few days and suffering from what many of us believe to be a very simple and common disease called malaria (ACM2 *Household Respondent*).

Interview with household respondent in Tsafe local government reveal during the interview that though malaria cases in the area are still high, but there is element of disease, decreasing due to the household behaviour on available control measures and activities of any organization working in malaria control. He opined that things are getting better as there is an improvement due to the current partnership

intervention by the local and international organization on malaria control and prevention. It observed that there is the presence of agencies that are providing many programs with aims of treatment and prevention of malaria. Those organizations include Malaria Action Program for States (MAPS) which is a United States agency. There is also Society for Family Health (SFH) and several other NGOs. When ask how do activities of those partners related to household behaviour and decreases malaria prevalence, the respondent informed that:

Yes, you see there are control measures provided free by those partners, which greatly influence people behaviour to go for such control measure since it is free and due to their behaviour of patronizing such intervention activities is what lead to the decrease of the disease that I mentioned to you earlier (*ACM2 Household Respondent*).

Interview conducted revealed how household behaviour on available control measures influences malaria prevalence in terms of treatment seeking behaviour. It is also shown how the prevalence of the disease influences other household members to employ control measures available for the management of the disease. Findings under this theme informed to this study that in some places malaria prevalence and presence of control measures do not influence behaviour due to the etiological understanding people give to malaria. The next theme is on the reasons encouraging or discouraging household behaviour on available control measures.

#### **5.4.3 Reasons Encouraging/Discouraging Behaviour on ACM**

One of the fundamental assumptions of this research is the issue of availability of malaria control measures and household behaviour on those available measures. This theme is on the factors and reasons that hinder or encourage household behaviour to use available control measures. Because it is generally stated that there is a serious

imbalance across the globe in the distribution of formal health care facilities and services in many third world countries Nigeria inclusive. Further, disparities exist in making those prevention measures available and the distribution of modern health services found, between the urban centres on one hand and the rural areas on the other which also impact on household health seeking behaviour (Adenipekun, 2013; Okafor & Amzat, 2007). Therefore, this section focuses on those disparities and several other cases.

The main concern of this section of the interview is to identify factors or reasons that encourage household member's behaviour on available control measures. This is in order for them to use or apply those control measures for the purpose of disease control practices. On the other hand, the interview also conducted to explore the discouraging forces causing household member to avoid applying or using control measures available for malaria prevention practices.

The interview is conducted with the household respondent towards his behaviour on available control measures. This behaviour according to the respondent is regarded as action performs in order to protect and maintain his health status from illness caused by malaria disease. The respondent summarized that:

The severity and nature of malaria are very influential factor in my treatment of malaria. Not malaria alone includes other diseases. So if the disease is very severe, even without the assistance of anybody I look for those control measures available for the treatment. For example now I have some element of malaria, but it is not so serious and at this stage of the disease I don't think of looking for any prevention measure for the treatment. But the moment I notice it may be serious, because if it is going to be serious it may be recognized at an early stage, so when I notice such situation before you know I report myself to the nearest facility centre where control measures are provided. When it risk me unexpected I therefore look for the assistance of people nearby for assistance to either take me to where those control measures are available or bring it to me at home (ACM 3- *Household Respondent*).

Another household respondent is interviewed with regard to his behaviour towards using malaria control measures for the prevention and treatment of malaria disease.

The responded informed during the interview that:

As a result of the presence of a number of treatment options including traditional and belief system of disease control and management I sometimes confuse on which, among the treatment measures available are suitable or better to use especially in the case of malaria that is on a daily occurrence. On my own site tradition and as I told you the belief system let say my religion (Islam) cause some delay which for so many times make me to abandon or not seeking the appropriate control measures available for disease treatment and prevention. Some time also there is a lot of decisions, you know of which one to go for. So in the process before you know somebody may advice to say that please just leave it is just work pressure or is just because of this and that. So before you know somebody convince you to not look for those control measures to treat malaria. In short, I have such many experience of such kind. For example, there is a time that I am sick one of my friend come visit me and I told him that I just planning to go to hospital for treatment, he just reply me back that is like you are looking better just wait for tomorrow and see and that is what happen (ACM- 3 *Household Respondent*).

The findings of this study show that cost imposed to available control measures of malaria is affecting many household heads for the treatment of malaria due to their socioeconomic conditions. Because it is found out that malaria control measures

provided free is not everywhere. Therefore, places where those control measures are not available required household to pay for them at a high cost. This situation is informed by the respondents as a factor discouraging them to use those control measures at the market for the treatment. Interview with household respondent from Gusau local government reveal during the interview that:

Malaria control measures are very expensive I do not afford to buy those control measures for malaria treatment because of the charges imposed upon to those drugs and vaccinations. Even the insecticide treated bed net is very expensive in the market. It is cost too much. I cannot spend, the less I have for that reason. But it is the one provided in the government facility centre I have no problem I can use. But the problem is how to get it. If I put my household income for malaria treatment, substantial part of the income will go for it which I think of me is not proper. So how do you think somebody with these situations afford to buy control measures available at market for malaria treatment (*ACM-3 Household Respondent*).

Another respondent informed to this study that lack of money to buy control measures is the most outstanding reason behind their behaviour towards using such control measures for malaria management. The respondent stated clearly during the interview that:

I have no reason for not utilizing malaria control measures than lack of money or resources of doing so. You know it required money to find those control measures. Because they are not provided free here. So if you need protection or treatment using those preventive mechanisms it means you need to pay for it. My income is very meagre to have those interventions at pay point. This condition is no doubt in my own case influences my behaviour toward using such control measures for malaria control (*ACM- 3 Household Respondent*).

The current study interview, it's respondent to find out what would household do differently in such situation of cost nature of malaria control measures in places



where they are not available that make household to pay for it. The responded reply in such a way that:

In that case depends on the nature of the symptoms. If it is complicated in nature, therefore, an effort must to be put to acquire such control measures. For example, I don't know how many time I sold my belongings a valuable one just for the reason to provide the treatment for malaria disease. This is the only solution for you. Sometime I get one quarter of the amount I bought what I have to sell. But I have no any alternative than to accept it because it is the last option for me. The situation is very painful, but it is a will of God you can't escape it and thank him for everything he did to me (ACM- 3 *household Respondent*).

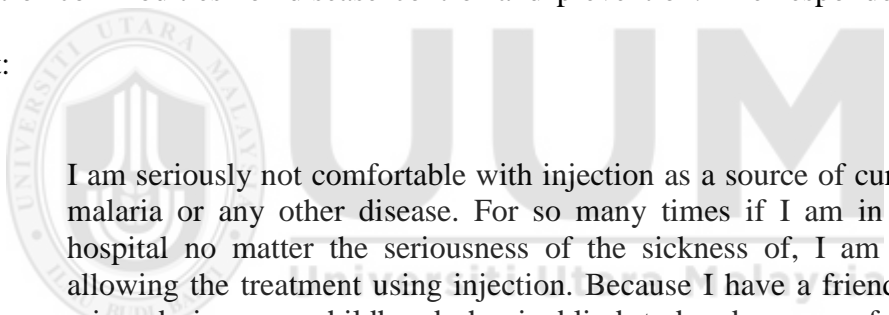
In this case another respondent shared his experience on the next sort of action he usually engages into if those control measures is beyond his ability. The respondent stated that:

I have a friend of mine that lend me some amount of money if I find myself in such kind of situation. I use to go and inform him that this is the situation I found myself if there is chance to please borrow me some money to take care of the problem so that if thing become normal I return them back to him. We are very close and he is very understanding and caring. Some time if I return to him, he asks me to leave it. I use to tell him please take it so that if it happen tomorrow, I may come back. So this is how I do because is better than to go where those control measures is provided free to waste your time (ACM-3 *Household Respondent*).

Widow respondent informed to this study during an interview with her about the action taken due to the high price charge when buying malaria control measures. The respondent replies that:

You see I have five children that I am taking care of because their father died in the last five to six years I think. What I usually do when some of them is sick, I use to take him go round to the mosque where people are gathered for prayer and look for assistance. Some time somebody may take care of the whole expenses, sometime through contribution from various people. Because some time back there is provision of giving much attention to orphan and less privileged people. But now they say there is hospital for less privileged people, but those control measures for malaria treatment and prevention is not available or provided there. But when I go round to show (*Alumma Annabi*) the situation we are they seriously assist and really appreciate it (*ACM-3 Household Respondent*).

Respondent during the interview expresses his fears using some available, malaria control commodities for disease control and prevention. The respondent informed that:

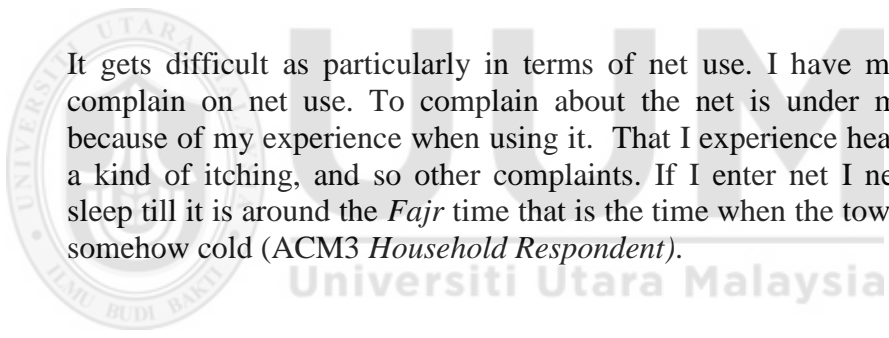


I am seriously not comfortable with injection as a source of curing malaria or any other disease. For so many times if I am in the hospital no matter the seriousness of the sickness of, I am not allowing the treatment using injection. Because I have a friend of mine during our childhood, he is blind today because of the injection. Even in this area today if you like I can show to you some negative consequences cause by injection to many people. This reason is behind my reason to take myself away from malaria treatment using injection. Believe me that is why I am not comfortable with all the rest of control measures, especially the ones used for injection (*ACM-3 Household Respondent*).

Under this circumstance highlighted by the above respondent, he explained further the next line of action usually takes due to the fear developed as a result of a bad experience of using some control measures. He stated that:

What shall I do than to use traditional means available for curing the disease. Even if this traditional or any other comfortable means apply and the disease persists, I choose not apply those control measures using injection. I some time did nothing especially when the treatment I try at home using the local method fails (ACM-3 *Household Respondent*).

Interview with household heads in Zamfara state reveals that there is complained from different angles among those that are using the net that their behaviour regarding using the net as a control measure for malaria prevention is not encouraging. It is due to their various complaining on the net. So as a result of this their behaviour and actions are not in line to those insecticide nets that are giving to them. With this regard, one of the respondents stated that:



It gets difficult as particularly in terms of net use. I have many complain on net use. To complain about the net is under most because of my experience when using it. That I experience heat or a kind of itching, and so other complaints. If I enter net I never sleep till it is around the *Fajr* time that is the time when the town is somehow cold (ACM3 *Household Respondent*).

It is through that household perception of the problem associated with some control measures serves as determining factor for their treatment seeking practices.

Household respondent reveals that:

My definition of the control measure available or the way I understand them is what determine how encourage or discourage they are to me in terms of their treatment seeking behaviour on those measures. You know I personally understand and define some control measures having some sort of problem. For example net used for malaria prevention it causes itches and heat. I understand that chloroquine has implication to pregnant women and it also causes body itches. Many of those perceptions and definition discourages me and my family members to use those control measures for control and prevention of malaria disease (ACM3 *Household Respondent*).

When asked what usually do if those control measures is not suitable for them, the respondent added that:

Sometimes I do not have any alternative to providing other means of prevention. The only thing is that you know if people define something as wrong or not suitable for them is a big task for you to change their behaviour on that thing. I, in general, have the behaviour of not using net due to it kind of heating and itching even if it is the last option. That is why you see me prepare to use the leaves of the tree to help me protect mosquito than to use a mosquito net provided for malaria protection. You see this happen as a result of the unsuitability nature of the control measures I personally notice, define and understand (ACM3 *Household Respondent*).

Another respondent also stated during the interview that his actions and behaviour is not influenced by control measures such as nets, drugs. The respondent stated during the interview that his behaviour is to surrender everything on hand of his creator for any disease he is suffering. That belief is said to deter him from seeking malaria prevention using available control measures. The respondent averred that:

I know we do not, there is no provision that when you are sick, you are not suppose to go to, I mean to attend to any health clinic. But I know and still believe that when I am ill, I just say (*Allah ya kawo kuma shi zai daukewa*) that is God that made it to me and he is one to take care. So I have that believe that I think everything that happen to me is from God, and God will take care of me. So with this believe even if you bring something to me no matter how you make it available will not to my own opinion and understanding influence any of my behaviour for its use. Or do you think is there any drug or vaccination intervention for disease treatment and prevention that is better than rely on my creator? No, there is not (ACM3- *Household Respondent*).

In a very similar way, another respondent highlighted the influence of household behaviour concerning available control measures on malaria control. The respondent lamented what influence his behaviour at times is his belief practices. Because he has a lot of believed that when he is sick, it is not malaria, but some evil or devil that

attacks him. According to the respondent treatment on that aspect required divine intervention. He has also shaded more light on that by saying:

You know malaria as far as I concern up to now I do not believe that malaria can do worse, or even the disease of fever are from it. To me, I take malaria as simple disease or do not even exist. So with that my understanding is still there and is what in most cases influence my behaviour, especially on those control measures that are saying is purposely for its control and prevention. Even if there are prevention measures available, I said and I told you I will not use it because it is from western countries that are aiming to do negative to Muslims society. Some time people come here when one of my subject are severely sick thinking they can influence me to take him for those control measures but I insist I do not. Some of those kinds of diseases that they are agitating as malaria, there is nothing to solve them than divine intervention. Look at a situation that someone is sick that he cannot even swallow water and start mentioning to provide him with drugs or some kind of treatment. To me at that point, nothing works than divine treatment (ACM3-NGO Respondent).

A household respondent was asked during the interview what behaviour of malaria treatment he engages into when there is a no available control measures, any misconception he has, or when do not believe in the existence of the entire disease itself. The respondent lamented that:

I do not believe in my household that what introduce by western society will be used to control any disease I and anyone belong to me are suffering. What I believe with, is that all disease I am suffering is better understood and cures traditionally. Therefore, as a result of introducing any control measure which is not from us do not influenced my behaviour to use those control measures for malaria prevention and treatment. To my understanding the control measures lacks the local acceptance. I prefer local treatment because I feel safer with it and also available at any time needed (ACM3 Household Respondent).

However, concerning the linkage between the availability of malaria control measures and their influence on household behaviour, finding from the interview provides rather a divided result. In a contrary statement to another respondent

mentioned that making available, malaria control measures seriously influence behaviour on treatment seeking practices. The interviewee provided the reasons why control measures influences behaviour as follows:

Yes, very sincere, it influences my behaviour. The control measures usually give to me really appreciate it and I am happy because it is free not charging me anything this is what encourage my behaviour. Moreover, after it is free, I myself see its impact. So anything with impact you know must encourage the behaviour. That is why now I am not surprised if I go to the hospital and find a long queue. Because I understand many people like me notice the impact. I send all my children's and their mothers visiting hospitals purposely because of the drugs and nets that are distributed free. So you see this is what influences my behaviour of attending to such hospital as a result of such thing that is giving there. Moreover, the majority of the control measure I know how to use them. Because if for nothing it is free. Moreover, I warned you on whatever you heard as freely giving, and it has an impact on behaviour and is given free. So there must be an improvement. So I am seriously enjoying such malaria control measures because it really assists me and I usually familiar with and know how to use or apply many of them correctly. Because I think some people even the failure to understand how to use those control measures matter. To me, I thank God that I am used to it, yes (ACM3 *Household Respondent*).

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In a more general way, another respondent also supported the view that available, malaria control measures influence behaviour. The respondent stated that if malaria control measures are to be provided adequately without out stock his behaviour will increase in terms of using such services. The respondent stated that:

If this provision continues to be available as the way those drugs and LLIN have been improved, you know that before I am using ITN now I am using what is called LLIN. ITN retreated after six months, and now the LLIN is used up to three years. So I am now being concentrated on it because it is better and available. It can take up to three years or up to 21 washes. So you see the strongness of the net reduces. So that's what makes my behaviour and acceptances are improving. Moreover, if this availability of those drugs and nets is taken care so to be sure its acceptance and use will be going on without any problem as I myself know it is unless those that not follows the criteria. The only problem is for me to look at this control measures and find it sometime not available (ACM3- *Household from Zamfara Central*).

Same respondent stated in the study the next line of action or behaviour shown when those control measures is not available. The respondent informed that:

I have nothing to do otherwise. Because being something that you rely on and look at it at your trial or critical time but find it not available. You see is very disappointing. In this case one has to think that if there is no certainty of the provision of those control measures, it means there is no or is not advisable to start using them. But if the provision, maintain and the quality improved all the time day by day, you know it is seriously encouraged my behaviour for some time to even consider myself as safe. Because of what of even if I have any trouble for malaria I at least have the first line treatment (ACM3- *Household from Zamfara Central*).

Furthermore, interview with household respondent further stated how he behaves in the situation of the absence of malaria control measures. The respondent who is from Tudun Wada in Gusau local government claimed that:

Yes, you see what I am doing is not something new per say because I am going back to what is called the root origin of the whole cases. I am now resorting to address the main origin of malaria distributor, agent that is mosquito. Because I believe malaria is caused by mosquito and mosquitoes breed at dirty environment. So with this understanding I have added it to the awareness among my household members by keeping proper cleaning of the environment, gutter and avoiding the keeping of water open. All those are measures put in place to tackle the causes of mosquitoes in the place. All what I do and telling my family members is about avoiding keeping belonging everywhere and other public hygiene all to protect from mosquitoes. With this I don't mind of whether the control measures in terms of drugs and other vaccination provided to be available or not. To me their absence has even blessed to me because it helps me to find my way (ACM3- *Household from Tudun Wada Gusau*).

However, being preventive measures for malaria control available seriously influences household behaviour according to the malaria commodity distribution agent. According to the respondent effort is in place to improve the present condition of providing malaria control measures as it is found out that it encourages household behaviour. The respondent affirmed that:

There is progress because there is adequate supply all the time. Because if you start giving something and stop, someone has come today and not collected, and another one come without getting it, is what causes the problem in the process. So people will say to others, even if you go you will not get it. However, if they know they can get it all the time, then that is fine it influences their behaviour all the time. Because there are some complaints we received from our suggestion box of dissatisfaction and disappointment, received by some people who look, for those control measures and find it not available. Due to this understanding there is effort making to ensure that these control measures are available at all times so that it encourages people to use them for malaria treatment and prevention (ACM3- *Commodity Distributor*).

Another respondent shed more light on how the availability of malaria control measures influences behaviour as follows:



Yes, well, well it influences behaviour. Before if you ask me for example to take drugs when I am sick of malaria I says where it is? However, now if you ask me to take drugs when I am sick, I simply know where it is and where to find it. Now, because I am in a place where control measures provided I can say all the time because if it is not available at government centre it is difficult to be not available at the market. Now I need no direction or advice from someone again looking for those control measures because I saw them, I try them and also found them useful to me. So any time when I am in need I just refer to places where I could find it. I use some time to keep some money in my house and tell my wife that you see this money is for malaria if I am not around for distance use it. So been it available sincerely helps greatly to influence my behaviour in malaria control. But if let say I have to pay more for travel expenses before reaching them, I thing (laugh) the situation may probably change I don't know (ACM3- *Household Respondent*).

The interview is conducted with the household head, bringing his pregnant wife to antenatal services in Tsafe local government area. The respondent explained in the study that his behaviour of visiting hospital for the ANC is encouraging. According to the respondent factors behind such encouragement is due to the services that are available. He points out that:

I think of what I see on my experience, I see a situation where at least for the fact that for my wife going to antenatal she always gets nets and malaria vaccination for treatment and prevention. However, this shows that being those control measures available is what influences my behaviour to go and have it. Also, I know that at least when I go with my pregnant wife for the first time, they give her mosquito net, they give her at least I know they take their tablets because when we go to the hospital she receive those malaria protection tablet she will swallow it at the movement. But in terms of whether it changes my behaviour, it is going to be difficult, is going to be difficult this is because you know, is the issue of if those control measures are available. Since they started it is always available, but I don't know if the time comes when it is not available which I am not hoping so whether my behaviour will change or not (ACM- 3 *Household Respondent*).

Another respondent from a rural household in Zamfara North stated that whether malaria controls measures is available or not he does not take malaria as serious that is the reason for him not having any behaviour for seeking treatment. He stated that:

Yes, because I do not take malaria as anything that required any treatment. I have a brother here that I just tell him that is not just ordinary malaria at least you just be a man and get well. I cannot believe malaria can kill me, so I do not care whether there is a mosquito or not. It is malaria, means while if it is Ebola come and see how I am going to rush because I know it is very easy that I can die in a seconds. But if it is an ordinary malaria so I am not serious about it, you know nothing influence me to go anywhere for treatment. My belief is mosquito is not the cause of malaria if I believe in myself why you just come and tell me take this for protection from mosquito just to avoid malaria. (ACM3- *Rural household head from Zamfara north*)

However, information obtained from another interviewee from the central area of Zamfara state is quite different. He said his wife behaviour on using the net as malaria prevention not only influences her behaviour alone, but to the rest members of the household. His statement is that:

However, in this instance at least I know that in my wife case she influences our children to sleep under the net. I think in our case it influences our behaviour. In that, I and my wife know that if I or she gets malaria it affects her, I and children. So I personally assist her to ensure that everybody sleeps under the net in the house. So she is angry if somebody sleeps outside net. If I am around I assist her in the night and ensure everybody sleep under a net. The reason she seriously involve is because of the nature of my work that if I slept at home for two weeks I have to spend another two weeks outside. So for that reason I succeeded in giving her training and some time instruction you know their nature women very weak some time I just tell her to be sure that net are properly use in the night and thank God she is complying (ACM3- *Experience household head from Zamfara Central*)

A household respondent from the Bakura local government area in Zamfara state enlightened that people's perception; their attitude of not using net couple with the

attitudes of the people in that particular area is what influences his behaviour. The interviewee responded that due to the people's perception of using nets in the area he comes from, the experience he have concerning the negative side effect of the malaria AA drug significantly discouraging his behaviour in using those control measures. The respondent informed that:

The people's behaviour in my community is that people are not sleeping under the net that is number one. Secondly, the experience I have with the *A-A drug* even if you give it to me, I will not take it. Thirdly is about my understanding that malaria does not harm me. It is here in this place that my neighbour's daughter prescribed with AA drug and that is the cause of her death. So how someone now shall come and tell me to use this drug for malaria treatment for myself or my family. You see, for that reason, if my sense is with me, I am not even attempt to do so because of the direct experience I have (ACM3- *Household Respondent*).

According to Roll Back Malaria (RBM) deputy manager in Zamfara state, looking back at the previous time is what makes us to believe that being those preventive measures available significantly influence behaviour. The respondent lamented that:

Looking back to 2011 only 8 percent of pregnant women is attending ANC according to HIMS data. However, because we employed volunteers to go round and enlighten people that malaria commodity are now available, and they are free. As a result this influenced behaviour. So in every ward we employed volunteers that are going round the houses for awareness for going to ANC by women and if they meet somebody is sick, he or she advises him to go to the hospital there are drugs free. If they meet the pregnant women, she will be told to go to the hospital there is net for her free this greatly help influence them to go for such services. (ACM4- *Deputy RBM Manager*)

Same respondent also added that:

Because of the availability of those malaria control measures in your facilities presently our ANC attendance is about 40 and above percentage all because of those available measures. Moreover, we are conducting a community dialog at the end of every month. Every month we are choosing 2-3 LGAs. We go and invite religious leaders. We call traditional chiefs, community leaders, whatever, whatever and we sit down with them and identify issues and informed them about our intervention on malaria commodity and informed them that the drugs are free and so on. So these also greatly help influence their behaviour. (ACM4- *Deputy RBM Manager*)

According to the coordinator of Direct Delivery and Information Captured (DDIC) a piloting program for malaria commodity distribution in Zamfara state expressed that:

Yes, quite okay, it is influencing people to come really down to the hospital to seek for this medication. Because in some places when we go for supervision, we begin to hear from the population of the community telling us that before they don't afford to go to the hospital, but because of the availability of them now, and at the same time they are free of charge, you know at the same time it gives them a kind of motivation that influence their behaviour, you know, for them to go to hospital whenever they are sick, or they have someone that is sick. (ACM3- *Coordinator DDIC*)

An interview with another respondent reveals that as a result of the availability of malaria control measures it influences their behaviour by seeking those control measures. The respondent stated that before there is nowhere to found those things, but now they are very close to him which seriously influences his behaviour. The respondent stated in his word that:

Before I am not encouraged to use that malaria control measures due to several issues. One of the issues includes the absence of those control measures. However, now being them available is what influences my behaviour to go for those control measures. One other thing is that sometimes they have even reached me at home to give me an insecticide net for mosquito protection and you see it will influence my behaviour of using it which is not like that before. So there is behaviour influence being those control measures available, especially here in this community where I am living. But I don't know if what happen here also happen everywhere (ACM3 *Household Respondent*).

Another interview with household respondent conveyed to the study that due to the availability of malaria control measures in the facility centres it influences his behaviour as head of the household on visiting such places. The respondent conveyed that:

Well, I believe it is impacting positively on my behaviour generally, for at least getting remedy for my own ailment at all steps and gives me good results which I am happy with. I say it was influenced. As I said, it has been enhancing my behaviour to attend hospital whenever I am sick. That one at least influences my behaviour to affect my family in general because I am not like that before in terms of using malaria prevention measures. In the olden days I don't do that. I prefer to either stay home to take herbal medicine or herbal remedies or probably to start looking for money to go to health care facilities. But because those drugs are given free of charge now you know whenever I am sick or my family I can easily find myself at the hospital and the rest. (ACM3-*Household Respondent*).

The interview is conducted with NGOs working in malaria control in Zamfara state to find out what should do to improve the present condition of household behaviour on areas that malaria control measures is provided but people not really ready to use them. The respondent summarized that:

We do ward development meeting at ward level, community dialog, visit traditional rulers, religious leaders, we trained them, passed malaria key messages to them. During religious services they pass the same key malaria messages to the followers, that is another way we use, the volunteer, traditional rulers, community leader, youth leaders in terms of telling people how malaria burden is affecting the entire community so that to influence their behaviour on treatment-seeking practices. (ACM3- *NGOs Respondent*)

According to the data bank manager, in the state ministry of health, there is an influence in terms of household behaviour considering the outcome of the survey that conducted on the malaria commodity use in Shinkafi local government. The manager points out that:

Yeah, actually yes, because after the distribution of the net, there is one survey that has been conducted to know if the community or the people are using the LLIN. We have found out that over 80% of the people are using LLIN in the area that has been selected during that survey, and is just an assessment, we selected one LGA that was Shinkafi and we have found out that the people are using LLIN. So we can say what influence their behaviour was only those measures that are available. Moreover, one of the preventive measures is the use of RDT kits to pregnant women and this RDT kit is given to pregnant women and SP that has been taken instantly in front of the health workers during their antenatal services at our facility. (ACM3- *State data bank manager*)

Moreover, the data bank manager added that:

I have said that since the people are using that LLIN, so of course there is influence. Because most of the people that are having that LLIN they use to go to the facilities and collect that LLIN. One of the indicators that we are saying the use of LLIN or the preventive measures of malaria is that most of the facilities that are rendering ANC services to pregnant women are experiencing high turnout due to the control measures that are provided. The rate of their turnout at the time without LLIN provision their turnout data is low. But with the introduction of LLIN in various facilities they have experienced a high turnout for immunization visit because of the distribution of LLIN during health week. When given this prevention measure in all of our facilities we have experienced a high turnout in the use of facilities. So you see we can say is those available measures that are provided influence their behaviour to access those facility centre. (ACM3- *State data bank manager*)

Furthermore, respondents from MAPS clearly stated that, the commodity distribution that is available is the reason behind the high turnout visit to ANCs services among pregnant women because those that are already collected their own during their previous visit will not come back again because during the subsequent visit nothing is given to them. The MAPS official response to the following statement:

I have seen basically on how those malaria control measures influence peoples' behaviour on various visits to the hospital. For example, many of the pregnant woman my wife as an example does not care to continue attending ANC visit after they collected their net that use to provide at the first ANC visit. Many of them, they are like that they do not want to go when they believed they were going to collect nothing. You see base on that we can say it is that provision that influence their behaviour (ACM3 *MAPS Official*).

Similarly, advocacy, communication and social mobilization officer reported same as the above concerning how measures available influence behaviour of pregnant women to attend ANC. The respondent stated that:

Availability yes, influence behaviour I can even look and cite another example, in case of ANC visits by our pregnant women in the areas that we use to distribute nets you see many pregnant women use to attend ANC due to that nets that are being given free. So the ANC attendance increased where the nets are available in most of our health facilities centres. (ACM3- *ACSM Desk Officer*)

Director public health services at Zamfara state ministry of health lamented during an interview session a step by step approach taken by the ministry of health in collaboration with partners to improve the present condition of the provision of control measures in one hand and household behaviour on using or regarding those available control measures. The respondent stated that:

Behaviour it takes many things, the first and foremost is not only the conduction of the activities itself like this spraying, you are saying like the distribution of nets, rather health education. You see we are working hand in hand with the department of primary health care of this state ministry of health through their health educator, the state health educator under the department. We are working hand in hand with them, and we are educating the public. You know, or when activities came up some time you hear of radio jingles that are aimed at, you know mobilizing people so that we get their appropriate participation. So that is the only way we can say we influence behaviour (ACM3- *Director public health services SMOH*)

The interviewee continued on the issues to improve the current situation and stated that:



Not only that you know there is training, every now and then. For example the MAPS, we have another supporting partner the MAPS (malaria action plan for the state) for the past two years we are in the continuous training activities you know health care providers in the health facilities in the country from the federal level, and then this person we have the training at the state level. Initially, there is training at the national level. First of all the national trainers was trained. I was also part and parcel of those one that was trained that time when I was director, medical services that time (ACM3- *Director public health services SMOH*).

Same respondent goes ahead and revealing to the researcher during the interview that there next stage of action after national training is to conduct this training to local and grassroots level. The respondent further elaborated as follows:

So we have trained in Abuja we come back, and then we give a state down training. Then some were subsequently sent to the LGAs, they provide state down training and even community volunteers were mobilized, and they also trained. All this is aimed with, you know targeting the public. So that not only given them the drugs not only mobilizing them to take the net, but toward a set up modifying their behaviour as appropriate as possible with regard to malaria control practices (ACM3- *Director public health services SMOH*).

In line with the above discussion, an officer from Malaria Action Plan for States (MAPS) offers a solution on how to influence human behaviour concerning using available malaria control measures. The respondent suggested that:

I think we need more sensitization on the important of promoting a positive attitude, positive values, and positive human behaviour. If we get more awareness, more information, more education I think household behaviour will be more positive. Household behaviour people may think to embrace and take malaria prevention measures more seriously. Because I do not think people will understand the stress of malaria that is why we are taking it so lightly (ACM3- *MAPS Official*).

With regard to influence of household behaviour, household respondent suggested that revealing negative experience with malaria to those with poor disease perception

may likely to encourage their behaviour to seek for those available control measures for treatment and prevention purposes. The interviewee discloses his story during the interview to serve as a lesson to others to direct their behaviour into proper treatment and prevention behaviour. The interviewee averred that:

Because you see my blood type is AA+ so I am scared of malaria anytime even if I see mosquito I am not resting till when I kill it because base on my blood type, it is very, very easy for me... I fold sick of malaria and I had an appalling case of severe malaria case when I was young. Moreover, it was almost to kill me. I was in the hospital for the month 10 bottles of drips. So if people have such kind of stories, if they have the number of how many people are dying of this thing they may change their behaviour. It will make them fight malaria more seriously and protect themselves better (ACM3- *Household Respondent*).

Monitoring and evaluation officer at state malaria control program suggested that the only solution to encourage household behaviour on available control measures is through the ownership of the program of malaria control. He cited an example with a program that thoroughly addresses the maternal, newborn and child diseases, but today they are no more in the state. The respondent suggested as follows:

We shall try to have ownership of the program. Because all the intervention, we have and programs taking place presently is a foreign organization that are supporting us, yeah, that are rendering these services to us. So now let me refer to what PRRINN-MNCH has done to the state. PRRINN-MNCH has done a lot to the state and PRRINN-MNCH has no more in the state. But they support the state in terms of providing the logistic, human and any other support, in terms of capacity building, infrastructure and a lot of things, but PRRINN-MNCH is no more in the state (ACM3- *Monitoring and evaluation officer SMCP*).

The respondent informed to this current study that the only solution concerning household behaviour on control measures available is the ownership of those control activities. In his explanation the respondent lamented those programs are usually in a

time frame and immediately their time expire, they withdraw and leave you with the rest. People's behaviour will not be stable if you have something that you used today, and you will find it no more tomorrow. The respondent suggested that since a lot is learned from those stakeholders providing control measures in the facility centre and to encourage people's behaviour concerning malaria control measures we need the sustainability on the policy they introduce. He stressed that:

We benefited with this, and we have the knowledge. However, now the issue is the sustainability of what we have acquired when working with them. That is what affects the attitude of the individual that is behaviour change. If I give you money, I am giving you money every day, at the end of the day I stop giving you the money. Your behaviour will change with regard to going along with me. Because what I have been doing for you, I have not been doing it. Ownership that is the only solution that is how I understand it. (ACM3- *Monitoring and evaluation officer SMCP*)

A household respondent suggested some other way to make control measures available so that to influence household behaviour for their use as treatment and prevention measures. The respondent suggested improvement in government commitment and community attitude as follows:

The government at all levels shall think twice and take malaria as a serious disease. It does worse than they think of. So if the government in all areas has considered malaria as a serious disease, there will be much improved. Our community attitude also needs to be improved, awareness creation need to intensify. (ACM3- *Household Respondent*)

Another household respondent recommended to the government and other collaborating partners to do as they do on the issue of polio eradication and emphasized on residual spray. The Respondent stated in his own words as follows:

The way government and other supporting agencies use to give much emphasis on polio if it is malaria that have been given this attention, I am telling you that actually we are at the stage of even eradication of malaria not even control or elimination or even eradicated it at all. Because it is not all mosquitos that carry malaria infection. So I still like to encourage or emphasized on state government to look into the possibility of doing indoor residual spray that IRS, which to have been done in all the country, all the state I can say so that we have a free malaria society. (ACM3-*Household Respondent*)

All these findings are in some cases encouraging household behaviour on available control measures for malaria prevention and in some other instances discourage household behaviour on those available control measures for malaria management. That is to say a lot of factors are revealed by the respondents as reasons that encourages their behaviour to avoid available control measures. It is also found out that many other factors discourage household behaviour to use or adopt those available control measures for malaria treatment and prevention services. The next theme of this section is on the location of ACM and household behaviour.

#### **5.4.4 Location of ACM and Household Behaviour**

It is widely accepted that for any health care programmes, malaria control included having maximum impact on the health levels of the population, it purports to serve; it must be both equitably and efficiently available across the society (Phillips, 1990). It is equally true, however, that not many countries have achieved these goals because of lack of available control measures to cover all the places in need, which in turn influence household behaviour in seeking those services. This comes as a result of locating those measures to be available only in some certain location while leaving other places that are in desperate need without supply. This study penetrates into

areas of Zamfara state to find out the clear picture of what exactly on the ground and how the locations of those control measures impact on household behaviour. This discussion created a room for the researcher to talk on how locating those control measures influence household behaviour on malaria control. Responding to the situation on availability of control measures base on location, official from malaria control office stressed that:

Yes, in case of distribution of the net is all over the state. We have 14 LGAs. Each LGAs have been benefited with these plans because I can remember MAPs partakes itself, it accommodates and facilitates in each LGAs. So in each LGAs, so I can assure you all the LGAs have been affected by this distribution of LLIN. Likewise, but in case of fumigation it is not all the state I mean all the LGAs yeah. It covers all the LGAs but only what do I call it the capital cities, the LGAs headquarters, the LGAs headquarters excluding the other towns and villages. (ACM4- *Monitoring and evaluation officer SMCP*)

The respondent further stated that:

When there is an activity in the place established for the purpose of malaria control it happens to influence people for it. Take for example places that introduce the sanitation practices many people participated. Because they are informed that it reduce the number of mosquitoes that caused malaria. But different location that not introduce such kind of things people do not even care because the services or activities are not there for them. So you see the presence or absence of activities in the different location impact on peoples behaviour residing on such location (ACM4- *Monitoring and evaluation officer SMCP*).

In a very similar way, another respondent from malaria control workers encapsulated on the issue of making malaria control measures available to the state in the following statement:

Any village that you can think have this provision, even if there is a river crossing we use river boats and cross to reach such places. You see the issue of being those measures are available is over. No one can say intervention is out of reach. If the road is not in good condition, we can use a motorcycle or canoe to reach such places and provide such intervention. That is what we are doing, and it is free. (ACM4- *Local government officer in charge of malaria control*)

However, there are some different comments about the location of control measures.

Deputy state rolls back malaria manager illustrated on how those control measures are available and distributed across the state. The Respondent contends that:

At the beginning of 2010, in each ward we have one hospital, so if you, count you see; per LGA we have 11 wards. So when MAPS comes, we increase them to 15. So MAPS when they come they said they wanted to take 15. So we increase four making 19. So now every ward in Zamfara state we have at least 1 hospital per wards. Because we have 147 so in every ward, we have one hospital, and you see we are supporting 26 something hospital. So you see some wards are taking, for example, if you look at *Kotar Koshi* ward it has like three hospitals that are supported like *Kotar Koshi*, *Gulubba* and *Tazami*. So there is ward that is like that. If you take here in Gusau you see we are supporting King Fahd, general hospital, Dr Karima, Shagari, specialist, Sabon Gari we are supporting them all. Some wards we are supporting more than 3 some we are supporting one. However, every ward is touched with at least one facility. (ACM4- *Deputy RBM Manager, State Roll Back Malaria*)

Furthermore, the data bank manager at the state ministry of health shared with this current study his knowledge and information about the distribution of malaria services across the location in Zamfara state and household behaviour because of such provision. His report summarized as:

Yes, we are having about 366 facilities that supported with LLIN, RDTs and ACTs and it is not mainly in urban areas it is across the state. Every ward has an at least 1-2 facility that is offering malaria services, and they are given ACTs and LLIN. LLIN is in two ways; there is one given to ANC pregnant women and one to children under five while there is one that are given at the community level. Due to such kind of provision provided its seriously influence people behaviour to seek for such control measures (ACM4- *State data bank manager*)

After having the knowledge about how those control measures are dispersed base on different location across the state, this makes it very easy to discuss with household members in those areas on their behaviour of using those control measures at the location where they are available and the behaviour show and action to be taken next in the fields where they are not available. The study begins with a discussion with the household respondent in the location with the presence of facility centres where malaria control measures are provided free. The respondent stated during the interview his behaviour as a result of being control measures available in their area. The respondent stated in the following statement:

Before I have nothing like using insecticide treated bed net, but now I am using it. What I do in the previous time is that I am using the little I have to buy mosquito coil and I even have the behaviour of using a Chinese balm to applying in my body for mosquito protection. However, today I am encouraged to use the net for mosquito protection because it is available in my place. Time before now even if I want to use it, I do not have it because it not provided in my area. However, have it available now and in some cases free, at least for the first time seriously influenced my behaviour of going there to have it and also influence my behaviour of using it. In terms of drugs for malaria treatment, it is also available and provided in this area. Unlike before that I do not care about malaria treatment for my family because of the absence of the drugs, but today being them available influence my behaviour of malaria treatment in the essence that it does not require me to spend for the expenses of travelling for farther distances for the treatment. This has really influenced my behaviour (ACM4 *Household Respondent*).

A similar account is reported by another respondent in the same location with the presence of health facility centers providing malaria commodities. The respondent informed during the interview that:

Let me start by telling you that I am here purposely because of the commodities that are available. This clinic established many years ago, but I was never been here before for the purpose of any type of treatment including malaria. I have the behaviour of not coming to the hospital when I am sick for so many reasons. Some of the reasons include when I come or I bring any of my family member the doctor or any health personnel were just prescribed the drugs for me to go and buy. If the case at the moment required admission also I have to pay for even the bed and even the hand globe the nurses use during the injection. However, now I am informed to please visit such place now the drugs are available and malaria protection net is also provided. So that is what influences my actions and behaviour of coming to the hospital in my area because of the location of the facility centre providing malaria control measures. However, to be frank with you before it was not like that  
(ACM4 Household Respondent)

In a related description same version is also reported by another respondent on how being malaria control measures in the facility centre located in their community influences his behaviour on malaria treatment and prevention. The respondent explains further during the interview that:

This assistance encourages me seriously. Because it helps me to go there and have such treatment. Sometimes they reach me up to my house telling me if I experience fever, headache and so many symptoms to please visit the clinic because the control measures are there. There is a place provided to assist with malaria drugs and even giving something that you hides yourself from a mosquito bite. So there is progress, and it is working. Because before I do not believe it (ACM4 Household Respondent).

However, in a different story another respondent reported that those facilities do not reach his area or they are out of stock and not available to people in the community and according to him is the reason behind his behaviour on treatment seeking



practices using malaria control measures. The following statement confirmed this from the respondent:

Unless in the urban centers. I live in the rural area and if I need any control measures for malaria I have to come down to the cities. I had cases in my family that suffering from malaria at the time that she even become unconscious without treatment, for example, some time when one of my child is sick, suffering with malaria before we reach urban cities already the he was at the coma stage all as a result here we are lacking that provision. Does that mean they are supplying it here no, no, no. Some time if I don't have money the only solution remains is traditional, and I am using it to replace medical when I am lacking funds to go for western type. I need it, but where it is? Where is it? I can tell straight to the point that absence of control measures in our locality is the reason behind my behaviour of doing other things to control malaria (ACM4- *Rural household head*)

Another respondent confirmed from the previous interview where he lamented his story about the hardship of getting malaria commodity such as long lasting insecticide treated net due to its shortage or unavailability within the community. The interviewee simply pointed out that:

It is not everybody that is opportune to have it. The problem is that those provisions you are talking about does not reach here where I am. It is not available. Even if they are given to distributors, they may turn it to marketable one. They say you have to follow for the queue, filled the form and you will be given the following days. If you have nobody you will not collect it. They said you had to follow the queue. Moreover, you filled the form take it to the hospital or community leader then you will be given, and the hospital is far from here. So all those sorts of things associated with much hardship and difficulty does not influence my behaviour in seeking those control measures because of the issues involve that I also highlighted for you. The presence of those difficulties highlighted for you is affecting my behaviour in this community to seek for these control measures for malaria control and prevention (ACM4- *Household member*)

That above respondent demonstrated that that malaria control measure is out of reach in their location. This is very clear as many of the respondents from malaria

stakeholders explain how those malaria commodities provided in health facilities. They indicated that the distribution does not cover the entire state, but on any certain location. This present study makes in an interview with household members that these services do not reach, or they are not available in their areas or communities. The discussion included what behaviour they resorted to in terms of malaria treatment and prevention as a result of the absence or unavailability of those control commodities. Interview with respondent from Zamfara West area informed to the researcher their behaviour of malaria control and prevention that:

What I do than to relax. How much will I spend or required before I reach where modern medical treatment is? As a result of that I prefer to embark on using traditional herbs and locally available measures to us here. That is why you see me here burning the leaves in the evening so that the smoke will send the mosquito away. That is why you see I do not care about the treatment of any illness not only malaria unless with what I have here locally. *ahhh to*, what you do? Almost nothing. So to me if those things are available I will use it and it encourages me to use it. Because I know the implication of something called malaria to my health and if I can find out something for the protection of it, I can use it yes of course (ACM4 Household Respondent).

A finding from this study also shows that many household members resort into a different form of behaviour on malaria control due to the absence of control measures in their location. Another household respondent in areas where control measures are not available informed the treatment seeking behaviour they involve into as follows:

It is because of the absence of any other alternative that I as household head send my sick ones to traditional healers where all the treatment is on the predictable situation. On this background, I send myself and those under my care when, sick for some other treatment like traditional one just because the hospital care is not there. So not me alone, I know many of the household have the behaviour of sending their people to the traditional healing system because it is the last alternative someone can have (ACM4 *Household Respondent*)

Similarly, another respondent stated that some household members directed their behaviours and health seeking related actions to lack of concern because to them, what is needed necessary for that action is not available. The respondent stated that:

You see, my behaviour of not taking any health-related action when I am sick or my people are sick is just because of the reason that the control measures is not provided at this place. I have to go for distance before getting it. So which one will I bear is it the painful of the sickness of my subject or myself or the spending of the little I have. One of the primary reasons for such kind of behaviour is because what I need or required to address such kind of problem when it is happen is not available to me. Sometimes it is not within my wish, you know, but one has to bear with the situation. If there is available of required needed facilities, I can make use of them because it is for my benefit (ACM4 *Household Respondent*)

Furthermore, another household respondent from the community of Zamfara north from the area where malaria control measures are not available reported for this study his behaviour due to the absence of such control measures. The respondent in his words informed during the interview that:

I travelled for a distant location to get treatment measures when I attack from malaria, or someone belongs to me. So that is why I have the behaviour of, no matter how I can, I have to reserve something for medical purpose which in case if it happens even if I am not around I directed them (my family) to go ahead for the medication. So to me, I have that provision for me and my family because I know we have to go far places before we get it. So I reserve for it, *hehe* I have its budget (ACM4 Household Respondent)

This study asks another respondent in the same area if he used to reserve something on the health of his family in case of something happen so that to address it without much difficulty. The respondent responded in the following way:

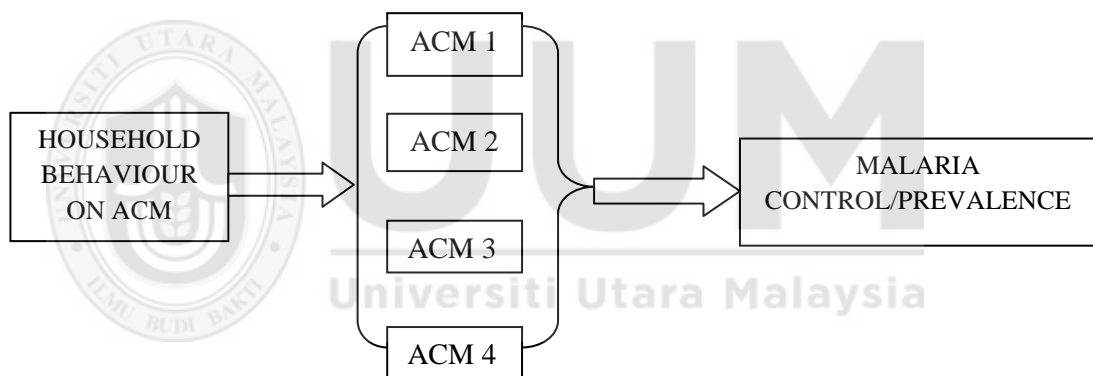
How will I reserve something for a medical purpose? I do not have that economic power, and even if I have, I do not do it. Because even if you reserved as you said where you got it? If I give you my money where you find it for me the net to cover myself and family from a mosquito. So I am not doing so what I am doing is only providing food for everyone because it is the major cure to all disease. Because there is no need to venture on something you are lacking. As I tell you the size of my family almost every day someone may fall a sick. So is even better to use, the local resources you have with you at all the times (ACM4 Household Respondent).

What is generally found out by this present study concerning malaria control measures that are available is that those measures, yes they are available, but largely targeted only some certain segment of the society. Those people are believed to be more prone to malaria attack and vulnerability. That is the reason for targeting pregnant women and children under five usually given to them during their immunization period. Similarly, respondents even among those from the government side that are interviewed reveal to the study that malaria control measures not cover all the areas of Zamfara state. But only on selected places and also targeted certain

categories of people. Those assertions and many more responses from the participant of this study reveals the influences of household on malaria control measures.

#### 5.4.5 Summary

In general this section discusses the findings of the research question on household behaviour on available control measures. The household behaviour on ACM produces four themes. These four themes are the influencing factor that either contributes to malaria control practices or increases malaria prevalence. The following figure 5.2 shows the connection between household behaviour on available control measures and malaria control/prevalence as follows.



*Figure 5.2* ACM model summary

Source: Field Survey

Model above shows that household behaviour on available control measures is explained by four major themes produce by the findings of this study. Those themes provide an explanation on the relationship between household behaviour on available control measures and malaria control/prevalence. Part of the result shows that household behaviour on available control measures increases the prevalence of malaria while in some instances, it is the presence of malaria control measures that influences household behaviour on malaria control practices.

## 5.5 Household Behaviour and the Effectiveness of Preventive Measures

In order to answer the research question number five and also achieved same objective under that research question, that is how household behaviour affect the effectiveness of preventive measures on malaria control and to explore the effectiveness of these preventive measures respectively, this study transcribed the recorded voices and information received during an interview session with those respondents that participated during the study. The aimed of this interview is to find out if control measures provided for malaria control are effective. Secondly, to see if household behaviour affects or relate to the effectiveness of those control measures provided. The recorded interview is coded and arranged into the themes as shown in Table 5.2 below.

Table 5.2

*Themes on Research Question 5*

S/N	Codes	Themes
1.	ECM1	Effective Control Measures
2.	ECM2	Household Behaviour on Effective Control Measures
3	ECM3	Treatment Choice due to Effectiveness
4	ECM4	Frequently used Malaria Control Measures

### 5.5.1 Effective Control Measures

For malaria control and elimination to be successful, all mechanisms and materials put in place for its control most not only being available but also effective. Based on the assumption of this study all countries and regions that are malaria-free have taken care with sufficient and satisfactory measures that are very effective. This present study conducted an interview with malaria stakeholders and community household members to find out if malaria control measures provided or available is effective.

Interview with advocacy, communication and social mobilization desk officer responded to the issue of effective malaria control measures where he stated that:

Yeah, control measures, they are effective, but the most effective one is using of LLIN as I said earlier because even if you have a clean environment your neighbour may not have a healthy environment so definitely the mosquito nearby will affect or will go into your compound. So when you are using a net always and regularly and effectively you will see the impact. (ECM1- *ACSM Desk Officer*)

A respondent from the malaria control unit in Gusau local government informed of this study that malaria control measures that are provided is very effective. The respondent informed during the interaction session that:

Yes, they are very-very effective because they are working. So don't forget this one they say long lasting insecticide net. It is long lasting; it takes up to three years in use with medication, you see if it is not effective it will not take too long. Because from where it's made, it is done with medicine. Moreover, apart from mosquito protection it also protects you from the cockroach, scorpion, etc. All those small insects because of the effectiveness of the medication contain on it (ECM1- *Local government officer*).

Similarly, interview with the officer in charge of commodity distribution at a Dr Karima hospital in Tudun Wada Gusau added that:

Yes, they are effective very well. What is given here is very effective. Because whatever, we are given they are good ones, and they are effective. Also, we have rightly been storing place that makes to keep them well without any problem. (ECM1- *Malaria commodity distributor*)

Furthermore, monitoring and evaluation officer stated that:

Yes, quite okay the net is effective. What makes them effectively is the quality of the net itself. The quality of the material and the chemical in the net, because if we say LLIN (long lasting insecticide net) so the material will last longer, will last long. Moreover, that's what make people continue to use the net because our net is still in circulation and the net given four years ago still in good condition. Almost 60% of the net given in 2011 are in good shape. (ECM1- *Monitoring and evaluation officer SMCP*)

Interview with the household head cited an example with his wife and the rest of the household members to buttress the effectiveness of long-lasting insecticide treated net as malaria control measure. The respondent attests that:

Well, at least I know that since my wife and her children sleep under the net she takes her anti-malaria medicine as a pregnant person. She does not have any complaint about malaria. So in my, own case with reference to my wife, I can say yes they are effective based on that experience (ECM1- *Household head*).

One experience household in Zamfara central using malaria control measures in the area expressed his satisfaction about the effectiveness of those control measures. The respondent household head stated during the interview with him that:

Very, very sure those control measures provided in the health facilities and the same type of them in the private institutions are very, very effective. If you are applying those measures correctly for sure, you are the one to tell others, yes they are effective and very effective. Unless maybe even if you have them you are not using them the way you are supposed to do so, and you see that one is a different story, but they are good (ECM1 *Household Respondent*)

Another respondent similarly accounts his experience on the effectiveness of control measures. The respondent who is a middle age, household in the northern area of Zamfara state reveal to the researcher during the interview with him that:



Sometime I assume those control measures, especially drugs for malaria treatment are just some kind of magic something. Yes, because it will not take time when I swallow those drugs when I am sick that I start recognizing that the ailment began to diminish. Likewise, those for protection. Hardly for me to use a mosquito net and also to have a mosquito disturbed when I am sleeping because it is a highly anti-mosquito. Unless if sometime I mistakenly not using it correctly, yes (ECM1 *Household Respondent*).

The current study attempted to discuss with one household head who reported during the interview with him about the effectiveness of malaria control measures and replied to the researcher in the following statement:

How do I know something is effective that I do not have? However, I hear in the media that people are encouraged when they are sick of malaria to go for that treatment and to use any protection mechanism (insecticide net) they are effective. People among us that are using it also tell me it is useful. However, people like me, I do not have access to it, and I am just using some other people experience to tell you what I hear from the media (ECM1 *Household Respondent*).

However, there is different narration during the discussion with Deputy Roll back malaria manager in Zamfara. During the interview, the respondent reveals some mix information about the effectiveness of malaria control measures where he stated that:

Yes, the only thing we have, you know the drugs is of different type. There is the one called AL and the other one AA. They are all effective. However, the case we have is that of AA that have a side effect, and people go on that side effect even if you give them it will remain in hospital until it expired. However, it is even better than AL but the only problem is its side effect. However, both the AA and AL they are all effective. If you take it within two hours, malaria will go. (ECM1- *Deputy Manager RBM*)

Confirming the statement of the effectiveness of some control measures and ineffectiveness of the others, interview with household from Zamfara west indicated

that some measures are effective while others is not. The respondent briefly stated that:

To be honest, some are effective, but others are not effective even if you try them they are not working. To be frank with you some of those control measures is very terrible in terms of their failure to curb the disease. (ECM1- *Household respondent*)

Another household respondent used the rate of malaria incidences and related it to weather control measures they are using is effective or not effective. The respondent reported during the interview with him that:

Yes, you see how do you know, how you know the effectiveness of all those measures left to be, is when the incidences of malaria are low. How do we know that all this prevalence cases is as a result of malaria we are suffering, just now I tell you how many people we lost due that fever? So think and you can also answer that your question. (ECM1- *Household respondent*)

In a very similar account by another respondent who reported to the researcher that if the rate of malaria in terms of morbidity and mortality and also its prevalence is used to justify the effectiveness of malaria control measures, one can just conclude that some goes wrong about the issue of effectiveness. The respondent reported that:

What I mean if those control measures are effective why the rate of morbidity, why mortality and why there is still high prevalence. To me if they are effective you cannot see those that are using those control measures are suffering any more malaria cases again (ECM1 *Household Respondent*)

But, the data bank manager at the ministry of health informed the researcher during interview session that if we are to look at the assessment of malaria cases we can find out that the control measures like Long Lasting Insecticide Treated Net (LLIN) are effective. The respondent opined that:

But to me, I can say that the thing is actually effective, because out of that assessment that have conducted it has been found out that only around 5-10% of those that are using the LLIN have confirmed malaria. While those that are not using the LLIN about 90% of them when tested, they have malaria. However, while the others that are using the LLIN around 5-10% only one that has confirms malaria. So this is to show that there is effectual in the use of LLIN for example (ECM1- *State Data Bank Manager*).

The discussions above highlight some insight into how effective malaria control measures are among different respondents of this study. The next theme in this section of the study introduces the household behaviour on effective control measures to the treatment and prevention of malaria control.

### **5.5.2 Household Behaviour on Effective Control Measures**

The main objective of this question is to explore how household behaviour affects the effectiveness of preventive measures on malaria control in Nigeria with particular reference to Zamfara state in the northern part of the country. Therefore, in order to achieve this objective and also to answer the research question under it, this current study conducted an interview involving both malaria stakeholders and household members to investigate whether household behaviour affect the effectiveness of malaria control measures or the effectiveness of control measures make them to utilize those measures for malaria prevention and treatment.

In order for this study to understand and explore the above statement, this research conducted an interview with advocacy, communication and social mobilization desk officer and he reported that:

Household behaviour in some instances affects the quality and effectiveness of anti-malaria vaccination provided with the intention to cure and solved the problem of malaria among those that affected. For example, if a malaria patient prescribed with anti-malaria drugs, he needs to complete the dose. However, the household behaviour of abandoning the rest of the dose due to the relief they get at first stage seriously affect the service suppose to be provided by the drugs (ECM2- *ACSM Desk Officer*).

It is also in the same vain the respondent goes ahead to explain how the effectiveness of malaria control measures influences their behaviour on treatment seeking and other control and preventive practices. The respondent stated during the interview that:

Effectiveness of malaria control commodities actually influences behaviour. It influences. Because as you see the impact or the importance of using the preventive measures by noticing a less prevalence of malaria as a result of using those drugs. So the preventive measures actually that are effective actually influence and encourage people to use them because it is effective in terms of curing or lessening the disease cases (ECM2- *ACSM Desk Officer*).

Similarly, the same respondent also lamented that if people perceived the ineffectiveness of any commodity or control measure might also affect their behaviour to not use them. The respondent cited example as:

Yeah, for example, as I said many people are not using a net because as they are saying they use to get heat when using the net. So they dislike using a net because *eh* when enter on the net they will feel the heat. So they will not feel comfortable. Incompatibility of using the net is the result or makes people dislike using the net as a preventive measure, and you see it will seriously affect their behaviour in terms of net use. (ECM2- *ACSM Desk Officer*)

According to Deputy RBM manager, a combination of home management of malaria using self medication with hospital and clinic base, poses a danger to the patients and

also disrupts the effectiveness and quality of control measures proved as effective.

The respondent averred that:

This issue of home management using self medication has a lot of implication and danger. Let say for example you have a patient suffering with malaria and use self medication at home and give him, let say chloroquine and after some few times the patient situation is deteriorating and decides to take him to hospital or nearby clinic. When you go and this patient at first instance, give with same drug you give at home, you see it cause what we call an overdose. You see as a result of this behaviour of treatment at home it causes or may result to negative situations (*ECM2 Deputy RBM Manager*).

In this case, it is clearly shown by the respondent that, it is the effectiveness of malaria control measures that influences household behaviour to adopt or use the malaria commodity proves to be effective for preventive action. Therefore, effective control measures according to ACSM desk officer play a critical role in the issue of malaria control. This is because their perceived benefit derived by using control measures that are effective influences their behaviour on treatment-seeking practices concerning malaria control.

Furthermore, another respondent stated that household behaviour on effective control measures, seriously affects their quality and efficiency in tackling what they are supposed to. The respondent informed during the interview that:

Look at how people are behaving and handling the insecticide net. This seriously affects their effectiveness, because there is a certain way and laid down procedures for handling and using those nets. So anything else to temper with those guidelines may probably affect the quality and effectiveness of those control measures. I think that is the reason you see somebody who is using the net, but he is still complaining about or suffering from malaria disease (*ECM2- Malaria commodity distributor*).

Interview with NGO respondent confirm to this study how household behaviour affects the effectiveness of malaria control measures. The respondent informed during the interview with him that:

In our community there is a large presence of anti malaria drugs in medicine vendor stores. Some of those malaria vaccines provided is counterfeit. Many of the household that treat malaria at home using self medication employed such substandard drugs. This behaviour of home treatment and self medication is rampant among household members. There is no doubt about to say that such kind of behaviour is a reason behind the drug resistance. Because household fails to seek those treatments at right places where those control measures are tested effective. Up to me this kind of treatment seeking behaviour among household members seriously affects the effectiveness of malaria control measures. Because the presence of those control measures that are not effective in various informal places largely lead the household members to abandoned seeking treatments at right channels and as a result, they apply local herbal remedies or at most the use of irregular used in medicine at local vendor stores or chemist with substandard medication (ECM2 *NGO Respondent*).

A household in the study area still uses some malaria control measures resisted by mosquitoes. Continue using such control measures describes as ineffective undermines the quality and effectiveness of those control measures. Interview with experience household head informed that:

Many of the failed malaria treatments are due to the use of chloroquine. It is well informed that today mosquito is resisting the use of chloroquine. This control measure is still widely used by household for treatment and management of malaria despite it fail treatment effort. Therefore, the inabilities of household patronize the control measures that are effective seriously affecting the quality and effectiveness of good ones (ECM2 *Household Respondent*).

Another respondent also expresses further on how household behaviour in one hand and effectiveness of control measures on the other influences each other. The respondent during this study stated that the effectiveness of control measures is what

sometimes causes to stop using them at the first trial. Because if they use it for the first time and experience how it is working make them abandon the remaining dose that required to completed by all means. The respondent recaps as follows:

Yes, it has relation very well. If you look at it, you can give it to someone due to its effectiveness he instantly recovered. If he takes it today, he will not take it the next day. You know malaria drugs if you take it today it will attack the parasite, next day it will weaken it and the following day it will enter the blood and fight for the remaining and destroy it. So you see, if you take it today and not make it the next day you see, you are just weakening the parasite, but it is active, it means it will be back the other time. So through the time, it will develop resistance. So actually human behaviour is what makes malaria control measures to be successful. (ECM2- *Deputy Manager RBM*)

Interview with the officer in charge of local government malaria control services informed during the interview that all those behaviour of pregnant women attending ANC are due to the effectiveness they received on the commodities provided. He mentioned in the following statement:

All those people you see here are all due to the effectiveness of the commodity we are distributing, very sure, and as I mentioned the most effective one is LLIN it is not only repelling it serve as a barrier between human and mosquito. If it is used the way it supposes to. (ECM2- *Local government officer*)

Interview with commodity distributor at a Dr Karima hospital in Gusau stated that effectiveness, influence behaviour because many people is encouraged to go directly to those facility centres because the commodity provided there are better than the one in the market. This shows that there are control measures provided at a marketplace that some people encourage to not go for them. The participant responded that:

Yes, they are effective. Those that have been tested it are telling others, about the effectiveness of those control measures, that it is better than the one in the market. The one given by MAPS is more effective and has treatment for it. (ECM2- *Malaria commodity distributor*)

Responding to the issue of effectiveness of malaria control measures and household behaviour, another respondent's point out that:

Yeah, of course, when definitely someone picks or tastes any anti-malaria drugs and find it effectively or may be better definitely it does not only stop on him, but rather he can even advise somebody to go for the same treatment in the hospital. So I believe that already it was influencing the behaviour in respect to attending to the clinics or advising the relation to go and seek for the treatment whenever they are sick. (ECM2- *DDIC Coordinator*)

Another respondent in his own words opined that:

Yeah, of course, what influence their behaviour at first instance is there is even awareness that the state ministry of health in collaboration with some partners are doing in the use of some malaria control measures like this LLIN at the houses. So people see the impact. So I can say they are using it and after testing the effectiveness it encourage them to encourage even others, yes. There is a behaviour influence in using the LLIN in the community level or the houses. (ECM2- *Data Bank Manager SMOH*)

Statistics show that effectiveness of malaria control measures influences household behaviour on using control measures that are effective for malaria control, prevention and treatment. This present study also interviews household respondent to hear from them how the effectiveness of malaria control measures influences their behaviour. A respondent from Zamfara Central reported to the researcher during the interview session that:



The effectiveness of control measures is what influences my behaviour by using control measures for malaria prevention and treatment. Because at a time that I started using this as treatment solution and tested its effectiveness, it therefore encourages me to use it at any time needed that is when I or somebody suffering from malaria. I am even campaigning for its use to other people because of the assurance I have about the effectiveness of those control measures (ECM2 *Household Respondent*)

Another respondent stated a similar account and further reported during the interview with him:

Before I am not using any western type of medicine for treatment and prevention of any disease, but when they introduce this and ask me to please try it when I am sick. When I start using it seriously changes my behaviour of not using something like it before. Testing it and find it effective is what influence my behaviour to continue patronizing it all time (ECM2 *Household Respondent*)

According to the household head respondent both effectiveness and ineffectiveness influence behaviour. Because if people taste the effectiveness, it will influence their behaviour to continue likewise if the reverse is the case, it will also influence their behaviour to discontinue. The respondent informs during the interview that:

Yes, it has influence, because if I look for that treatment and it would not work for me, you see I have to, you know, discouraged and I have to stop using it, so this ineffectiveness stops me from using prevention measures found ineffective and I have to return back to traditional one. I have to go back for (*surachi*) and taking it orally, till I or the patient from my family gets relief. Moreover, being it effective also makes a lot of change in my behaviour to continue using what I try and find effective. So that is it. Because I heard sometime information that some new malaria vaccines arrived and they are effective. So when somebody try and informed me I sometimes used also to try myself, but discontinue after find it ineffective (ECM2- *Household respondent from Zamfara Central*).

Household respondent cited an example of how the effectiveness of commodities such as, Long Lasting Insecticide Treated Nets (LLIN) and drugs that he is distributing to his family influence his behaviour as follows:

Well, I have to use one or two examples in my family to make a judgement on how effectiveness influences behaviour. For instance, at least I know that in one of my pregnant wife case, here she informed me that she is very, very satisfied with the effectiveness of commodity and drugs provide for her during her ANC visit. So that effectiveness is what influences her to ensure that her children sleep under the net. I think in her case it influences her behaviour. So in such instance, she always encourages me to assist her for a regular ANC visit when she is pregnant. I some time ask her to leave some domestic responsibility for and go to hospital because of the benefit I myself witness and at the end also is of my great benefit (ECM2- *Respondent from MAPS*).

Interview with respondent stated that he has a negative experience of using AA drugs due to its side effect and, therefore, assume all malaria control measures that are provided is not effective. When ask if malaria attack him what behaviour, he usually involves, the respondent in his words informed the researcher that:

Since the time I have experienced badly about AA drug I never and will never again use any form of treatment. Because till now I am not recovering well to the side effect consequences. So with this experience, how do I allow myself or somebody under my watch to use it again? No, no, no-till my last breath and never again. You see me, here I prefer to die due to malaria sickness, but I am not going anywhere, *wallahi* (ECM2 *Household Respondent*)

Another respondent in Zamfara West reported to this present study that lack of trust about the effectiveness of malaria control measures is the primary reason for his behaviour influence of not using or go for such kind of treatment and prevention type. The respondent informed the interviewer that:

I do not have the feeling of acceptance about the certainty of these drugs. I am suspecting so many things about it. Such kind of suspicion and doubt about authentication of those control measures seriously plays a vital role in my behaviour and action regarding using them. For example, look at the origin of those control measures and they said they are mainly providing free and even at the commercial places or private places those things given at a subsidized rate. Hope you understand me, can't you; yourself suspecting anything about it, think of it some provided free and mainly from western places (ECM2 *Household Respondent*)

Moreover, a respondent from household, community from Zamfara central suggested at the time of discussion that:

Based on my understanding of any malaria control measures to influence the behaviour of general members of the society must be in line with what people perceived and understand as causes of malaria itself. After that those in charge of those malaria control activities must understand that what people employed at local as their means of prevention and treatment must be carried along and improved them to the modern standard instead of leaving them behind. Because left to me if those entire things they are in line with community, culture and practices those things will be successful (ECM2- *Household respondent*).

### **5.5.3 Treatment Choice due to Effectiveness**

The focus of this theme is for the treatment choice among malaria control measures due to their effectiveness or acceptance among the household. This current study, interact with participants of this study to investigate if being the effectiveness of malaria control measures influence their behaviour to use those measures so that recommendations will be made to those in charge with the responsibility of malaria control and prevention activities.

Interview with the participant of this study on effectiveness of malaria control measures and treatment choice reveals that:

Oh, on treatment behaviour. Okay, if I can answer you this way I prefer using LLIN because as long as you are using the net you may not be likely to be infected with malaria. However, since by the virtue of using the net the malaria prevalence will be reduced so that's why I prefer it. (ECM3- *Household respondent*)

Another respondent also from household members reveals that:

Let me tell you, for me to start using anything I need first of all to find out how effective it is in providing the solution of what I am suffering from. Like for example me in particular, there are some drugs, no matter how sick I am, I will not use them. Moreover, there are others that I am even recommending to others. So you see the issue of effectiveness is what first warrant such behaviour. (ECM3- *Household respondent*)

Similarly, a respondent from the Zamfara north area reported to the study that:

If you bring the issues that among the preventive measures which one I prefer, I can tell you, I only use the one at my disposal. Because due to its scarcity here at the time you have attacked the issue of treatment choice among preventive measures may not even arise (ECM3- *Northern Zamfara household respondent*).

Another respondent confirmed to the researcher during the interview on how the effectiveness of malaria control measures impacts on treatment choice among those measures. The respondent cited an example as follows:

I can cite an example, my neighbouring compound sees me as their neighbours not spending too much in the case of malaria treatment to my children, so he uses to ask what is rational behind it, I now tell him I am using net almost every day regularly with my family, and it is effective. So I now encourage him to start using it and luckily he experiences the impact. So when he starts using the LLIN as a preventive measure I am telling you now he even now encouraging others to use it. So actually you see what make me for that chooses is the effectiveness of that net. So you see I can say it has an impact on my choice of treatment to even encourage other (ECM3- *Household Respondent*).

Still on the issue of effectiveness and treatment choice behaviour respondent from Zamfara Central lamented during an interview with him that:

What I can here be that if you are using let say drugs and injection for malaria treatment if you are sick, you use it for several times it does not work for you. You see that one, if you are wise enough, is better for you to find another one that better cured your ailment. In that case, to me, I see it is where the matter of treatment choice comes. Because if you go for the treatment you have to tell them that you prefer that one because the other is not working for so that you do not accept it. (ECM3- *Household respondent*)

According to the respondent from the Zamfara West during an interview with him, expressed fear and doubt about the effectiveness and real motives behind commodities distributed for malaria control which such fair and doubt observed may not be shown if it is for other diseases. The respondent stated during the interview that:

I do not have the feeling of acceptance about the certainty of these drugs. I am suspecting so many things about it. Such kind of suspicion and doubt about authentication of those control measures seriously plays a vital role in my behaviour and action regarding using them. For example, look at the origin of those control measures and they said they are mainly providing free and even at the commercial places or private places those things provided at a subsidized rate. Hope you understand me, can't you; yourself suspecting anything about it, think about it some provided free and mainly from western places (*Household Respondent*).

An economic issue to saved money is what influence some household member's behaviour in choosing a treatment. One of the household respondents reported that:

I prefer to choose the cheapest malaria control measures for me to save money from buying insecticide spraying. I think when I am looking for malaria prevention what make me to choose is only the one that I may pay less. So honestly, this is what determined my treatment choose not any other thing. (ECM3- *Household respondent*)

Deputy roll back malaria manager informed during the interview that:

What makes people choose those commodities we are distributing is that the drugs are working very well. Moreover, as I told you if not because of those drugs only God, who know who is going to die as a result of malaria. So there is effectiveness very well and being those control measures effective is what makes many of the household heads chooses during treatment and management of malaria. (ECM3- *Deputy RBM Manager*)

#### **5.5.4 Frequently used malaria control measures**

The focus of this is on malaria control measures frequently used by household members for disease prevention and management practices. The main concern of the theme is to explore the reason behind or pushing people to use those control measures. Household mentioned several reasons that make them to adopt a particular malaria control measures or the other. Those reasons, according to the result of the interview served as an influencing factor to them for malaria control practices.

This study found out that the frequent used in traditional medicine by household members in the community under investigation constitute another challenge facing effective malaria control measures provided. The traditional medicine in combination with other western vaccination is usually employed by those people in malaria control. Interview with NGO confirm to this study that:

Although people used allopathic medical services and traditional system of curing disease, but household, especially in rural areas rely heavily on home management of malaria treatment. I think you are aware that rural population constitutes the larger part of the society in this country so many of them rely on management of malaria, which is based on or characterized by self treatment using various concoctions of herbs and leaves of trees. Sometime they used to combine both. The implication here is that the effective malaria control measures provided is under mine. It is seriously affected I mean their quality (ECM4 *NGO Respondent*).

With regard to frequent malaria control measures used by household members, a respondent from community studied stated that:

Cost and my convenience with control measures determine how frequently I use those control measures. Effectiveness not all the time plays a role. Because some time I am not so convenient with the statement about whether those control measures describe as effectively prove to be effective. Let me give you an example how sure I am that the measures are effective despite the inability of even those that are using them to be out of the disease like malaria fever. So I have such doubt and still play a role. Another thing is the issue of the cost that is to say even if they are effective are they within the price that I as a household head able to afford. So all those issues combine together is what, to my own opinion determine which among the prevention measures to be frequently used by or among the household members when malaria occur (ECM4 *Household Respondent*).

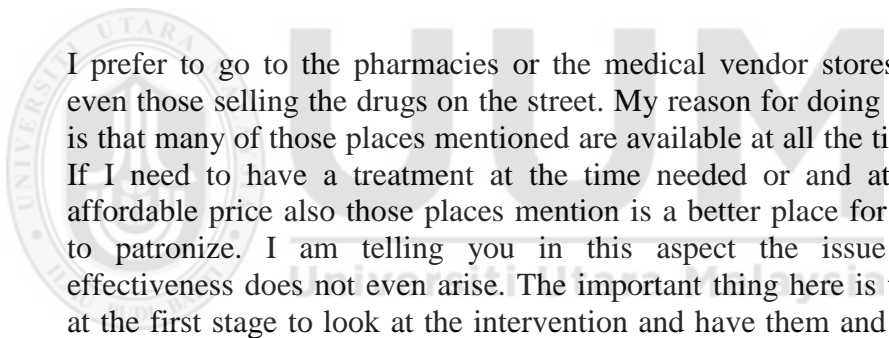
Household perception is also another factor that determines control measures to be frequently used for malaria control. Interview with household respondent claimed that:

My perception about the issue of control measures encourages me for the home treatment of various diseases and ailment including malaria disease. Those treatments and medication is mostly on self medication services. The controls measures frequently use depend on those available to me irrespective of being them effective or not. Other treatment outside the home usually happens only when I try in some cases, treatments at home using available control measures persist. In a situation like that I use to go outside home treatment because you know you can't allow yourself or somebody under your watch to continue suffering if still there is another option yet to try (ECM4 *Household Respondent*).

According to RBM manager home treatment of malaria associated with self medication impact negatively on the effectiveness of control measures. The respondent stated this during an interview with him that:

You know home treatment is associated with application of inappropriate vaccination or medication of drugs or therapy which those drugs, vaccines apply is to some extent poses low quality. Those types of medication used or prefer by most of the household do not have a correct regiment or dosage of their prescription. So the point I want to make here is that patients undergoing such type of treatment seeks another treatment outside the home only when it is beyond the capacity of those measures at home. Usually at the time seeking the treatment at right point or places may be already the diseases they are suffering with already do the last damage it can do. In such cases even if they apply the measures tested as effective nothing can do. So you see it affect their quality because it doesn't use at the right time they suppose to use unless in the time that the disease may be is already reaching the final stage of damage (ECM4 *Deputy RBM Manager*).

Respondents of this study stated their reasons behind choosing or patronizing the malaria control measures. The household respondent stated that:



I prefer to go to the pharmacies or the medical vendor stores or even those selling the drugs on the street. My reason for doing this is that many of those places mentioned are available at all the time. If I need to have a treatment at the time needed or and at an affordable price also those places mention is a better place for me to patronize. I am telling you in this aspect the issue of effectiveness does not even arise. The important thing here is that at the first stage to look at the intervention and have them and the other one to have it at the rate affordable to you (ECM4 *Household Respondent*).

Another household respondent informed to this study during the interview that the attention received during the consultation and treatment determines how frequently they use such particular control measures. The respondent stated that:



Health workers in the various clinics and hospitals lack the manner and professionalism for attending to patients. That is one of the reasons why I am not willing to patronize those places just to avoid embarrassment and conflict that is at first instance. The second part of the reason is the period of the consultation. From this place where I am if I want, for example to see a doctor for any type of consultation, I need to prepare as early as 5.00am or otherwise you will miss the doctor. At times you go, there you meet a serious queue all waiting for a consultation. One funny thing is that this queue is just by name people come and attend to base on personality and social class. Before you know you spend the whole day there and if care is not being taken without seeing the doctor (ECM4 *Household Respondent*).

Still on frequently use control measures for malaria treatment and prevention, household respondent stated that failure of health facilities centres to provide adequate control measures to cope with a high influx of people is the reason necessitates the household to seek that treatment at home using self medication or any other alternative. The respondent informed in his own words that:

Let say I rely on hospital or clinical base of malaria treatment I can tell you without any doubt that nobody knows how many people in my family is going to die as a result. The issue there is a matter of who you know. Due to the high congestion in such place compare to those in need of the services make me to seek those treatments at home for myself and my family. Those institutions provided those services are unable to cope with the influx of those people in need. So you see this make us to seek home treatment which poses many potential dangers causes by delay in taking the patient to medical centre Even if he is taken another delay occur there due to the teeming population of those waiting for the same reason (ECM4 *Household Respondent*).

Concerning method mostly prepared by community members in Zamfara, this present study interviews the officer from the state ministry of health who is also a desk officer, advocacy, communication and social mobilization. The participant confirmed the method mostly prepared by people for malaria prevention as follows:

Okay, you know depending on the individual, but the most prominent one actually many people, despite their complaint is the net use. But you see the rate of percentage that using the net as a preventive measure actually is more than other means or method of prevention. (ECM4- *ACSM Desk Officer*)

Another respondent also informed during the interview that Long Lasting Insecticide Treated Nets (LLIN) and Insecticide Treated Net(s) (ITN) together with SP is top in terms of malaria prevention measures among community members and those that are pregnant women. The respondent averred that:

The one that mostly used and preferred by people is net. And if you come to pregnant women is under most to add with SP that has been those on the 2nd and 3rd pregnancy period and they have informed if not use it the implication will bring to both the mother and baby. That you can see a baby that his mother is not using SP, there is different with the one that is using SP. That if they have shown the black and white they will see that and they promise to take care next time (ECM4- *Local government manager, SMCP*).

This current study interacts with household head in the community of Zamfara to discuss with him malaria prevention measures that are mostly used by him and his entire household members. The respondent stated the frequent measures used for malaria control and his reason for choosing such measures. The respondent mentioned that:

I prefer the mosquito net because the net is saving me money from buying insect spraying, mosquito flit. I think the mosquito flit is poisonous may not be good to use it. So if you sleep under net, you save money, and it lasts for up to three to four years. However, the money you use to buy one flit you can use it to buy a net. Because the net is more comfortable, you save money, and you save the life of your family. So for me it has to be mosquito net. It is the safest and surest way of protecting malaria. (ECM4- *Household head*)

According to head of malaria control and elimination of Gusau local government, Zamfara state informed during the interview session that issue of malaria control

measures to be used for treatment and that for prevention is not the matter of choice or the one that you prefer most. The interview with the respondent, in this case, reveals that:

So it depends, it is not people that choose what you say, you know the control measures it depends on your age. For example, you see pregnant women recommended to sleep under the net and to use SP 1<sup>st</sup> and 2<sup>nd</sup> trimester for pregnant women. Whereas for under five what is better for us to sleep under net or there is a new program that we start which is called accessible.... To give in SP..... is combined at least if you give him, it will take him 28 days to one month after giving him for another 28 days at least for 4 months during the rainy season. You know it is the period with a speed malaria rate that is under five combinations of SP and..... and net. For pregnant women IPT and net than for adult net and environmental sanitation (ECM4- *Local government manager SMCP*)

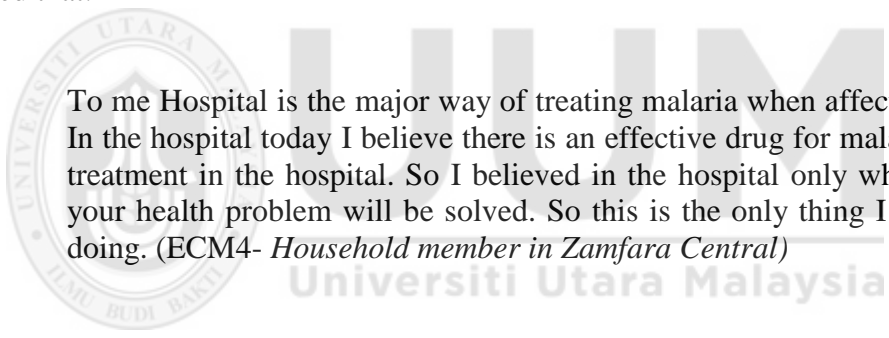
Similarly, same respondent averred that the issue of choice comes only in a situation where two drugs take the same work. So in that case they used to choose the one they prefer like in the case of if there is a side effect. He states that:

Yes is like the issues we have at treatment like this the drugs are two the one has side effect while the other one do not have. So they prefer to go to one without side effect. In the absence of this one, they will not take the other one. So you see it affect their behaviour base on the side effect. (ECM4- *Local government manager SMCP*)

Another respondent shade more light on reasons for treatment choice. The respondent highlighted that:

So is depend on your level of resources you have at hand, because this required, if you talk like the Insecticide Residual Spray (IRS), as I said IRS there are big people in the country or the world that can spray their houses by purchasing such chemicals to spray their houses at cost prices and they can manage it. If we come to the community level, where someone living less than a dollar or he cannot spend 200 Naira per day to be buying insecticide spraying he cannot do it. So what they are going for, they go for mosquito coil that is cheaper at least with little 10 Naira. That I am talking about level in terms of what I have. Others go for spraying, which is about 1000 Naira depending on the level you are as I said earlier. Then the one that everyone can go is LLIN or the net. (ECM4- *Monitoring and evaluation officer SMCP*)

Interview with a household member reveals that due to his believed on hospital services is the only place he uses whenever an attack by malaria. The respondent stated that:



To me Hospital is the major way of treating malaria when affected. In the hospital today I believe there is an effective drug for malaria treatment in the hospital. So I believed in the hospital only where your health problem will be solved. So this is the only thing I am doing. (ECM4- *Household member in Zamfara Central*)

Another respondent in Kaura Namoda also lamented similar story and responded during the interview as follows:

I used the hospital to treat malaria. Because in the modern day hospital is more reliable and to some extent safer means of disease protection not only for malaria alone and it is almost everywhere in this town as you see. So that is why if I or one of a family member is suffering from malaria or any other disease before we think of anything we can take him/her to the hospital. (ECM4- *Household head in Kaura Namoda*)

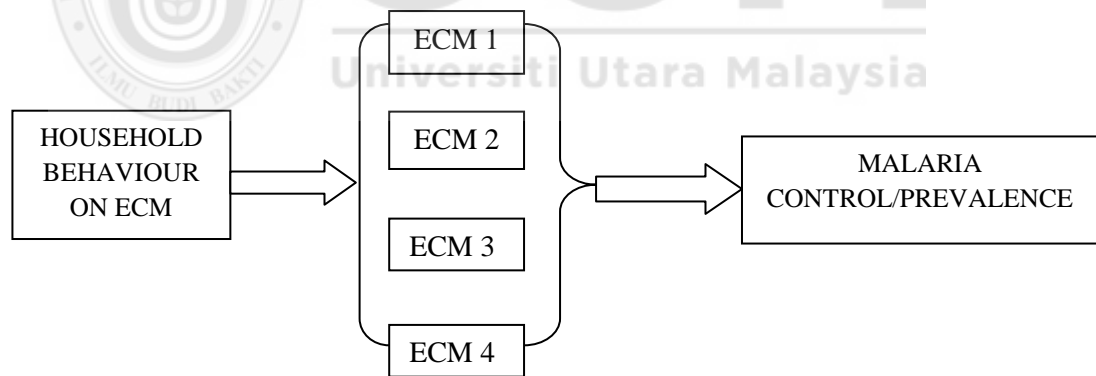
An experience head of household reported during this study that since he understands mosquito is a major agent of malaria, he takes adequate measures to ensure that mosquito will not find a place within his surroundings, but stated that his effort is

getting a serious setback from a neighboring household that make him use spray. The respondent explained that:

In my house, there is gutter that I used the pipe to cover it, letting the water outside of the premises. In my house, you cannot see water stagnant. This is just to avoid the breeding site for the mosquito. Our gutters are flown not stagnant, but all in vain as we have different behaviour with those close to me. After that, I make use of insecticide for spraying. (ECM4- *Household head Zamfara Central*)

### 5.5.5 Summary

In summary section 5.5 of this current study gives a detail explanation on how household behaviour affects the effectiveness of malaria control measures. Interview conducted with household members and malaria control stakeholders in Zamfara state produces four themes under this question. The diagram below explains the connection between household behaviour and effective control measures.



*Figure 5.3* ECM model summary

Source: Field Survey

The ECM model shows that household behaviour on effective control measures is measured by four themes. Those four themes according to this model are what influence either malaria control practices or malaria prevalence. Findings from the interview informs that household behaviour on effective control measures influence

both malaria control and prevalence. Similarly, those effective control measures also influence household behaviour in treatment practices.

## **5.6 Conclusion**

The chapter above talk about result analysis of the influence of household behaviour on available and effective measures of malaria control. It included the transcription of data recorded during the interview with about twenty participants from both malaria control stakeholders and members of the household. The analysis of the chapter is based on the thematic analysis. Those themes are arranged based on the research questions. Both research questions have four themes respectively. The next chapter focus on the discussion on the findings of the present study in relation to the literature and theories.



## **CHAPTER SIX**

### **DISCUSSION OF FINDINGS IN RELATION TO THEORIES AND LITERATURE**

#### **6.1 Introduction**

This chapter divided into four sections. Section one is introduction. Section two of the chapter combined the analysis of the two previous chapters. Section three is the discussion on fumigation, waste control and perception of malaria in relation to theories and previous literature. The last part of the chapter discusses on household behaviour on available and effective control measures with theories and previous findings. The reason of constructing this chapter at first instance is to provide a joint analysis of the previous chapters four and five to see how the finding of the both chapters helps to add more value to the answers provided in the separate previous chapters. Knowledge acquired through general observation of the malaria situation during field work is also integrated together. Secondly the chapter also aims to provide the discussion of the findings of this study in relation to theories and previous studies.

#### **6.2 Combine Analysis of Chapters Four and Five**

Section 6.2 introduces the mixed analysis of both chapters from quantitative and qualitative methods. Analysis using data from both methods in this present study provides more strength to the findings that in turn lead to provide more answers to

the research questions and also achieve the objective of the study. Therefore, the combine analysis of the chapters is conducted based on the five research questions of this study (see chapter one, 1.3). In general each research question can be discussed using either or both data from those methodologies.

### **6.2.1 Household Behaviour on Fumigation of Environment and Malaria control**

Result from chapter four (fumigation, waste control and perception of malaria) of this current study present in detailed household responses to their behaviour on fumigation of environment and prevalence of malaria. In this section, it is going to look at those findings by including the qualitative aspect of the data in order to add more value to the answer provided previously in the quantitative aspect of the study.

Results from chapter four revealed a significant relationship between behaviour on fumigation and malaria control. The data show that the fumigation or cleanliness practices and the nature of the environment has a profound impact on the malaria prevalence and mosquito density (see chapter 4, section 4.11). Findings from chapter five reveal that fumigation as measures of malaria control is not used by household to control malaria. Many of the household members in the study show no concern to use environmental fumigation as important and very essential in the management and prevention of malaria.

However, on the other hand, qualitative finding of this study reveal that fumigation of the environment is difficult to the household. Because resources required to carry out fumigation services and activities is not available. Those shortages of fumigation services in the area under study are the main reason many of the household members



do not care to employ as the means of malaria control and prevention. Many of the reasons why households do not engage in the fumigation activities is the nature of their economic and social status. A lot of them have several other problems to carry out, than to put the little resources at their disposal in buying insecticide and or spraying the environment with the purpose of malaria prevention (see 4.13).

Household members prefer to spend the little they have to other household problem than in a fumigating environment that many of them believe do not require a necessary attention. Some household members during this present study reveal to the researcher that fumigation of the environment is the sole responsibility of government to provide to its citizens. It is found out that individual fumigation to its immediate household and surrounding is not necessary because of their perception that it does not prevent household members from future malaria occurrence. It is among the reasons why many of the household members do not take it as a serious or as something they suppose to do with the management of malaria.

An environmental fumigation service is among the measures taken or carries out by Zamfara state government to reduce or prevent the occurrence of communicable diseases like malaria and other vector-borne diseases. Thus, those services are provided in some few selected places in Gusau the capital city, but it is largely absent in many parts of the state. Even in the city that those services offered, it is confirmed that areas dominated largely by poor people did not witness the provision of such fumigation services adequately.

It is understood that the cost of environmental fumigation is the reason the government is not covering everywhere in the state. It is also revealed that only a few household members who are economically vibrant can provide environmental fumigation to their household. Environmental fumigation here ranges from the application of several measures such as mosquito coils, insecticides sprayed, and several other measures aim at disinfecting mosquito for malaria prevention. Even among the household the method of fumigation carried out by household depends on the resources available to the household. Refer to section 4.13 for more details.

Because of the believed that the environmental condition, played a vital role in the breeding of mosquito which is the sole agent of malaria transmission (see Appendix G). Most of the people from rural places is experiencing the harsh economic condition and therefore, not be able to provide or to take up fumigation services. Though many of them have a little income, but they may not sacrifice it to fumigation because they have some pressing social issues that they believed to be more important than fumigation.

Interview with a household member reveals to this study that, the interviewee agreed that environmental fumigation is important to the management and prevention of malaria, but economic problem prevents him from using fumigation services for malaria control. People in the area suffer most from malaria because they lack proper environment and sanitation facilities to protect their self from the bite of a mosquito. Lack of environmental fumigation measures for malaria control significantly increased the prevalence of malaria. Because it is found out that many of the people

with reported malaria cases and high incidences are from the household from harsh or unfavourable economic conditions (see section 4.13).

Observation during the period of this current study points out that many of the areas of Zamfara state are conducive to breeding mosquito. The areas characterized by harrowing and hazardous environmental conditions. Poor housing stock, overcrowding, poor drainage system, improper waste disposal characterized the area. Many other features conducive to mosquito and other pest breeding (see Appendix G). It is believed that those poor socio-environmental conditions increased the prevalence of malaria (see also section 4.13).

In general, combine analysis of the influence of household behaviour on fumigation of the environment from chapter four, five and also the general observation found out the relationship or connection between household behaviour on fumigation and malaria control and prevalence in Zamfara State. These analyses therefore, add more strength to the answer provided by quantitative method alone.

### **6.2.2 Household Behaviour on Waste Disposal and Malaria Control**

Chapter four (Influence of fumigation, waste control and perception of malaria) provides a detail discussion concerning household behaviour on waste disposal and the prevalence of malaria in Zamfara State. In this section of the present study data from both quantitative and qualitative findings employed to put in additional value to the answer provided separately by quantitative part of the study. It implies that data collected from interviews or even from the researcher's observation during this research and experience in the field is going to be used.

Findings from statistical analysis reveal that improper waste disposals such as poor public hygiene, lack of sewage disposal, deprived housing conditions and lack of sanitations is the major cause of malaria prevalence in Zamfara State. Result from the analysis using smart PLS 2.0 path modelling supported the relationship between household behaviour of waste disposal and malaria control/prevalence (see chapter 4, section 4.12.2; 4.13 and appendix G).

Result from data on both quantitative and qualitative findings reveals that in the areas of Zamfara state, there is poor or shortage of place reserved for dumping of refuse and other discarded material. Household members lack specific environment purposely for dumping refuse. This present study observed that this problem of absence or inability to provide such services are the reason leading to the behaviour of household members to discard and put waste indiscriminately. Observation during this study shows that authority concern fails to evacuate the refuse, household dumps irregularly (see section 4.13 and appendix G).

Observation during this study found out that many of households discarded and waste materials are carried out to litter the street. It blocked the already poor waterway system that subsequently results to hold stagnant water. The stagnant water is one of the root causes of malaria because of its suitability for producing mosquito (refer to Appendix G). Findings from this study reveals that even the types of toilets and bathroom systems in the resident of the majority Zamfara people does not have the facilities for proper waste water passage (see chapter 4, section 4.12.2 and Appendix G). Household behaviour of no concern for better waste disposal services

increases the prevalence of malaria and its control and management practices (see section 4.13).

Findings from both quantitative and qualitative data indicate that household behaviour, actions and practices with regard to waste disposal by making waterway clean and provide places reserved for disposing waste is needed for proper malaria control and prevention (refer to Appendix G). Result from the personal experience during the course of this study show that there is no households commitment found among the household members to ensure proper waste disposal to avoid present of stagnant water (see chapter 4, section 4.12.4 and 4.13). This study discovered that due to the household behaviour in such a way, it is significantly influences the prevalence of malaria and also deter it control practices.

Interview with qualitative respondent in areas with some provision of waste disposal services such as good public hygiene, sufficient waterway passage and adequate provision of disposing waste and discarded materials record low malaria prevalence in such areas (refer to chapter 4 section 4.13 and chapter 5, section 5.4.3). Household behaviour on public hygiene, sewage disposal, housing conditions and proper sanitations, and improved living conditions produce low malaria prevalence in the area as observed by this present study. It is also found out that household behaviour motivated to carry out health services in the areas with provision of waste control facilities and efficient garbage collection system (see also section 4.13). This also adds to the importance of waste control to the management and control of malaria.

This study observed that household lived in impoverished and alienated conditions are more rampant to malaria disease. The household behaviour in such places is characterized by the lack of sanitation, harrowing and hazardous conditions, poor housing stock, overcrowding, inadequate nutrition and poverty (see Appendix G). Behaviour on those conditions makes not only the prevalence of high malaria, but also an arena of developing many vector-borne diseases. It is also found out that there is an outmoded waste disposal method that predominantly used; as there is an acute shortage of garbage disposal facilities with the attendant huge piles of garbage on the streets (see section 4.13 and Appendix G). This household's behaviour is as a result of household improper waste disposal which consequently influences the prevalence of malaria (refer to Chapter 4 Section 4.12.2 and 4.13).

With this finding, this present study makes a general grand tour in the capital city of Zamfara state to specifically observe the exact situation of waste disposal control practices in such areas. The result of the tour reveals that Zamfara state still lacks most vital public infrastructures to facilitate proper disposal of waste in the state vicinity. Streets frequently littered with domestic and commercial garbage because of the failure of the household to organize a regular collection and disposal of wastes. Authority's concern on the other hand fails to provide efficient and regular garbage collection system (confirm from Appendix G). Equally, extensive flooding is often experienced due to such behaviour especially after stormy rains as poorly water drainage systems are filled with rubbish inside.

This present study found out in both quantitative and qualitative data the role of providing adequate waste disposal is beyond the ability of the individual or

community household members. Because this study observed that the task of creating a clean and hygienic environment is not only on household member alone (refer to chapter 5, section 5.4.1). This study revealed that many households have the behaviour of tidy their houses and the surrounding. However, many of those households may not be able to afford a decent house sewage system, or sustained a hygienic waste disposal mechanism. In their households, they may neatly gather garbage, but lack money to purchase or hire garbage disposal vans service. The collected and indisposed garbage consequently constitutes breeding sites for mosquitoes the agent of malaria transmission (see section 4.13).

In many of the areas of Zamfara state high malaria prevalence is recorded each day due to the poor sewage disposal system, poor water drainage and refuse dumps places. Such behaviour in turn influences malaria prevalence as many household members suffer much greater exposure to malaria attacks. It is found out and reported that adequate waste disposal through showing behaviour by providing a sound public hygiene as well as general preservation of the entire environment have a profound impact on the health of the society, since better environment with excellent service provision serves not conducive for disease like malaria (find more details in section 4.13).

The interview is conducted specifically to find out why household behaviour associated with poor management of waste disposal. The situation is mentioned by the household respondent in a remote area of Gusau local government. The respondent mentioned as follows:

In my area as you, yourself witnessed there are overwhelming wastewater, excreta and solid waste disposal. Many of those problems associated with our behaviour because, like myself in the whole of my house there is no place research for dumping refuse materials. To be sincere with you this gutter in front of you as you see is what we usually disposed all those garbage gathered from the house. However, to be honest with us this behaviour is becoming a must because system available for collecting, transporting and disposing the wastes is totally not available. Thus, large amounts of rubbish are left to litter the streets, or accumulate in open dumps where flies, mosquitoes and other disease-carrying insects proliferate (*Household Respondent*).

From the general observation during the study, there is the presence of open drainages in the area, which are often dumped with discarded household wastes, with sand and refuse transported from different houses. The unclean drainages and the potholes in the streets, pools of stagnant water and waste gushing from traditional and local bathrooms and kitchens become breeding sites for mosquitoes and other carriers of the malaria disease (see Appendix G). Consequently, this provides breeding sites for mosquitoes that spread malaria. Because it is clearly stated that, the malaria larva needs stagnant water for the production of mosquito and other vector pest confirmed to be the sole agent of malaria transmission.

In general, both quantitative and qualitative findings informed this present study that household behaviour due to improper waste disposals such as poor public hygiene, lack of sewage disposal, deprived housing conditions and lack of sanitations is the major cause of malaria. Similarly, data from both findings indicates that provision of waste disposal services such as good public hygiene, sufficient waterway passage and adequate sanitation provision has an impact to malaria control and prevention. Those with adequate protections in terms of household provision of sound public hygiene as well as general preservation of their entire environment reveals to be



significantly important in the control and the prevalence of malaria in the areas of Zamfara state as shown by both quantitative and qualitative data. This combines analysis adds more strength to the answer provided in chapter four (see section 4.11; 4.12.2 and 4.13).

### **6.2.3 Influence of Household Perception on Malaria Control**

Findings from quantitative data and analysis using smart PLS path modelling of this present study demonstrate that there is a significant relationship between household perception and malaria control activities (refer to chapter 4, table 4.10b). Results from quantitative data indicate that household perception on malaria engages them to look into possible prevention measures to protect themselves and to provide treatment for those that are already infected. The result similarly demonstrates that perceiving malaria consequences are associated with household behaviour on treatment seeking practices (see chapter 4, section 4.11; subsection 4.12.3 and 4.13).

It is found out in this study that household perception of increased risk is linked to household health behaviour and also decreased the risk to unhealthy household behaviours. It is also discovered that the household in Zamfara state perceived disease based on information or knowledge from beliefs household has about the difficulties a disease would create or the effects it would have on his or her life in general. As mentioned in chapter four (section 4.13) household respond to health seeking behaviour only if they perceived the seriousness of the disease and its possible consequences to their life in general (see chapter 4, table 4.10; subsection 4.12.3 and 4.13).

For example, it is observed during this study that many households in Zamfara state perceived HIV, Ebola and TB as severe and vulnerable diseases compare to malaria. Household perception about the susceptibility of those diseases is one of the most powerful instruments in promoting household to adopt healthier behaviour. Many of the respondents contacted reveals to this study that people do not engage in unprotected sex due to the fear of contracting HIV. It is for that purpose many adults prepare to abstain from casual sex. It is also because of the perception of TB that many households distances themselves from those with TB even if they have close relation with those affected due to the fear of getting the disease. It is, therefore, stated that this household perception is what prompts and influences people to vaccinate against those diseases that perceived as vulnerable to health in order to decrease the risk of the disease. All those behaviours by taking regular actions to protect and decrease such diseases are due to the perception of such illnesses.

Furthermore, in the case of Ebola many of the respondents interviewed basically on that matter adopt the behaviour of taking extra measures and cautions just to ensure that they protect themselves from getting Ebola virus. This virus record only a few cases in the whole country and also yet to find any cases in the study area as many of the people in the area could not even describe the symptom of the disease, but they are very responsive to carry out whatever possible measures for protection due to the fear created by the disease. In that case, what we have seen so far is that in Zamfara state a household perception of increased risk is linked to household health behaviour and also decreased the risk to unhealthy household behaviours.

A household in Zamfara state reveals that they are not feeling in danger as a result of malaria. This perception is not feeling at risk is what make many of them perceived malaria as not a serious disease. This issue is what this present study observed as the reason discouraging household behaviour to adopt malaria prevention measures or its control. The study understood that only when household members perceived malaria disease and illness with all attendant consequences and effects that make them to engage in malaria control practices. It is also what engages them to look into possible prevention measures to protect themselves and to provide treatment for those that are already infected.

However, many of the respondents in qualitative interviews reveal so many conditions they put before they agree to use or adopt any malaria control measures (see chapter 5, section 5.5.3). Such kind of condition does not attach to the issue of Ebola, HIV or TB prevention, which makes this present study, to observe that those respondents not perceive malaria as serious compare to those mentioned diseases. According to the respondent from Zamfara West during the interview with him, (refer to chapter 5, section 5.5.3) expressed fear and doubt about the effectiveness and the real motives behind commodities distributed for malaria control. Such fear and doubt may not be shown if it is for those diseases mentioned earlier.

This present study observed that household perception from Zamfara state about malaria is not encouraging people to engage seriously in providing adequate care and provision for the control and management of malaria. Although some of the respondents mentioned malaria consequences, but still do not practice safest behaviour for prevention purposes. The finding clearly indicates that perception

about disease plays a critical role in encouraging the behaviour of people to adopt health seeking practices as also observed in this study (see Table 4.11: Summary of findings for testing hypothesis).

The study observed and understands that, though many of the people have knowledge about malaria, but still there are some that perceived and attributed it to several other causes. For example, some respondents with religious belief and understanding perceived malaria as just the wish and will of the creator, who make it happen to his subject. People with such perception stated during the interview that God caused disease at the time he wants and also take it at the time he also wishes. In general analysis using combine method under this question add more strength to the answers provided in chapter four previously.

#### **6.2.4 Household Behaviour on Available Malaria Control Measures**

Chapter five (Influence of household behaviour on available and effective control measures) discussed in section (5.4) the main issues of household behaviour of available preventive measures and malaria control in Nigeria. The interview is conducted to find out if malaria control measures are available and the result of the interview indicates that there is control measures available to some selected government facilities in the state. While some respondents show the presence of control measures, but not everywhere (see chapter 5, section 5.4.1). The study observed that these control measures are targeted to some categories of people believed to be more prone to malaria attack and vulnerability. One of the interests of this research is to understand if being those preventive measures available influence

household behaviour to carry out health seeking behaviour with regard to malaria control and prevention activities.

Findings from qualitative data reveal that many of the respondent's interviews are interested in highlighting the household behaviour on available control measures and prevalence of malaria. The result showed that household behaviour influences malaria prevalence. The result also indicates that malaria prevalence also influences household behaviour on malaria control and prevention in terms of treatment seeking behaviour. While some of the respondents informed that malaria prevalence does not in any way influences their behaviour to take any treatment. Section 4.13 adds more in providing the role of social class factors in influencing the behaviour of household on malaria control practices (see 4.13)

Finding from this research indicates that being malaria control measures available is among the challenging issues facing malaria control and prevention. Result from the study confirm that being prevention measures available significantly influence household behaviour concerning using those measures with the sole aim of controlling and preventing the disease (refer to section 5.4.3). However, on the other hand, those measures that influence household behaviour are not available and accessible to many household members. These reasons for the absence of those control measures influence their behaviour in treatment seeking. Therefore, poor availability of malaria control measures is one of the major disputes facing malaria control and prevention activities (see section 4.13).

An investigation of the study shows that among the issues that influence people behaviour negatively with malaria control is the issue of uncertainty. Many of the household members are not very sure about the continued provision of those control measures in future (refer to chapter 5, section 5.4.3). It is revealed by the respondents that, they use to start using some control mechanisms or commodities, but sometimes those commodities are nowhere to be found (see section 5.4.3). The respondents shared their experiences, for example, in the case of immunization services. Therefore, those fears are what those respondents highlight being vital in influencing their behaviour in malaria prevention and other treatment seeking practices.

The study observed that people use, seek or involve into health seeking practices only when the services and control measures put in place is available. The research also found out that issue of availability is among the factors that influence individual behaviour on treatment and prevention seeking practices (refer to section 4.13 and interview in section 5.4.3). Findings from the study reveals that available control measures serve as a determinant of whether an individual or household members permit or barred to use those services and involved in such health behaviours. Respondents reported that there is behaviour influence on children under five and pregnant women in terms of treatment and prevention of malaria. The study observed that the reason for that behaviour is that, there is adequate provision mainly targeted to them and in most cases free of charge (see section 5.4.3). As a result of being controlled measures available to those categories of people (children under five and pregnant women) there is a high turnout in the ANCs and children's immunization services in facilities centres design to provide such services. This high turnout indicates that the provision of those control services encourages and influences their

behaviour to control; prevention and treatment seeking behaviour (refer to section 5.4.3).

The combine analysis of the findings of chapter four and five provide further relevance to the previous answer on the household behaviour on available control measures and malaria control provided in chapter five using qualitative research methods. The next subsection of the combine analysis is on the household behaviour on effective malaria control measures.

#### **6.2.5 Household Behaviour on Effective Malaria Control Measures**

Chapter five (Influence of household behaviour on available and effective control measures) discussed in detail on how does household behaviour affect the effectiveness of malaria control measures in Nigeria with particular reference to Zamfara state in North-Western part of the country. It is understood during this present study that the issue of effectiveness of commodities and the mechanism for malaria is the major challenge associated with malaria control, prevention and management in Nigeria.

According to the respondents of this study there is behaviour influence only if malaria control measures available or that is provided can be able to deal effectively in curing and preventing the disease they are purported to cure. From the observation, it reveals that even if those control measures is available everywhere, it can be useful to influence household behaviour only when they are effective that is to say they are capable and effective in terms of prevention and treatment of malaria. This can be found in so many instances reveal by household respondents. They

indicated that they use to cite references to their follow household members who use and tested those control measures and found it effective or ineffective (see section 5.5.2 in chapter 5). The study discovered that if those control measures is effective, it influences their behaviour and if it is ineffective, it is only discouraging their behaviour to some extent in the treatment or prevention using those services and or commodities.

Findings from this study indicate that the majority of the respondents that participated in this study confirmed that being prevention measures effective significantly influence household behaviour concerning using those measures with the sole aim of controlling and preventing malaria (see section 5.5.2). The finding highlights that preventive measures that are effective not only influence and encourage people to use them, but also influence and encourage other households due to the impact or effectiveness they observed by using such control measures.

Furthermore, result from the qualitative study shows that household and community members that the experienced ineffectiveness of malaria control measures largely discourage to continue with those measures that found ineffective. Household members informed that there is no benefit to continuing with something that is not solving your problem (refer to section 5.5.2). They stated that for behaviour to adopt in control, management and prevention of malaria, a person needs to believe the benefits and effectiveness of the control measures to be used. They mentioned that household definition, understanding and experience about the effectiveness of the malaria control measures played a critical and important role in the adoption of behaviours and treatment seeking.



This study found out that many respondents are of the opinion that for any control measure to apply for disease control or prevention there is need to know how effective those measures are in handling such disease. One respondent also reported that there are some control measures that he even recommends to others. He informed to the study that there are some precautions that he also discourages other to use and to not choose those as treatment option due to their ineffectiveness (see chapter 5, section 5.5.1 and 5.5.2). The study observed that household tends to adopt control measures when they believe the prevention and control measures effectively decrease their chances of developing the disease. Finding from question three (perception of malaria) also add more to this finding as people perception about the benefit of the outcome of health behaviour encouraged them to that behaviour (see also 4.13).

However, finding from the study show that household behaviour also has an impact on the effectiveness of malaria control measures. For example, some of the respondents mention that behaviour of discontinuing with a prescribed dose of treatment seriously affect the quality and effectiveness of the prevention measures especially drugs. Some of the household members also have the behaviour of using nets the way they like not the way they are suppose to do. All those behaviours from household members are one factor or the other that affect the effectiveness of control measures to effectively lessen or deal with malaria disease. This combines analysis similarly reinforce the answer to the research question five provided in chapter five section 5.5 of this current study.

In general, it is stated clearly in chapter three that this study is just a mixed method approach, but, scholars like Kalthum 2008 and Creswell 2003 hold an opinion that providing a combining analysis is very fundamental in such kind research. Providing the mixed analysis between two methods employed in the research will provide more strength and clarity to the answers and our findings from separate method. It is for this reason that a finding from each question or method is used to give more strength where necessary. This is also done to add more value to the answers provided separately in chapter four and five.

### **6.3 Discussion on Fumigation, Waste Control and Perception on Malaria**

Before going into the main discussion of the quantitative findings of this study it is very important to bring up the recap of the major results of this research from the quantitative aspect so that to provide an overall picture of the discussion that follows in succeeding subsections.

#### **6.3.1 Summary of the Findings**

The general objective of this current study is to examine the influence of household behaviour on malaria control in Zamfara state North West Nigeria. In general this research achieved the overall objective of this study by examining the household behaviour on the contemporary issues surrounding malaria prevalence its control and prevention. This achieved through providing answers to the following research questions:

1. What is the relationship between household behaviour on fumigation of the environment and malaria control and prevalence in Zamfara state, North West Nigeria?

2. What is the relationship between household behaviour on waste disposal and malaria control and prevalence in Zamfara state, North West Nigeria?
3. What is the relationship between household malaria perceptions and malaria control and prevalence in Zamfara state, North West Nigeria?

Research question one is about household behaviour on environmental fumigation and malaria control. Results from the study shows that, the independent variable (behaviour on fumigation) and dependent variable (malaria control) indicated a significant relationship as findings from this study demonstrate that hypothesis one ( $H^1$ ) is supported. Furthermore, result from the PLS path model reveal also that household behaviour on fumigation are associated with malaria control and prevalence. While concerning household behaviour on waste disposal and malaria control, hypothesis 2 ( $H^2$ ) that assumed the relationship between household behaviour on waste disposal and malaria control and prevalence are supported. Results from the current study show that hypothesis 3 ( $H^3$ ) under this question that states a relationship between household perception, malaria control and prevalence are supported. Therefore, in light of the summary of the research findings the main discussion are presented according to the research questions and arranged in the following headings.

### **6.3.2 Influence of Household Behaviour on Fumigation and Malaria**

Fumigation in this study entails the behaviour of people on the application of several measures such as mosquito coils, insecticides sprayed, nets for the purpose of disinfecting the environment from a mosquito that cause malaria. Malaria control is defined by the World Health Organization (2012) as dropping malaria morbidity and

mortality to a locally satisfactory level through the hard, purposeful work using the preventive and healing measures available (WHO, 2012). Similarly, Godin and Kok (1996) define human health behaviour as obvious behavioural patterns, human actions and habits that relate to human health maintenance, to human health restoration and human health development. A valuable broader meaning of human behaviour about health would comprise any action undertaken for the purpose of preventing or detecting disease or for improving health and well-being. Some studies have looked at the relationship between the performance of human health behaviours and a variety of health outcomes.

It is stated by Ityavyar and Gusau (1990) as well as Owoeye and Omole (2012) and Dako-gyeke & Kofie (2015) that human behaviour on the environment has an additional deep impact on the physical condition of individuals. Findings showed exact effects of certain environmental behaviour on morbidity and mortality in diverse settings. It is in light of the above that this current study assumed that there is a link between household behaviour on fumigation of environment and malaria control. After this assumption a hypothesis that states a relationship between household behaviour on fumigation of the environment and the prevalence of malaria is also formulated. The hypotheses were tested using the Smart PLS path modelling.

The result from the hypothesis 1 revealed a significant relationship between the behaviour of fumigation and malaria control as the outcome shows the acceptable significance value of ( $\beta= 0.230$ ,  $t= 3.575$ ,  $p<0.001$ ). This finding suggests that when household shows a behaviour on environmental fumigation, such as (application of mosquito coils, insecticides spraying, and several other measures) with the main

purpose of disinfecting the environment from mosquito likely to prevent their self from malaria and also to have protection. However, household behaviour denies the use or application of fumigation services to disinfect the environment from mosquito likely to promote high malaria prevalence.

Though there is no study conducted on household behaviour on environmental fumigation and malaria control, but similar study studies like Coleman et al. (2009) indicates that there is a strong and significant relationship between malaria and the nature of environmental conditions (fumigation). The findings are also consistent with findings of previous study by Ogoma et al (2010) which believed that people protect their self from mosquito biting using different sanitation activities to reduce the number of mosquitoes. He also stated that as long as the number of mosquitoes reduced, the rate of malaria will also be declined. Atieli et al (2009) found out that the sanitation practices and nature of environment has a profound impact on the malaria prevalence and mosquito density. Those findings are in good agreement with the results of the present study.

The present finding also supports Konradsen et al. (2003) study that concluded that there is a strong association between house characteristics and malaria vectors. They reported that people from the area suffered the most from malaria because they lack good environment and sanitation facilities to protect their self from the bite of a mosquito. Therefore, this shows that the lack of environmental fumigation measures for malaria control significantly increased the prevalence of malaria. While providing fumigation services and taking adequate care on environmental fumigation issues likely to reduce the prevalence of malaria. The same result is reflected in the finding

of this current study. The finding of this study also adds to the theory of planned behaviour. The theory stated that attitudes in the direction of behaviour, determined by the conviction that exact behaviour contain with a solid effect and the assessment of its consequence. This illustrates that finding of this study extended further to one of the major assumption of the theory of planned behaviour.

### **6.3.3 Influence of Household Behaviour on Waste Disposal and Malaria**

As this subheading implies, the next research question is on the influence of household behaviour on waste disposal to the prevalence of malaria. It is in view of this research question that research objective two of this study was formulated. The objective is to examine the influence of household behaviour on waste disposal control and malaria prevalence in Nigeria. Waste disposal implies human behaviour, actions and their conduct concerning disposing waste materials, unused or unwanted resources within the environment.

This current study assumes that household behaviour due to improper waste disposals such as poor public hygiene, lack of sewage disposal, deprived housing conditions and lack of sanitations is the major causes of malaria. It is also the assumption of this research that household behaviour that comply with ample provision of waste disposal services such as good public hygiene, efficient waterway passage and adequate sanitation provision may likely not experience high malaria cases. The base of that hypothetical assumption, a hypothesis was formulated and states that there is a relationship between household behaviour on waste disposal and malaria prevalence. This hypothesis is tested using smart PLS path modelling.

Result from the finding of the study reveals that there is a relationship between household behaviour of waste disposal and malaria control/prevalence. The outcome shows ( $\beta= 0.230$ ,  $t= 3.575$ ,  $p<0.001$ ) value and therefore, the hypothesis supported. The finding demonstrates that if a household member of the community is able to provide maximum protection to their environment likely to be out of malaria cases. Those with adequate protections are in terms of showing the behaviour of sound public hygiene as well as the general preservation of their entire environment. This finding is consistent with findings of previous studies by Owoeye and Omole (2012), which reveals that better environmental services are therefore providing a permanent solution to the health problem caused by deterioration of a poor environment. They reported a relationship between diseases such as malaria and human behaviour. They reported that sanitation through adequate waste disposal had a profound impact on the health of the society, because better environment with excellent service provision serves not conducive for a disease like malaria.

The present finding also supports Alemu et al. (2011) study that concluded that sanitation practices (such as proper waste disposal) should put in place in targeting the vector breeding sites with the aims of providing the lasting solution to malaria that hamper the quality of life and health status of people in the endemic region. Haque et al. (2010) found out that environmental factors like pools of stagnant water, bushes, heaps of garbage and poor housing conditions encourage disease prevalence. The finding is in good agreement with the results of the present study. They reported that the provision of adequate sanitation services to make the environment better would also significantly improved the quality of life and health status of the people.

Furthermore, the results of this study are consistent with findings from Paterson et al. (2009). He demonstrates that poor housing conditions that are suitable for mosquito breeding are among the factors responsible for the whole cases. Similarly, this finding is in line with a related study by Iwashita et al. (2010). Their findings report that houses built close to the jungle or the bushes are more likely to have a further malaria prevalence because of the presence of environmental factors that increased the survival and dominance of mosquitoes. They reported that those structures may likely experienced the poor provision of sanitation facilities and other social service provision. This consequently results in their behaviour of disposing waste indiscriminately.

The findings of this study also support the Aims and Lloyd (1999) study that concluded that Nigeria still lack most necessary public infrastructures to ease environmental sanitation and cleaning. There are no sufficient and adequate public toilets, even in some government institutions such as markets, stadium, parks and amusement centres (Aims & Lloyd, 1999). Out-of-date waste removal technique is also largely used and there is a severe deficiency of garbage and rubbish removal vehicles with the attendant enormous heaps of garbage on the roads (Aims & Lloyd, 1999).

The result of this study is also consistent with the behavioral theory of health. The theory is of the opinion that direct access to health facilities and presence of programmes could influence individual behaviour. In general the predisposing factors (belief and attitudes, social status, family size, education, employment etc), the enabling factors (urban or rural location, household features, socioeconomic



background, etc.) as well as the need factors (perception of disease) combine to influence the household behaviour on health seeking practices. Similarly, the results of this study give more strength to the basic assumption of the behavioural theory of health services.

#### **6.3.4 Influence of Household Perception on Malaria Control and Prevention**

The last research question under quantitative method is on household perceptions of malaria control and prevention in Zamfara state, North West Nigeria. In sequence to this research question, the objective under it which is also the last under quantitative part of the study is to find out household perception on malaria and its influence on their behaviour in control activities in Nigeria. Perception, in this case, is used to build up higher-level of evidence about household understanding, knowledge, views and insight concerning malaria and how this influences their behaviour in malaria control activities. Perception of malaria is very imperative because it is the assumption of this current study that, it is only through such perception that people define, understand and perceive malaria. People in different socio-geographical and cultural settings perceived different signs and symptoms of malaria and it is of our believed that only through such perception that people can take proper or provide necessary measures for malaria control, elimination and prevention (Ranasinghe et al., 2015; Mayala et al., 2015). This statement represents the general agreement of this study under this particular question.

Given a research question, objective and theoretical assumption, this current study formulated a hypothesis based on those statements. The hypothesis, read as there is a relationship between household perception and malaria control activities. To arrive at

this, the study employed smart PLS path modelling to test the hypothesis. The result from the PLS path modelling reveals that there is a relationship between household perception and malaria control activities. The results shows that  $\beta= 0.279$ ,  $t= 4.577$ ,  $p<0.001$ , this indicated that Hypothesis 3 ( $H^3$ ) is supported based on Falk and Miller (1992) who recommended that an  $R^2$  value of 0.10 is to be considered a minimum standard value. Hence this current study value indicate  $\beta= 0.279$ ,  $t= 4.577$ ,  $p<0.001$ . Findings of this study is consistent with that of Das, de Wit, Vet, and Frijns (2008) who found out that the greater the household perceived risk, the greater the likelihood of household engaging in health behaviours to decrease the risk. They stated that Personal risk or susceptibility is one of the most powerful perception in promoting household to adopt healthier behaviour. Chen, Fox, Cantrell, Stockdale, & Kagawa-Singer (2006) found that perception about hepatitis is what prompts people to vaccinate against hepatitis B in an effort to decrease the risk of the disease that is in good agreement with the result of the present study. The present finding also supports Wolitski, Halkitis and Hoff (2005) study that concluded that perception about cancer is what motivates people to use sunscreen to prevent skin cancer. The findings reported that if people perceived the vulnerability of cancer and other diseases may likely be motivate to seek for health care and influence their seeking behaviour.

The finding of the current study also indicates that if household members perceived negatively about the malaria disease, they may likely to adopt any measures for protection or prevention. However, when people believe they are not at risk or have a low risk of vulnerability, unhealthy behaviour tends to result. The result is also consistent with finding by Maes and Louis (2005) who found among adult and HIV

prevention behaviour. They testified that adults do not perceive themselves as prone to HIV and therefore not practice safe sex protection. The finding of this study is also consistent with that of Yep (1993). He reported that same scenario happened with Asian American college students who perceived HIV as a non - Asian disease, and they are not susceptible to it. This is what makes their low safer sex practising behaviours.

Furthermore, finding from the current study is matching with health belief model (Courtenay, 1998). The model assumes that perception of increased risk linked to household health behaviour and also decreased risk to unhealthy behaviours. Furthermore, Perception of disease risk among household members is related to healthier behaviours even when the perception of risk is high. The result is also consistent with finding of Mullens, McCaul, Erickson and Sandgren (2004). The findings demonstrated that cancer is a severe disease with a high risk of recurrence. It is the perception of the threat recurrence that increases the likelihood of behaviour change in people previously treated for the disease. The result is in line of earlier literature (Frank & Swedmark, 2004; Frank & Swedmark, 2004; Centre for Disease Control & Prevention, 2004; Janz & Becker, 1984) that support perception about disease is one of the stronger measures in promoting household to adopt healthier behaviour which is incongruent with this current student. In general, the finding extended further the assumption of the health belief model

## **6.4 Discussion on Household Behaviour on Available and Effective Measures**

As discussed in the previous section, it is again vital to bring up the recap of the major findings of this research from the qualitative part of the study.

### **6.4.1 Summary of the Qualitative Findings**

The objective of research questions under this section is to identify household behaviour on available control measures in Nigeria as well as to explore the household behaviour on the effectiveness of preventive measures on malaria control in Nigeria. Those highlighted objectives achieved through providing answers to the following research questions:

1. How does household behaviour with respect to available control measures influence malaria control in Zamfara state, North West Nigeria? (RQ 4)
2. How does household behaviour affect the effectiveness of malaria control measures in Zamfara state, North West Nigeria? (RQ 5)

In general, result from the qualitative study reveals that household behaviour has the influence on available and effective malaria control measures in Nigeria. Specifically the result shows that household behaviour on the availability of malaria control measures is measured by ACM1, ACM2, ACM3 and ACM4. All those are themes found to be relevant to household behaviour and available control measures to malaria control. On the other hand, household behaviour on effective control measures is considered by ECM1, ECM2, ECM3 and ECM4. Those themes explained household behaviour on the effectiveness of malaria control measures and its influence on malaria control. The discussion is provided based on the research questions and themes generated under each research question.

## **6.4.2 Household Behaviour on Available Control Measures and Malaria Control**

Research question one under qualitative study is on how household behaviour on available control measures influences malaria control in Nigeria. It is widely accepted that for any healthcare provision malaria control provision included having maximum impact on the health levels of the population, it purports to serve; it must be both available and distributed efficiently to the general members of the society (Phillips, 1990). It is equally true, however, that not many countries have achieved these goals because of the lack of available control mechanisms in every aspect of human society. The discussion of the findings under this question is organized based on the theme under it.

### **6.4.2.1 Available Control Measures**

It is the assumption of this study that for malaria control activities to be successful control measures must be available. Even though when they are available it is only when people accept to utilize those measures that they have been able to solve the problem. Interview with the participant of this current study reveals that malaria control measures in Zamfara state are available. Those malaria control measures in the state that are available include Long lasting Insecticide Treated Net (LLIN), Insecticide Treated Net (ITN), malaria drugs (AA, SP etc.) and Rapid Diagnosis Test (RDTs).

An investigation conducted by the researcher revealed that international donors and partners mainly provide those malaria control measures in the state. Among the partners that are currently in the forefront of provision of malaria commodity in the

state include Malaria Action Plan for State (MAPS) a United State Agency for International Development (USAID) funded program. The investigation revealed that those interventions by MAPS and other supporting agency are not covering the entire Zamfara, but they are only supporting two hundred and three facilities across the state. There is also a discrepancy in the number of the facility supported as other respondent informed that they are supporting two hundred and sixty-three facilities in the state. Those provisions mainly located in city centres.

The finding is consistent with findings of previous studies by Knudsen and Slooff (1992). According to Knudsen and Slooff (1992), provision of basic service is used as mechanism of ethnic and tribal separation, a social guidelines that guarantee the lesser community members sheltered in separate high excellence housing reservations. Zoning and hygiene, as well as cleanness, became a passion. Similarly, Aims and Lloyd (1999) found that only about 25 to 30 percent of Nigerians, largely top government functionaries, skilled and other rich and privileged people, benefit from the government housing program. The vast majority of the houses, particularly those informal unapproved settlements is jammed, structurally substandard, and at times located in areas that do not provide adequate defenses against diseases like malaria and other health hazards, which is in good agreement with the results of the present study. This finding is also confirmed by NPC & ICF Macro (2009).

This current research found out that those facility centers that provided malaria control services is mainly targeting pregnant women that are attending antenatal clinics during pregnancy and children during their immunization services. The investigation shows that other category of people is not of paramount importance. It

is just in the recent that they introduced a new program called community base distribution system. This new system looks into the distribution of malaria control commodity among the community members. However, an interview with respondent on the other side informed that those modes of distribution are not benefiting ordinary man as only those that is close or have relations with the distributors can get it. That finding is in line with the earlier literature (NPC & ICF Macro, 2009; Aims & Lloyd, 1999). They found that government guiding principles for providing development, particularly under the extended era of military administration, covers not the effective and successful implementation of the various programme due to their inability to cover everywhere. Those findings have relation to both the theory of health belief, behavioural theory of health services and rational choice theory. Refer to chapter two of this study subsection 2.8.1; 2.8.3 and 2.8.4. The assumption of these theoretical perspectives shows their connection with the findings of this study.

#### **6.4.2.2 Household Behaviour on ACM and Malaria Prevalence**

This study finds out that household behaviour on available control measures in terms of their use and acceptance increase malaria prevalence. Similarly, the high malaria prevalence, causes many household members to seek for any available control measure for disease control and prevention. Findings under this theme informed to this study that in some places malaria prevalence and presence of control measures do not influence behaviour due to the etiological understanding people give to malaria. This finding is consistent with various reports by both national and international bodies about malaria prevalence in the country. The present findings also support reports by (WHO, 2013; WHO, 2012; WB, 2009).

In the case of malaria prevalence and human behaviour, the result of the current study shows that many community members in Zamfara state demonstrate a different sort of behaviour due to high malaria prevalence. Some may attempt to seek for treatment intervention, but failed for one reason or the other. The finding is consistent with the health belief model. The theory assumes that perceived susceptibility of the disease (risk) influences household behaviour. That is belief with the intention of as soon as people are at risk or danger of an infection they will be more probably to do something to put off disease from occurrence. The finding is also consistent with the assumption of the theory of planned behaviour. The general assumption of the theory is that attitude in the direction of behaviour, determined by the conviction that an exact behaviour will contain a solid effect and the assessment of this consequence. Biased standard norms, or the idea on whether other significant individuals will endorse one's behaviour, in addition to the person inspiration to fulfil with the prospect of others.

#### **6.4.2.3 Reasons Encouraging/Discouraging Behaviour on ACM**

Availability of malaria control measures and its influence on household behaviour is among the challenges facing malaria control and prevention in general. The central issue here is that the majority of the respondents that participated in this study confirmed that being the prevention measures available significantly influence household behaviour concerning using those measures with the sole aim of controlling the disease. However, on the other hand, those measures that influence household behaviour is not available and accessible to all members of the community that in another way influence their behaviour in treatment seeking.



The findings of this study show that cost imposed to available control measures of malaria is affecting many household heads for the treatment of malaria due to their socioeconomic conditions. Because it is found out that malaria control measures provided free is not everywhere. Therefore, places where those control measures are not available required household to pay for them at a high cost. An investigation of the study shows that among the issues that influence people behaviour negatively with malaria control is the issue of uncertainty. That is to say, household members are not very sure about continued with such services. According to the behavioural theory, there are some factors that influence individual behaviour on treatment and prevention seeking. However, people use, seek or involve into health seeking practices only when the services and control measures put in place is available. Andersen (1995) reveals that available control measures serve as a determinant of whether an individual or household members permit or barred to use those services and involved in such health behaviours. They reported that available measures across the household location (rural or urban areas) closely related to influence behaviour in health care seeking which is in good agreement with the finding of this study.

Results from the interview of this current study reveal that malaria control service provided at facility centres is targeting mainly pregnant women who are attending ANC's and those children on immunization. The results are in lines with earlier literature (Adenipekun, 2013; Okafor & Amzat, 2007; Boadu, 2002; Egunjobi, 2000; Jauro, 1981) that shows serious imbalances in the distribution of formal health care facilities and services in many third world countries Nigeria inclusive. Further, disparities in the distribution of modern health services can be found, between the

urban centres on one hand and the rural areas on the other targeting certain people, which also impact on their health seeking behaviour (Adenipekun, 2013; Okafor & Amzat, 2007; Boadu, 2002; Egunjobi, 2000; Jauro, 1981).

#### **6.4.2.4 Location of ACM and Household Behaviour**

One of the greatest challenges facing malaria control programme in Zamfara state is the issue of basing control and prevention measures in some certain location while leaving or neglecting other places with the teeming demand of such provision. After respondents notify to the researcher that malaria control measures is available, participant further stressed that those malaria control measures are available only in some certain location called facilities centres. Phillips (1990) asserted that for any health care programmes to have maximum impact on the health levels of the population, it must be both equitably and efficiently available across the society. The present finding also supports Philips (1990). They concluded that not many countries had achieved these goals because of lack of available control measures to cover all the places in need which in turn influence household behaviour in seeking those services.

There are discrepancies of information from stakeholders and part of household respondents. Participants from government side reveal that malaria control commodity reached a substantial number of facility centres, but many respondents informed during the interview that, their location and communities are out of reach for those services. Though a respondent from malaria control office in the state explained to the researcher detailed on how those services provided to the community in the entire Zamfara. The respondent elaborated that in each ward of

Zamfara state, there is one hospital that provided those services. That is at least each ward is touched by one facility, and there is in some cases, wards with three hospitals that are supported by those interventions. The finding is consistent with that of Jauro (1981). He indicated that hospital services for treatment, prevention of diseases are not available or largely inadequate.

To recap those discrepancies from both sides the researcher found out that one facility per ward is not enough to cater for the provision of malaria treatment and prevention services to the teeming population living in the ward that also dispersed in various long locations. Therefore, this current study agreed with household respondent that malaria control services are out of reach in many places of Zamfara state. Since this study observed that international partners mainly provided those malaria control measures it is also observed that the failure of the state government to contribute greatly to the provision of those control measures is the major reason behind lacking those treatment and prevention measures across the state. Those problems are what influences household behaviour on available control measures.

#### **6.4.3 Household Behaviour and the Effectiveness of Preventive Measures**

The last research question is about how household behaviour affects the effectiveness of malaria control measures in Nigeria. Issue of effectiveness is the major challenge concerning malaria control and management in Nigeria. Effectiveness comprises a situation whereby malaria control measures available or that are provided can be able to deal effectively with curing and preventing the disease they are purported to prevent. Because even if those control measures are available everywhere, it can be useful only when they are effective that is to say they are capable and effective in

terms of prevention and treatment of malaria. Discussion of this research question is arranged in four themes.

#### **6.4.3.1 Effective Control Measures**

The first theme under this question is on the effectiveness of malaria control measures as one of the motivating factors that influence household behaviour in malaria control and prevention in Zamfara state north-west Nigeria. The interview under this theme conducted to find out whether those control measures are effective, and if been them effective have any influence on household behaviour. The results of the interview conducted reveals that most of the prevention measures that is provided are effective, but the most effective one is using long lasting insecticide net. The result of this study further confirmed the effectiveness of those control measures based on the assessment that have been conducted and found out that only around 5-10 percent of those that are using the long lasting insecticide net have confirmed malaria. While those that are not using the net about 90 percent of them when tested they have malaria. Base on that assessment it shows that malaria control measures are effective.

However, in a counter finding, another respondent reveals during the interview that among the drug that are provided for malaria treatment some of them have a side effect that make a question on their effectiveness. The finding from another respondent claimed that they use the number of malaria cases, including death, to report that those malaria control measures are not effective. Though with all those divergent views about quality and effectiveness of malaria control and prevention measures there is a clear understanding that those that are using control measures

always, regularly and effectively reaffirmed to the study that control measures are very, very effective and henceforth influence their behaviour on using them.

Findings above are consistent with rational choice theory. According to this theory of rational choice, individuals are encouraged by their subjective needs and ends that motivated by individual desires. Rational Choice Theory (RCT) believed that since it is not possible for persons to achieve all of the numerous things that they need, they must make choices related to both their objectives and the means for them (Owumi, 2013; Polycarp, 2013 & Ulen, 1999). It is believed that individuals must anticipate in advance the outcomes of other courses of action and analyze which, among available actions will be better and better for them.

The major challenge reveals by the investigation of this current study concerning the issue of effectiveness of malaria control measure is the issue of lack of access to those control measures among the majority of the population. Another vital issue found out by the study is that of lack of knowledge of how to use those control measures. For example, there are some people that if they are attacked by malaria and prescribe to them some drugs to take when they start the dose and begin feeling better at first stage they stop the rest of the dosage which has a lot of implications. Because the study found out that first dose of malaria drugs attack the parasite, next day of the dose weaken the parasite and the following day it will enter the blood and fight for the remaining parasite and destroy it. So the issue of effectiveness express by some users of those control measures may likely attributed to their failure of completing the dose prescribe. That is to say, if they take it today and felt better they will not take it the other day. The theory of planned behaviour and the health belief

model has connection with those findings and therefore, the assumptions of those theories have been further extended.

#### **6.4.3.2 Household Behaviour on Effective Control Measures**

This theme tried to answer the main subject of this research question is whether that being that malaria control measures effective influence household behaviour on treatment seeking practices. The central issue here is that the majority of the respondents that participated in this study confirmed that being the prevention measures effective significantly influence household behaviour concerning using those measures with the sole aim of controlling and preventing malaria. Interview conducted shows that effective preventive measures not only influence and encourage people to use them but also influence and encourage others due to the impact or effectiveness they observed by using such control measures. This is consistent with health belief model (Frank & Swedmark, 2004; Graham, 2002) that found out that household's opinion of the value or effectiveness of a new behaviour in decreasing the risk of developing the disease. Household tends to adopt behaviours when they believe the behaviour decrease their chances of developing disease. Household definition about the effectiveness of the programme plays a significant role in the adoption of behaviours.

On the other hand, this current study found out that household and community members that experienced ineffectiveness of malaria control measures largely have a discourage of continuing with those measures that found ineffective. According to Janz and Becker (1984) effectiveness of health services and provision is the most significant factor or construct in determining behaviour change. For a new behaviour

to be adopted, a person needs to believe the benefits and effectiveness of the new behaviour that is in good agreement with the results of the present study.

#### **6.4.3.3 Effectiveness and Treatment Choice**

The primary concern of this theme is to find out whether being malaria control measures effective or ineffective influence household behaviour on treatment choice. The household's opinion of the effectiveness or usefulness of a new behaviour in decreasing the risk of developing the disease is the determining factor in treatment choice. Household tends to adopt behaviours when they believe the prevention and control measures effectively decrease their chances of developing disease. Household experience about the effectiveness of the control measures plays a significant role in the adoption of their behaviour on treatment choice. This study found out that many respondents are of the opinion that for any control measure to apply for disease control or prevention there is need to know how effective those measures is in handling such disease. One respondent also reported that there are some control measures that he even recommends to others due to its effectiveness and there are some preventive measures that he discourages others to use. This is exactly what is found to be true among black women who believed breast self-exam were beneficial and effective in tackling breast cancer among the women (Graham, 2002).

The result is also consistent with MacCormack (1984) who stated that the main explanation for why people do not recognize and believe in a new form of health behaviour is as a result that, the behaviour being promoted is either not conveniently or somehow difficult, which consequently generated unnecessary side effects, or

does not give observable and evidence results (MacCormack, 1984). The finding is also consistent with rational choice theory. The theory outline that people are attentive decision makers whose activities are meaningfully influenced by the cost and benefits which is congruent with the result of this study.

#### **6.4.3.4 Frequently used malaria control measures**

Malaria control measures that are frequently used by household members in Zamfara state is one of the major problems that influence malaria disease and prevalence in the state. An investigation conducted by the research shows that household members in Zamfara state employed many control measures with the sole intention of treatment and prevention of malaria. Though it is found out that people largely employed long lasting insecticide net for malaria prevention and also various drugs such as *AA 1-4 SP* for treatment, it is also confirmed during the study that those control measures is not enough or sufficient among general members of the society in the state. This finding is in line with behavioural theory of health services and rational choice (see chapter 2 section 2.7).

The first challenge is the issue of side effect, and another one is that of complained from those that are using net due to the hot nature of the net while sleeping under it. Many household members reported not to choice, such types of treatment and prevention due to such problems. These make the issue of choice to be of a significant challenge to the issue of malaria control. Respondent, among the household heads reported during the interview that they choose to use the traditional system because they believed it is better than using other medications. Some other respondent exposed during the interview that their reason for treatment choice



involved financial reason. There is agreement between this result with that of Fredrickson 2004; Wyatt, (1980) who stated that presently people in northern Nigeria used both the two preventive methods (Hausa and Islamic) that is treatment using herbs and other traditions and belief in Allah alone, is the source of illness and only for him cure comes (Fredrickson, 2004; Wyatt, 1980). The result is also consistent with rational choice theory (see chapter 5 section 2.7.4) for the major assumption of this theory.

An investigation conducted by a researcher with regard to the issue of treatment choice also reveals that some people do not accept any idea that come from western countries that they believe it as anti Muslim and it is a plot to destroy Muslim community. Those respondents express their fair, why not targeting the sources of the problem. They reported during the interview that since it is understood malaria is caused by mosquito why not attacking mosquito breeding site. This respondent believed that those measures introduce by western is mainly anti-society because it negated all the existing structures in place or local means of tackling and handling malaria. Based on their understanding, they reveal to the researcher that their choice not to employ any measure introduce by western societies to control or prevent any disease. This finding is also consistent with rational choice and the health belief model. These theories provide an explanation that perceived effectiveness and perceived benefits, influences peoples' behaviour on health seeking practices.

## **6.5 Conclusion**

This chapter discussed the combine analysis in chapter four and five. The next part of the chapter discusses findings on the influence of fumigation, waste control and

perception on malaria control and prevention. Similarly the chapter discusses influence of household behaviour on available and effective measures of malaria control. The discussion is in relation to previous literature related to this study and also in relation to underpinning theories for this study. The next chapter of this study is chapter seven. The chapter discussed the recommendations and conclusions, including research contribution and implications.



## **CHAPTER SEVEN**

### **RECOMMENDATIONS AND CONCLUSION**

#### **7.1 Introduction**

The previous chapter discusses the combine analysis of chapters four and five. Discussion of the influence of fumigation, waste control and perception on malaria control and prevention as well as the influence of household behaviour on available and effective measures of malaria control is carried out to provide a connection between the finding of this study to theories and previous literature related to this study. In this chapter recommendations and conclusion is discussed. The chapter talks about theoretical, methodological and practical implication. The chapter also discussed research limitations and recommendations. Provision for future research directions is also provided and then a conclusion.

#### **7.2 Research Contributions and Implications**

It is evident from both quantitative and qualitative data findings, analysis and discussion of this current study that this research is offered some vital contributions to theory, methodology and practical purposes in the large-scale academic environment especially in the area of medical sociology concerning malaria control and prevention. Both contributions are discussed separately in this chapter.

### **7.2.1 Theoretical Contributions**

The research model of this study designed with the support of practical evidence and theoretical proofs documented in the literature. The conceptual model also is back up and given a detailed explanation from four theoretical perspectives. Those theoretical points of view include health belief model, the theory of planned behaviour, the behavioural theory of health services and rational choice theory. Based on the findings and discussion of this current study, this research offers quite a lot of theoretical contributions to the influence of household behaviour on malaria control and prevention. This current study contributes greatly by employing those theories to conceptualize, developed and tested empirically both behaviour on fumigation, behaviour on waste disposal, household perception, behaviour on available and effective control measures as independent variables to examine their relationship to malaria control as dependent variable emerged as one of the vital theoretical contribution provided by this study.

Findings from the current study successfully contributed to theory in medical sociology, particularly in malaria control studies employing a health belief model, rational choice theory as well as the behavioural theory of health services. The major contribution of the study is that household behaviour on fumigation of the environment has been ascertained to have a significant and encouraging influence or effect on malaria control. These findings generally extended further the existing assumptions of the theories used in this research. These emerge to be an essential contribution to those theories and literature.

Similarly, another fundamental contribution of this study is that of household behaviour on waste disposal extensively affect malaria control and increases its prevalence. Household behaviour due to improper waste disposals such as poor public hygiene, lack of sewage disposal, deprived housing conditions and lack of sanitation is the major cause of malaria. The finding evidently revealed that a better environmental service is therefore providing a permanent solution to the health problem caused by deterioration of a poor environment. This also contributed to the body of knowledge.

Moreover, findings from this study theoretically contribute to the concept of household perception and malaria control. The argument is that household perception of malaria disease influences their behaviour on prevention and treatment-seeking practices. This possibly established and empirically confirmed by the findings of this study where a household perception of malaria disease significantly related to malaria prevention and control. This is also another contribution to the theory and literature provided by this study.

Again, a finding from qualitative part of this current study has contributed by strengthening the basic assumption of the theory of behavioural health services. The theory posit that for any medical intervention to impact on the health levels of the population, it purports to serve, it must be both equitably distributed and available to the general members of the society. The findings further validated that of Okafor & Amzat (2007), Alaba (2005) and Ogbole (1981) among several others. This expanding the range of malaria control indicator explaining how lack of available, malaria control measures, hinder the successful malaria control and prevention.

Issue of effectiveness is the major challenge concerning malaria control and management in Nigeria. Effectiveness comprises a situation whereby malaria control measures available or that are provided can be able to deal effectively with curing and preventing the disease they are purported to cure. This current study contributed greatly in that regard by confirming that effectiveness of malaria control measures is a standard determinant for measuring successful malaria prevention and control activities. Results from the interview conducted shows that preventive measures that is effective actually not only influence and encourage people to use them, but also influence and encourage others due to the impact or effectiveness they observed by using such control measures. It is also providing a milestone contribution to the fundamental assumptions of the health belief model and rational choice theory. The assumption is that household's opinion of the value or effectiveness of a new behaviour in decreasing the risk of developing the disease.

### **7.2.2 Methodological Implications**

The ability of this study to employ more than one method recommended by Maheu-Giroux and Castro (2013) justified the methodological contribution of this current study. Therefore, both methods of quantitative and qualitative were used to analyze the data gathered from interviews and questionnaires. Many of the related researches used either quantitative or qualitative but merging the two methods to attend to the gap provided by Maheu-Giroux and Castro (2013) make it to be a great contribution to the methodology.

Furthermore, removing insignificant items from original scale, adding significant items by cleansed and tested the new measure to suit the study setting using Cronbach's alpha coefficient is a vital methodological contribution of this study. Using PLS path modelling to measure the assets of every latent constructs of this study emerged as another vital methodological contribution offer by this study. To be précised convergent validity and discriminant validity was successfully measured the properties of every constructs in this current study. Average Variance Explained (AVE), individual item's reliability, internal consistency reliability was examined and assessed. While the discriminant validity was verified by evaluating the relationship between the constructs with average variance explained square roots. Discriminant validity of the research model was assessed by measuring the results of the cross loadings matrix. This current study administers this vigorous method of PLS path modelling to assess the items of every constructs demonstrated in the model of this study, hence provided a great methodological contribution. In a nutshell, a sample size above 400 was used by this current study after data screening and clearance as clear responses after initial verification proved to be a fundamental milestone achievement need to provide in cross sectional research as stated by Hair et al (2010). This was achieved in this current study and provided it with another basic methodological contribution.

### **7.2.3 Practical Implications for Policy Exercises**

In this current research provides some practical contributions to the influence of household behaviour on malaria control, prevention and management practices. Therefore, the finding of the current research could be employed to offer an appropriate and proper solution and explanations for the way out of the crisis of

malaria control, prevention and management. In general base with the insight gained by this current study with regard to the fumigation of environment and malaria prevalence and control, academicians, malaria control stakeholders and household members are advised to strongly adhere to providing fumigation services and taking adequate care of environmental fumigation issues to reduce the malaria prevalence. It is also recommended considering the issue of fumigation of environment into the new thinking and a framework for malaria control. The finding offers a vital contribution to practice and policy exercises.

Addressing the issue of household behaviour of waste disposal has a significant contribution to both members of the society and policy stakeholders to malaria control and management. This study suggests considering household behaviour on improper waste disposal such as poor public hygiene, lack of sewage disposal, deprived housing conditions and lack of sanitation into malaria control key issues and operational plan, through provision of better environmental services in order to provide a permanent solution to the health problem caused by deterioration in bad environment. For the purpose of achieving malaria control stakeholders both at the local and international level should look into including waste disposal practices of household members in their key areas of malaria control activities.

This study found out that household perception of malaria disease with all its attendant consequences influences their behaviour to engage in malaria control practices. Malaria control and prevention can only be successful if household perception about the malaria disease is given due consideration. Perception of malaria is very imperative because it is only through such perception that people



define, understand and perceive malaria. It is also through that perception people can take proper measures or provide control. The implication of the policy here is that government and agencies concerned both at the local and international level should provide an avenue for considering household perception about malaria into the top priority agenda of malaria control. Correspondingly, this study suggested empowering awareness campaign services to sensitizing community members and all parties involved in malaria understanding.

Qualitative findings of this current study found out that there is an association between household behaviour on available control measures and malaria control. The finding shows that there is an increase in attendance to facility centres providing malaria commodity. Therefore, it would be of enormous benefits to malaria control stakeholders (such as government agencies, private organizations at the local and international level) to devise and developed ways to address the issue of unavailability of malaria control measures. This study suggested that malaria control measures shall be available for smooth and equal access to all people in need in respective of location, or priority among others, so that malaria control would be successful.

### **7.3 Research Limitations**

After considering the findings and contributions of this study, it is vital to recognize the limitations at theoretical and methodological implications. The limitation of this study found as a result of time, resources and access constraints. Firstly, this study has a limitation of employing malaria control stakeholders and the household heads as a target population for data gathering. Despite the fact that, those target choices

are enough and sufficient to provide answers to the research questions, but there is a need for wider representation to give the authenticated and clarify results.

Another limitation of this research is that after data screening this study used clean 409 data responses which is quite sufficient as recommended by Sekaran (2003) but there is need for sample size increased with more respondents because Hair et al. (2010) stated that the larger the sample size, the more the reliability and strength of the findings. Though McNamara (2009) stated that interview with a minimum of 10 participants in cross-sectional research is adequate, but this research faced with the limitation of interview with only 20 participants.

Moreover, some malaria stakeholders like Malaria Action Plan for States (MAPS) failed to grant an interview with the researcher. Before the interview granted a researcher need to write an application letter to the US embassy to US state department through MAPS office in Gusau and then to Abuja. This may take not less than six months or time unknown before the interview may grant. Due to the time frame the researcher need to switch from the official arrangement and seek with a local arrangement. Though this study employed cross-sectional research, which does not permit a fundamental conclusion, it is important to use longitudinal studies to confirm the validity of this current study of the influence of household behaviour on malaria control.

#### **7.4 Future Research Directions**

It is important to understand that malaria is one of the problems facing society in Nigeria and household behaviour on environmental fumigation, household behaviour

on waste disposal as well as their perception of malaria together with household behaviour on available and effective control measures is one of the major challenges faces its control and prevention activities. This research focus in the area of behaviour on fumigation, waste control practices, perception of malaria as well as behaviour on available and effective control measures. Further research should emphasize on the other areas, consider by sociologists in the study of health seeking behaviour. Such areas include; religion, physical activities, community, intellectual, emotional as well as leadership aspects of malaria control in communities of Zamfara state. It is also recommended to replicate this study in other parts of the country Furthermore, it is imperative for more empirical studies on socioeconomic influence on malaria control using qualitative and quantitative approach in the communities studied. Thus, this study recommended that there is a need for refinement and item validation of the instrument used in this study. Therefore, measuring item that can adequately facilitate to give more details is needed. Despite the fact that the measuring items subjected to investigative factor analysis, further study is required for improvement and confirms the measures employ in this present study and uses them to similar research in the future.

Moreover, this study is a cross-sectional study that usually does not permit causal inferences to be made. There is a need for longitudinal studies to ascertain the real findings of this current study of the influence of household behaviour on malaria control. In the quantitative part of this study, only 409 responses are used for the analysis of data after data screening. Future studies should emphasize on enlarging the number of sampling of more than 500 after data cleaning so that the final result would be more consistent and acceptable. In the qualitative side, this study interview

only 20 people. There is a need for future studies to increase the number of the participant for the interview to have adequate community representation.

The focus of this present study is on the household heads and malaria control stakeholders in Zamfara state as respondents. This provides it with the limited power of generalization. In order to have generalization power, further studies should emphasize on including other categories of the study population like religious leaders, community leaders, cultural and traditional health providers in the community studied (Zamfara state north-west Nigeria) so that to have general knowledge on malaria control and generalization can be realized.

### **7.5 Conclusion**

A finding from this study provides further proofs from the emerging body of knowledge concerning the influence of household behaviour on malaria control. Results from the quantitative and qualitative findings offer support for key theoretical assumptions. After having some limitations, this current study successfully answers all the research questions and also achieved all the objectives of the study. This is evident through testing the hypothesis of the study within which they are all supported on the quantitative side. While research questions under qualitative is also succeeded to interview household members, malaria stakeholders and offer to endow with reached information through expressing their view on household behaviour on available and effective control measures to malaria prevention and control practices. In general, this study significantly added to the existing body of knowledge in the influence of household behaviour on malaria control and prevention in Zamfara state North West Nigeria.

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## Appendix A: Quantitative Instruments (Questionnaire)

### QUESTIONNAIRE



### **Influence of Household Behaviour on Malaria Control in Zamfara State North West Nigeria**

Dear Respondents,

I am a research assistant to Doctor of Philosophy (PhD) candidate of School of Government (SOG), College of Law Government and International Studies (COLGIS), Universiti Utara Malaysia. The candidate is undergoing a research work on Influence of Household Behaviour on Malaria Control in Zamfara State North West Nigeria. My function is to help the researcher in conducting the survey and therefore request for your cooperation. It is hope that the outcome of the research will be of immense benefit to policy makers, researchers and general members of the society regarding malaria control and prevention. Your effort in responding to the questions is highly appreciated as it assists the researcher to achieve the objective of the study. Be assured that the information gathered will be solely for the purpose of this academic research and confidentiality is highly guaranteed.

In anticipation of your positive response, on behalf of the researcher I am very grateful for your time in filling this questionnaire.

Yours Sincerely

For any enquiry contact the following:

Ahmad Yahaya Maigemu  
[s95084@student.uum.edu.my](mailto:s95084@student.uum.edu.my)  
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+6049287902

Please decide how true the following statement is in describing you and your feeling. Kindly response to the questions that best represent your view and opinion based on the below 5 likert scale

**1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree**

**SECTION A: Behaviour on Fumigation**

S/NO	Statement	SD	D	N	A	SA
BF1	Fumigation as measures of malaria control is not use by household to control malaria	1	2	3	4	5
BF2	Fumigation of environment is not use by household because it is too expensive	1	2	3	4	5
BF3	Fumigation of environment is difficult to household because resources required is not available	1	2	3	4	5
BF4	Fumigation is not utilized by household because it is new which require starting new behaviour	1	2	3	4	5
BF5	Members of the household is not comfortable with fumigation	1	2	3	4	5
BF6	Household does not undertake fumigation services because they are full of other activity	1	2	3	4	5
BF7	Household have other choice important than fumigation	1	2	3	4	5
BF8	Household does not fumigate because of ignorance of where and how to do it	1	2	3	4	5
BF9	Time consuming is what make household to not make use of fumigation services	1	2	3	4	5
BF10	Lack of information about importance of fumigation is what make it less use by household	1	2	3	4	5
BF11	Household environmental condition is not conducive for fumigation	1	2	3	4	5
BF12	Household belief about not developing malaria is what make them to not make use of fumigation	1	2	3	4	5
BF13	Feeling not at risk of malaria is what make household to not adopt fumigation	1	2	3	4	5
BF14	Fumigation is not necessary because of the believe that it does not prevent household members from future malaria occurrence	1	2	3	4	5
BF15	Household not understand the importance of fumigation with regard to malaria control	1	2	3	4	5
BF16	Household does not concern with fumigation	1	2	3	4	5



BF17	Ineffectiveness of fumigation is what affect it use by household	1	2	3	4	5
BF18	Household members does not regularly fumigate their environment	1	2	3	4	5
BF19	Believe about not dying as a result of malaria is what make household to not engage in fumigation services	1	2	3	4	5
BF20	Fumigation services/activities is very dangerous to household members	1	2	3	4	5
BF21	Fumigation of environment is not affordable to household members	1	2	3	4	5

---

### SECTION B: Behaviour on Waste Disposal

---

S/NO	Statement	SD	D	N	A	SA
BW1	Waste disposal facilities is not available	1	2	3	4	5
BW2	There is no place reserved for dumping waste and discarded materials	1	2	3	4	5
BW3	Refuse in my house is carried out by water and filled the waterway passage	1	2	3	4	5
BW4	Refuse is dump on the street	1	2	3	4	5
BW5	Refuse is dump inside the waterway	1	2	3	4	5
BW6	Household members dump refuse anywhere they like	1	2	3	4	5
BW7	There is no provision for household to gather garbage from houses	1	2	3	4	5
BW8	Household lack purchasing power to own waste disposal vans	1	2	3	4	5
BW9	There is no concern by household members on where to dump refuse	1	2	3	4	5
BW10	It is costly to dump refuse properly	1	2	3	4	5
BW11	Proper sanitation and dumping of refuse is time consuming	1	2	3	4	5
BW12	Busy nature of household doing other activities is the reason for not dumping waste properly	1	2	3	4	5
BW13	There is other thing important than disposing waste properly	1	2	3	4	5
BW14	Household members lack the resources to dispose waste properly	1	2	3	4	5
BW15	My financial status will be in danger if I use the little I have for disposing waste	1	2	3	4	5
BW16	Doing waste disposal to gather garbage is a new behaviour to me which required a new starting point	1	2	3	4	5

BW17	There is no community concerned to make sure waste is dispose properly	1	2	3	4	5
BW18	I am forgetting to dispose waste properly	1	2	3	4	5
BW19	There is no action to gather and dispose waste regularly	1	2	3	4	5
BW20	There is no household involvement in any activity regarding waste disposal	1	2	3	4	5
BW21	The level of disposing waste generally is very poor	1	2	3	4	5
BW22	There is shortage of proper waterway system which serve as conducive environment for breeding mosquitoes	1	2	3	4	5
BW23	The waterway system available is open gutters very easy to be filled with discarded materials	1	2	3	4	5
BW24	There is no proper way for waste gushing water from toilet/bath rooms	1	2	3	4	5
BW25	The type of bathrooms/toilets use by household members does not have facilities for proper waste water passage	1	2	3	4	5
BW26	Waterway system not properly manage by household members	1	2	3	4	5
BW27	Household members filled waterway passage with discarded materials	1	2	3	4	5
BW28	Behaviour and practices to make waterway clean and proper sanitation is low	1	2	3	4	5
BW29	There is carelessness by the household in the provision of proper water for water passage	1	2	3	4	5
BW30	Household members does not clean waterway passage because it is time consuming	1	2	3	4	5
BW31	Lack of facilities is what makes household to clear stagnant water	1	2	3	4	5
BW32	There is no stagnant water clearance because of the busy nature of household	1	2	3	4	5
BW33	The system of toilet/bathrooms is traditional conducive for holding waste water	1	2	3	4	5
BW34	There is presence of old building structures with poor network of water passage in my area	1	2	3	4	5
BW35	I do not clear stagnant water because to me it is not cause any harm	1	2	3	4	5
BW36	Household members fails to remember the situation of waterway in the area	1	2	3	4	5

BW37	There is no activity in the area in charge of clearing stagnant water	1	2	3	4	5
BW38	There is no community commitment to ensure proper passage of water to avoid presence of stagnant water in the area	1	2	3	4	5

### SECTION C: Perception on Malaria

SN	Statement	SD	D	N	A	SA
PM1	There is no chance of developing malaria in life time	1	2	3	4	5
PM2	There is no feeling at risk as a result of malaria in life time	1	2	3	4	5
PM3	Malaria is not a serious disease	1	2	3	4	5
PM4	Malaria is serious just if compare to other disease	1	2	3	4	5
PM5	It is not possible to contact malaria easily	1	2	3	4	5
PM6	The high risk of malaria is not encouraging behaviour to adopt preventive measures	1	2	3	4	5
PM7	Perception about susceptibility to malaria does not prompt me to seek for treatment	1	2	3	4	5
PM8	There is no change on household career as a result of malaria	1	2	3	4	5
PM9	There is no shock when thought of malaria	1	2	3	4	5
PM10	There is no feeling of life change as a result of malaria	1	2	3	4	5
PM11	Malaria is not a severe disease as far as I am concern	1	2	3	4	5
PM12	Malaria has no major consequences in life	1	2	3	4	5
PM13	Malaria is not causes difficulties to me and those close to me	1	2	3	4	5
PM14	Malaria control activities does not prevent me from future problems	1	2	3	4	5
PM15	I have nothing to gain by doing malaria control activities	1	2	3	4	5
PM16	Malaria control services is not effective	1	2	3	4	5
PM17	The price of control services is not affordable	1	2	3	4	5
PM18	Malaria control services does not decreases the chances of people dying from the disease	1	2	3	4	5

## SECTION D: Malaria Control

SN	Statement	SD	D	N	A	SA
MC1	There is a major environmental concern in the area	1	2	3	4	5
MC2	Poor behaviour on environmental issues increases the prevalence of malaria	1	2	3	4	5
MC3	Level of knowledge does not influence household behaviour on malaria control	1	2	3	4	5
MC4	Household cultural values influence their behaviour on malaria control	1	2	3	4	5
MC5	There is no household commitment on fumigation	1	2	3	4	5
MC6	There is no motivation for household members on bad water treatment	1	2	3	4	5
MC7	The general behaviour of household members on waste disposal is poor	1	2	3	4	5
MC8	There is no cooperation by household to control malaria	1	2	3	4	5
MC9	There is no team work by household members to control malaria	1	2	3	4	5
MC10	There is no assistance by household members to control malaria	1	2	3	4	5

## SECTION E: Demographic Characteristic of the Respondents

1. GENDER: Male [ ] Female [ ]
2. AGE: [30-40] [41-50] [51-60] [61 above]
3. INCOME (in '000 naira'): [10-20] [20-30] [30-40] [40 above]
4. EDUCATION STATUS: Non formal education[ ] Primary education[ ] Secondary education[ ] Tertiary education [ ] Others [ ]
5. OCCUPATION: Civil service[ ] Business[ ] Farming[ ] Others [ ]
6. RELIGION: Islam [ ] Christianity [ ] Traditional [ ] Others [ ]
7. TRIBE: Hausa [ ] Yoruba [ ] Igbo [ ] Others [ ]

**Table of Determining Sample Size**

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	<b>100000</b>	<b>384</b>

Source: Krejcie, Robert V., Morgan, Daryle W. Determining Sample Size for Research Activities

Note: N= Population size S= Sample size.



**UUM**  
Universiti Utara Malaysia

## Appendix B: Qualitative Instrument (Interview Guide)

### INTERVIEW GUIDE



#### Section A: Personal Profile of the Respondents

- A. age
- B. Gender
- C. Educational Qualification
- D. Religious Affiliation
- E. Occupation

Interview Date [            ]            Time [            ]            Code [            ]

#### **SECTION A: Interview on Availability and Effectiveness of Preventive Measures and Influence of Household Behaviour on Malaria Control**

1. How did you define a seriousness and health problem of malaria in your household? Kindly elaborate more on how these affect household behaviour in terms of health seeking behaviour.
2. Is the seriousness as a result of availability of the preventive measures? How?
3. Are preventive measures of malaria control available?
4. Can you explain how you respond to the issue of available control measures?
5. Do you have any issue with those control measures?
6. Is available control measures encourages you to protect yourself from malaria?
- 7.

8. Is it available to all household (elaborate)
9. Is it available at any time
10. In any location
11. How the above influence household on care seeking behaviour to control malaria
12. Does this issue of availability in general influence household behaviour to use those preventive measures?

#### SECTION B: Effectiveness

1. Does preventive measures of malaria control effective?
2. Does it influence household choices on preventive measure? Elaborate
3. Does effectiveness of preventive measure contribute to the seriousness of malaria?
4. Does the issue of effectiveness of the control measures influence household behaviour?
5. When malaria strike in one of the household member, do you usually start treatment from home by taking certain preventive measures.
6. Please share with me the method you prefer in the management and prevention of malaria in your household.
7. Do you think the issue of effectiveness is a challenge facing household in treating malaria which also influence their behaviour on treatment seeking behaviour
8. Is the issue of effective influence household behaviour on type of treatment preferred?
9. Please share with me any other issue related to effectiveness of malaria control measures and household behaviour on malaria control?

## **SECTION B: General Behaviour Interview**

1. How do you explain the prevalence of malaria in Zamfara state
2. How complicated do you consider the prevalence
3. What do think are the factors contributing to malaria prevalence
4. How does household members response to those curative measures
5. What of the affordability of those curative measures
6. How does household behaviour in terms of their cultural values and beliefs affect malaria control
7. Does household level of education influence their behaviour on malaria control
8. What of household religious beliefs and practices. Does it influence their behaviour on available malaria control measures
9. How does household economic status and background influence their behaviour on malaria control
10. What of their skills, does it have any influence on their behaviour?
11. In general how do you consider the influence of availability and effectiveness of malaria control measures on malaria control



**Appendix C: Consent Form**

**SCHOOL OF GOVERNMENT  
COLLEGE OF LAW GOVERNMENT AND INTERNATIONAL STUDIES  
UNIVERSITI UTARA MALAYSIA  
SINTOK,  
KEDAH DARUL AMAN**

Date .....

RESEARCH TOPIC: INFLUENCE OF HOUSEHOLD BEHAVIOUR ON MALARIA IN  
ZAMFARA STATE NORTH WEST NIGERIA.

**RESEARCH INTERVIEW CONSENT FORM**

I wish to freely without any coercion, intimidation or compulsion to partake and contributed my knowledge and understanding on this research topic without any fear, panic or favor. My participation on this research is on the agreement that this research work is mean for academic purposes only, and there is nothing like political relevance will allow taking advantage of the information provided during and after the study. I will not expect any return benefit from the researcher being me participant of this interview.

\_\_\_\_\_  
Participant Signature

\_\_\_\_\_  
Researcher's Signature

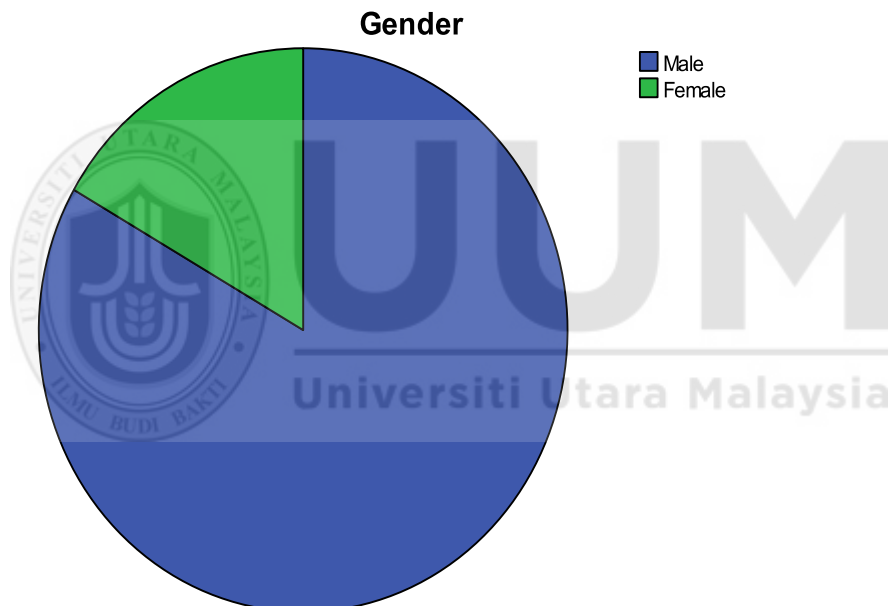
## Appendix D: Statistics of Demographic Information of Respondents

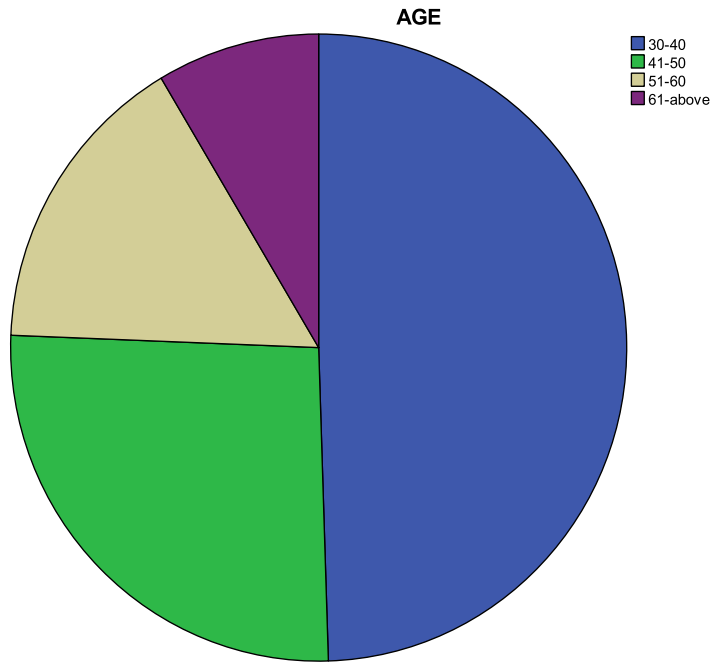
### RESPONDENTS STATISTICS

	Gender	Age	Income	Education Status	Occupation	Religion	Tribe
Valid	401	398	365	386	397	402	399
Missing	1	4	37	16	5	0	3

### Gender

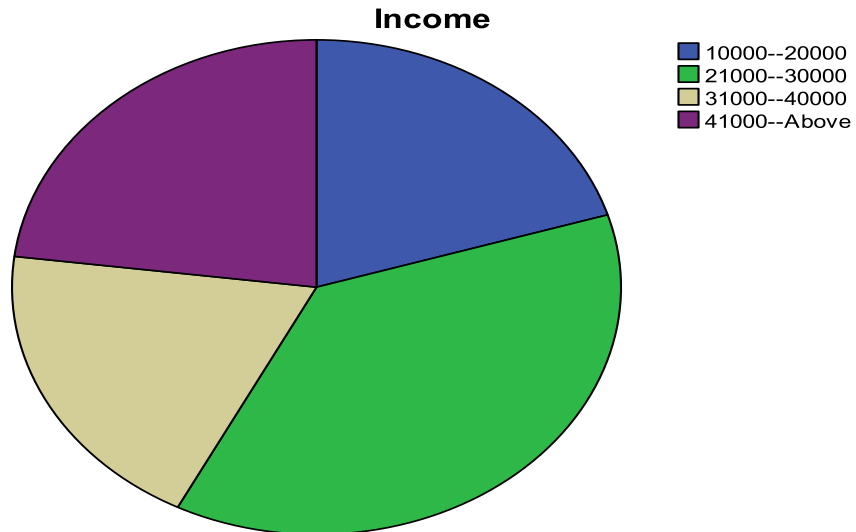
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	334	83.1	83.3	83.3
	Female	67	16.7	16.7	100.0
	Total	401	99.8	100.0	
Missing	System	1	.2		
Total		402	100.0		





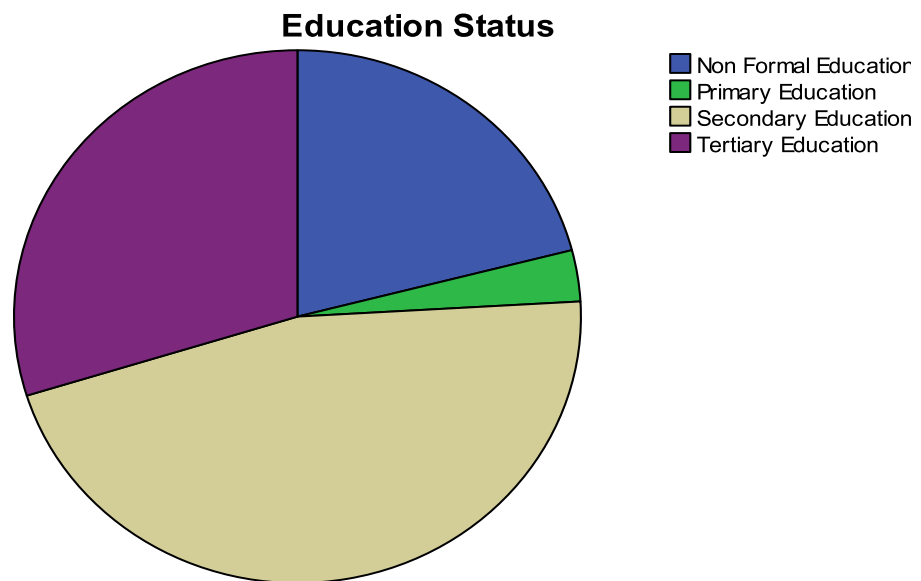
		<b>AGE</b>			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30-40	197	49.0	49.5	49.5
	41-50	104	25.9	26.1	75.6
	51-60	63	15.7	15.8	91.5
	61-above	34	8.5	8.5	100.0
	Total	398	99.0	100.0	
Missing	System	4	1.0		
<b>Total</b>		<b>402</b>	<b>100.0</b>		

		<b>Income</b>			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10000--20000	74	18.4	20.3	20.3
	21000--30000	136	33.8	37.3	57.5
	31000--40000	71	17.7	19.5	77.0
	41000--Above	84	20.9	23.0	100.0
	Total	365	90.8	100.0	
Missing	System	37	9.2		
<b>Total</b>		<b>402</b>	<b>100.0</b>		



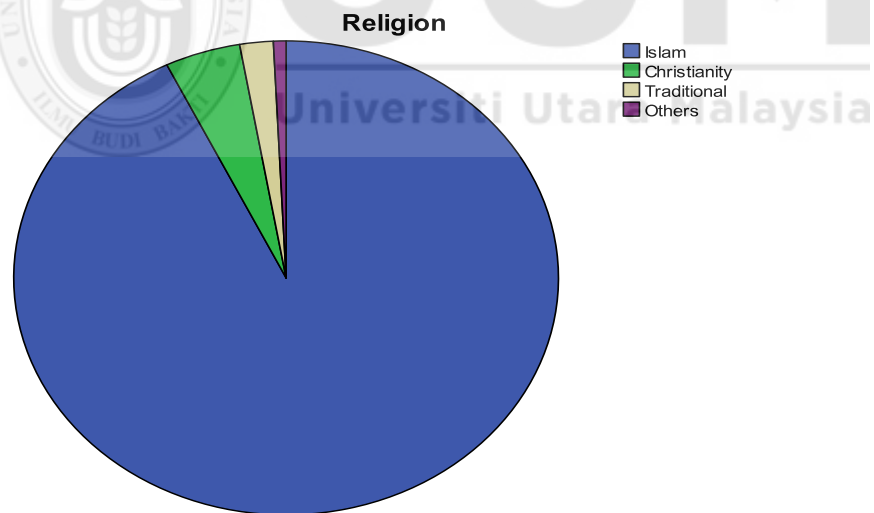
### Education Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Non Formal Education	81	20.1	21.0	21.0
	Primary Education	12	3.0	3.1	24.1
	Secondary Education	178	44.3	46.1	70.2
	Tertiary Education	115	28.6	29.8	100.0
	Others	0	0	0	0
	<b>Total</b>	<b>386</b>	<b>96.0</b>	<b>100.0</b>	
Missing	System	16	4.0		
<b>Total</b>		<b>402</b>	<b>100.0</b>		

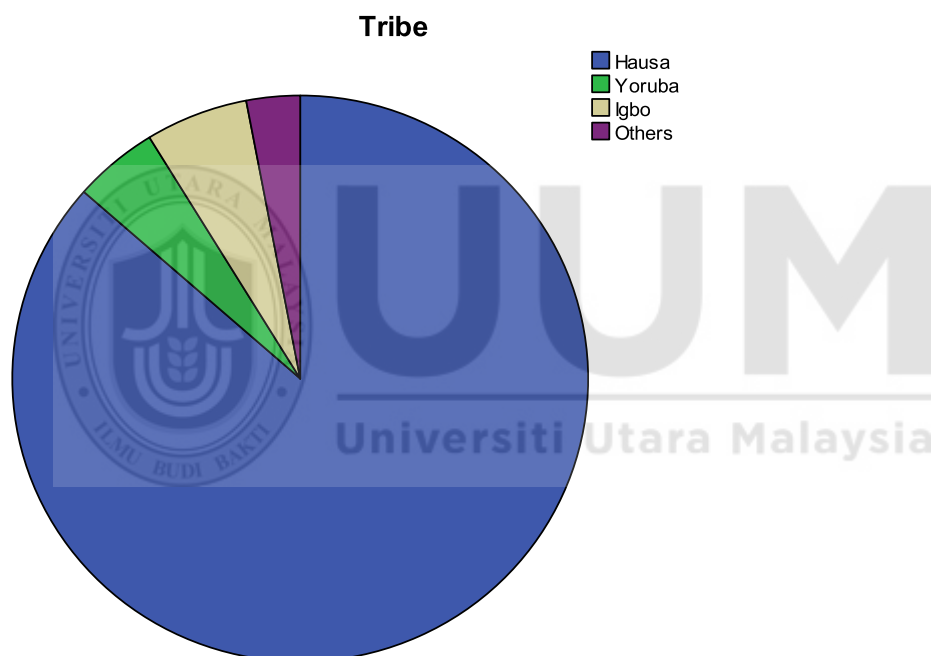


Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Civil Service	85	21.1	21.4	21.4
	Business	184	45.8	46.3	67.8
	Farming	87	21.6	21.9	89.7
	Unemployed	41	10.2	10.3	100.0
	Others	0	0	0	0
	Total	397	98.8	100.0	
Missing	System	5	1.2		
Total		402	100.0		

Religion					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Islam	373	92.8	92.8	92.8
	Christianity	18	4.5	4.5	97.3
	Traditional	8	2.0	2.0	99.3
	Others	3	.7	.7	100.0
	Total	402	100.0	100.0	



		Tribe			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hausa	345	85.8	86.5	86.5
	Yoruba	19	4.7	4.8	91.2
	Igbo	23	5.7	5.8	97.0
	Others	12	3.0	3.0	100.0
	Total	399	99.3	100.0	
Missing	System	3	.7		
Total		402	100.0		



## APPENDIX D: RELIABILITY AND VALIDITY TEST RESULTS

### RELIABILITY TEST FOR BF ITEMS

#### Case Processing Summary

		N	%
Cases	Valid	39	97.5
	Excluded <sup>a</sup>	1	2.5
	Total	40	100.0

a. Listwise deletion based on all variables in the procedure.

#### Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.898	.900	21

#### Item Statistics

	Mean	Std. Deviation	N
BF1	3.8718	1.19603	39
BF2	3.8462	.96077	39
BF3	3.8462	1.03970	39
BF4	3.8974	1.04617	39
BF5	3.8462	.81235	39
BF6	3.6923	1.17325	39
BF7	3.7436	1.09347	39
BF8	4.1795	.85446	39
BF9	4.2051	.86388	39
BF10	4.1282	1.05580	39
BF11	3.6923	1.15060	39
BF12	3.8718	1.26032	39
BF13	3.7692	1.08728	39
BF14	3.8974	1.16517	39
BF15	3.4872	1.23271	39
BF16	3.0513	.88700	39
BF17	2.2821	1.25549	39
BF18	3.8205	1.27469	39
BF19	3.3846	1.53238	39
BF20	3.8974	1.18754	39
BF21	3.7949	1.28103	39

### Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.724	2.282	4.205	1.923	1.843	.175	21

### Scale Statistics

Mean	Variance	Std. Deviation	N of Items
78.2051	184.220	13.57277	21

## RELIABILITY TEST FOR BW ITEMS

### Case Processing Summary

		N	%
Cases	Valid	40	100.0
	Excluded <sup>a</sup>	0	.0
	Total	40	100.0

a. List wise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.834	.832	38

### Item Statistics

	Mean	Std. Deviation	N
BW1	3.8000	1.06699	40
BW2	3.9000	1.05733	40
BW3	3.9750	1.04973	40
BW4	3.8250	.93060	40
BW5	3.5000	1.32045	40
BW6	3.7750	1.16548	40
BW7	4.0500	.98580	40
BW8	4.1250	.99195	40
BW9	4.0750	1.16327	40
BW10	3.6500	1.23101	40
BW11	3.7750	1.32988	40
BW12	3.6250	1.23387	40
BW13	3.8000	1.20256	40



BW14	3.5000	1.19829	40
BW15	2.9500	.95943	40
BW16	2.4000	1.31656	40
BW17	3.7500	1.33493	40
BW18	3.4250	1.53402	40
BW19	3.8750	1.22344	40
BW20	2.8750	1.15886	40
BW21	2.8500	1.36907	40
BW22	3.3000	1.30482	40
BW23	3.6500	1.02657	40
BW24	3.6750	.99711	40
BW25	3.4000	1.10477	40
BW26	3.1500	1.33109	40
BW27	3.1750	.84391	40
BW28	3.4750	1.01242	40
BW29	3.4750	.98677	40
BW30	3.1750	1.03497	40
BW31	2.5750	1.03497	40
BW32	2.8500	1.31168	40
BW33	3.0000	1.30089	40
BW34	3.2500	1.40967	40
BW35	3.8500	1.05125	40
BW36	4.0500	.95943	40
BW37	3.7500	1.31559	40
BW38	3.8500	1.29199	40

#### Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.504	2.400	4.125	1.725	1.719	.191	38

#### Scale Statistics

Mean	Variance	Std. Deviation	N of Items
133.1500	277.515	16.65879	38

## RELIABILITY TEST FOR PM ITEMS

### Case Processing Summary

		N	%
Cases	Valid	40	100.0
	Excluded <sup>a</sup>	0	.0
	Total	40	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.845	.845	18

### Item Statistics

	Mean	Std. Deviation	N
PM1	3.8000	1.06699	40
PM2	3.7500	1.10361	40
PM3	3.9750	1.04973	40
PM4	3.9750	.86194	40
PM5	3.5750	1.31826	40
PM6	3.7500	1.21423	40
PM7	4.0500	.98580	40
PM8	4.1500	1.00128	40
PM9	4.1500	1.18862	40
PM10	3.7750	1.20868	40
PM11	3.7250	1.30064	40
PM12	3.1750	1.15220	40
PM13	2.6500	1.02657	40
PM14	2.9250	1.34712	40
PM15	3.0500	1.29990	40
PM16	3.3500	1.38767	40
PM17	4.0000	.98710	40
PM18	4.0750	.97106	40

### Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.661	2.650	4.150	1.500	1.566	.203	18

**Scale Statistics**

Mean	Variance	Std. Deviation	N of Items
65.9000	117.374	10.83394	18

**RELIABILITY TEST FOR MALARIA CONTROL ITEMS****Case Processing Summary**

		N	%
Cases	Valid	39	97.5
	Excluded <sup>a</sup>	1	2.5
	Total	40	100.0

a. Listwise deletion based on all variables in the procedure.

**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.895	.894	10

**Item Statistics**

	Mean	Std. Deviation	N
MC1	3.7949	1.28103	39
MC2	3.9744	1.13525	39
MC3	3.7949	1.03057	39
MC4	3.8974	1.04617	39
MC5	4.0000	1.05131	39
MC6	3.8718	.95089	39
MC7	3.6410	1.26672	39
MC8	3.6923	1.19547	39
MC9	4.1026	1.02070	39
MC10	4.1538	1.01407	39

**Summary Item Statistics**

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.892	3.641	4.154	.513	1.141	.028	10

**Scale Statistics**

Mean	Variance	Std. Deviation	N of Items
------	----------	----------------	------------

**Scale Statistics**

Mean	Variance	Std. Deviation	N of Items
38.9231	62.757	7.92194	10

**ALL ITEMS: Reliability****Case Processing Summary**

		N	%
Cases	Valid	38	95.0
	Excluded <sup>a</sup>	2	5.0
	Total	40	100.0

a. List wise deletion based on all variables in the procedure.

**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.921	.921	87

**Item Statistics**

	Mean	Std. Deviation	N
BF1	3.8947	1.20336	38
BF2	3.8947	.92384	38
BF3	3.8947	1.00779	38
BF4	3.8684	1.04419	38
BF5	3.8684	.81111	38
BF6	3.7368	1.15511	38
BF7	3.7895	1.06943	38
BF8	4.2632	.68514	38
BF9	4.2632	.79472	38
BF10	4.1842	1.00956	38
BF11	3.7368	1.13147	38
BF12	3.9211	1.23860	38
BF13	3.7895	1.09441	38
BF14	3.8684	1.16645	38
BF15	3.5000	1.24662	38
BF16	3.0526	.89887	38
BF17	2.3158	1.25430	38
BF18	3.8684	1.25571	38
BF19	3.4474	1.50130	38
BF20	3.9474	1.16125	38
BF21	3.8158	1.29145	38
BW1	3.8421	1.05334	38

BW2	3.9737	1.02632	38
BW3	3.9474	1.06409	38
BW4	3.8158	.92577	38
BW5	3.5263	1.33025	38
BW6	3.7895	1.14273	38
BW7	4.1579	.85507	38
BW8	4.1842	.95451	38
BW9	4.1053	1.13398	38
BW10	3.6579	1.21425	38
BW11	3.8421	1.32596	38
BW12	3.6316	1.26108	38
BW13	3.7895	1.21161	38
BW14	3.5263	1.22445	38
BW15	2.9211	.96930	38
BW16	2.3684	1.26108	38
BW17	3.7895	1.33878	38
BW18	3.4737	1.51990	38
BW19	3.9211	1.21659	38
BW20	2.8421	1.17465	38
BW21	2.8947	1.39089	38
BW22	3.4211	1.22213	38
BW23	3.7105	1.01096	38
BW24	3.6579	1.02077	38
BW25	3.3158	1.06809	38
BW26	3.1316	1.31870	38
BW27	3.1579	.85507	38
BW28	3.4737	1.03289	38
BW29	3.4211	.97625	38
BW30	3.1579	1.00071	38
BW31	2.5526	.95003	38
BW32	2.8421	1.26334	38
BW33	2.9474	1.29338	38
BW34	3.2632	1.36924	38
BW35	3.8947	.95265	38
BW36	4.1053	.83146	38
BW37	3.7895	1.25543	38
BW38	3.8947	1.22562	38
PM1	3.8421	.97333	38
PM2	3.7895	1.01763	38
PM3	3.9211	1.04962	38
PM4	3.9211	.85049	38
PM5	3.6053	1.26362	38
PM6	3.7895	1.14273	38



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PM7	4.1053	.86335	38
PM8	4.2105	.87481	38
PM9	4.2105	1.09441	38
PM10	3.8158	1.13555	38
PM11	3.8684	1.16645	38
PM12	3.2632	1.10733	38
PM13	2.6316	1.02459	38
PM14	2.9211	1.30242	38
PM15	3.0526	1.25089	38
PM16	3.4474	1.34962	38
PM17	4.0263	.99964	38
PM18	4.0263	.97223	38
GB1	3.8421	1.26334	38
MC2	4.0000	1.13899	38
MC3	3.8421	1.00071	38
MC4	3.9474	1.01202	38
MC5	3.9737	1.05233	38
MC6	3.8947	.95265	38
MC7	3.6842	1.25430	38
MC8	3.7368	1.17828	38
MC9	4.1842	.89610	38
MC10	4.2105	.96304	38

**Scale Statistics**

Mean	Variance	Std. Deviation	N of Items
318.4211	1212.250	34.81739	87

## Appendix E: Regression Statistics Output

### REGRESSION OUTPUT

#### Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.551 <sup>a</sup>	.304	.111	111.743

a. Predictors: (Constant), BF, BW, PM

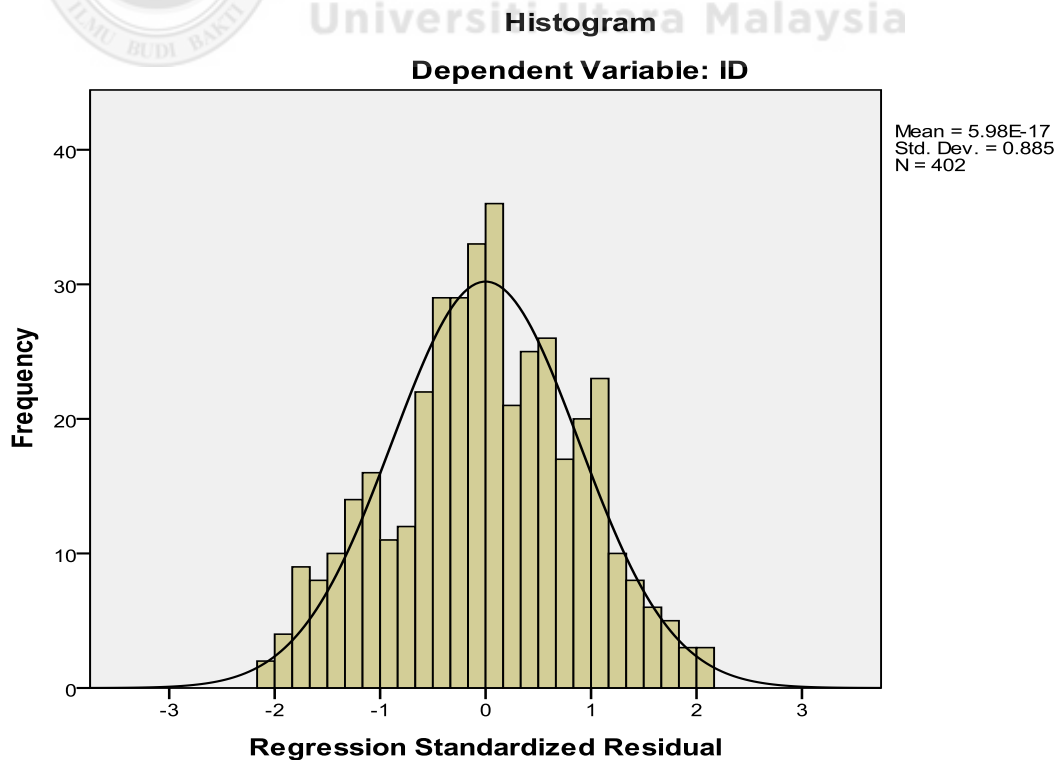
b. Dependent Variable: MC

#### ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1710139.530	87	19656.776	1.574	.003 <sup>a</sup>
	Residual	3920783.975	314	12486.573		
	Total	5630923.505	401			

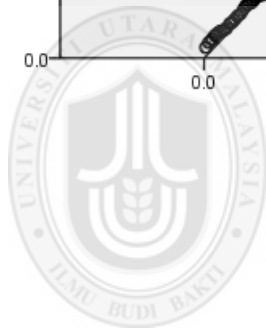
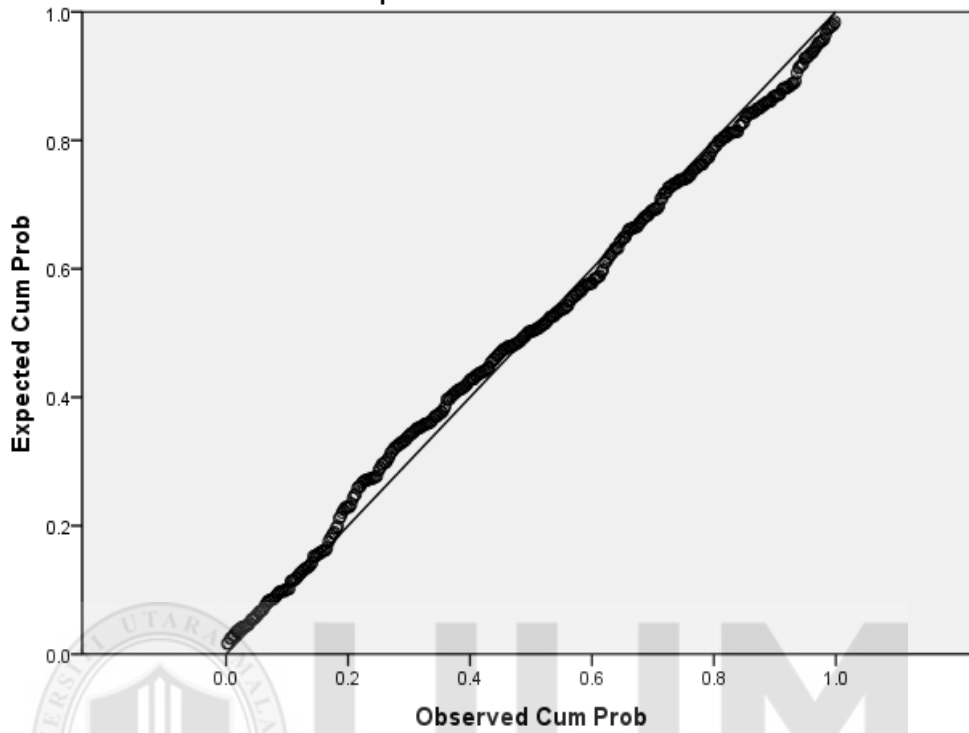
a. Predictors: (Constant), BF, BW, PM

b. Dependent Variable: MC



**Normal P-P Plot of Regression Standardized Residual**

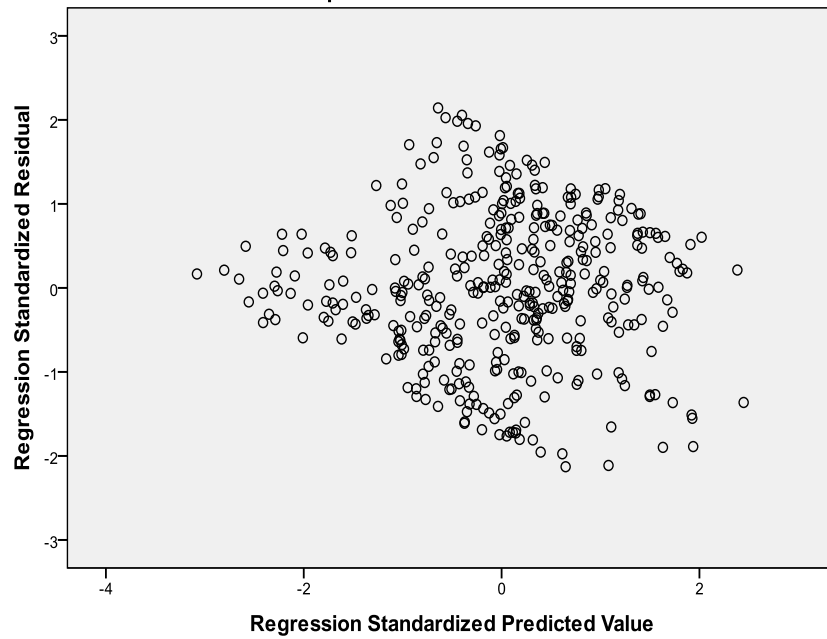
**Dependent Variable: ID**



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Scatterplot

**Dependent Variable: ID**





## Variables Entered/Removed<sup>b</sup>

### ANOVA<sup>b</sup>

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	218.445	2	109.223	463.228	.000 <sup>a</sup>
Residual	94.079	399	.236		
Total	312.524	401			

a. Predictors: (Constant), PM, BW

b. Dependent Variable: BF

Model	Variables Entered	Variables Removed	Method
1	PM, BW <sup>a</sup>	.	Enter

a. All requested variables entered.

b. Dependent Variable: BF

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.836 <sup>a</sup>	.699	.697	.4855778

a. Predictors: (Constant), PM, BW

### Coefficients<sup>a</sup>

Model	Unstandardized		Standardized			Collinearity	
	Coefficients		Coefficients			Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	.425	.121	3.507	.001			
BW	.246	.035	.236	7.035	.000	.671	1.490
PM	.650	.032	.678	20.223	.000	.671	1.490

a. Dependent Variable: BF

**Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Variance Proportions				
		Eigenvalue	Condition Index	(Constant)	BW	PM
		2.950	1.000	.00	.00	.00
		.030	9.935	.68	.00	.65
		.020	12.106	.31	1.00	.35

a. Dependent Variable: BF

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.818 <sup>a</sup>	.669	.667	.5312861

a. Predictors: (Constant), BF, BW

**ANOVA<sup>b</sup>**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	227.249	2	113.624	402.545	.000 <sup>a</sup>
	Residual	112.624	399	.282		
	Total	339.873	401			

a. Predictors: (Constant), BF, BW

b. Dependent Variable: PM

**Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Variance Proportions				
		Eigenvalue	Condition Index	(Constant)	BW	BF
		2.955	1.000	.00	.00	.00
		.027	10.459	.92	.06	.36
		.018	12.903	.07	.94	.64

a. Dependent Variable: PM

**Model Summary**

Model	R		Adjusted R	Std. Error of the
	R	R Square	Square	Estimate
1	.635 <sup>a</sup>	.403	.400	.6566849

a. Predictors: (Constant), PM, BF

**ANOVA<sup>b</sup>**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	116.164	2	58.082	134.688	.000 <sup>a</sup>
	Residual	172.063	399	.431		
	Total	288.227	401			

a. Predictors: (Constant), PM, BF

b. Dependent Variable: BW

**Coefficients<sup>a</sup>**

Model	Unstandardized		Standardized		Collinearity		
	Coefficients		Coefficients		Statistics		
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	1.555	.147		10.590	.000		
BF	.449	.064	.468	7.035	.000	.338	2.955
PM	.178	.061	.193	2.903	.004	.338	2.955

a. Dependent Variable: BW

**Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	BF	PM
		2.956	1.000	.01	.00	.00
		.034	9.310	.97	.06	.13
		.010	16.997	.03	.94	.87



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a. Dependent Variable: BW

## Appendix F: PLS Statistics Output

### PLS STATISTICS OUTPUT

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics ( O/STERR )
BF -> MC	0.230484	0.230429	0.064472	0.064472	3.574950
BW -> MC	0.342678	0.343255	0.047253	0.047253	7.251992
PM -> MC	0.278935	0.282374	0.060937	0.060937	4.577425

Items	BF	BW	MC	PM
BF1	<b>0.428</b>	0.312	0.303	0.415
BF10	<b>0.601</b>	0.485	0.409	0.512
BF11	<b>0.641</b>	0.525	0.490	0.545
BF12	<b>0.623</b>	0.517	0.458	0.527
BF13	<b>0.630</b>	0.563	0.573	0.620
BF14	<b>0.665</b>	0.535	0.549	0.604
BF15	<b>0.522</b>	0.440	0.442	0.472
BF16	<b>0.632</b>	0.514	0.495	0.546
BF17	<b>0.492</b>	0.442	0.413	0.440
BF18	<b>0.518</b>	0.501	0.437	0.445
BF19	<b>0.608</b>	0.485	0.503	0.536
BF2	<b>0.595</b>	0.539	0.515	0.482
BF20	<b>0.597</b>	0.452	0.478	0.464
BF21	<b>0.578</b>	0.561	0.471	0.477
BF3	<b>0.665</b>	0.580	0.547	0.561
BF4	<b>0.545</b>	0.512	0.516	0.481
BF5	<b>0.522</b>	0.490	0.500	0.506
BF6	<b>0.478</b>	0.450	0.467	0.486
BF7	<b>0.562</b>	0.515	0.488	0.456
BF8	<b>0.610</b>	0.461	0.440	0.535
BF9	<b>0.476</b>	0.462	0.372	0.432
BW1	0.500	<b>0.621</b>	0.550	0.447
BW10	0.365	<b>0.400</b>	0.365	0.396
BW11	0.368	<b>0.442</b>	0.384	0.377

BW12	0.478	<b>0.488</b>	0.445	0.466
BW13	0.223	<b>0.348</b>	0.298	0.256
BW14	0.403	<b>0.417</b>	0.366	0.426
BW15	0.283	<b>0.360</b>	0.314	0.305
BW16	0.497	<b>0.493</b>	0.455	0.496
BW17	0.498	<b>0.579</b>	0.446	0.496
BW18	0.276	<b>0.341</b>	0.243	0.290
BW19	0.379	<b>0.421</b>	0.330	0.359
BW2	0.533	<b>0.640</b>	0.559	0.481
BW20	0.417	<b>0.408</b>	0.364	0.423
BW21	0.402	<b>0.501</b>	0.363	0.367
BW22	0.390	<b>0.522</b>	0.413	0.335
BW23	0.541	<b>0.571</b>	0.496	0.515
BW24	0.531	<b>0.623</b>	0.526	0.500
BW25	0.483	<b>0.614</b>	0.513	0.463
BW26	0.489	<b>0.599</b>	0.486	0.459
BW27	0.523	<b>0.612</b>	0.486	0.455
BW28	0.504	<b>0.605</b>	0.523	0.492
BW29	0.530	<b>0.602</b>	0.550	0.481
BW3	0.489	<b>0.569</b>	0.518	0.443
BW30	0.449	<b>0.470</b>	0.407	0.460
BW31	0.466	<b>0.509</b>	0.429	0.456
BW32	0.497	<b>0.500</b>	0.474	0.496
BW33	0.558	<b>0.616</b>	0.551	0.519
BW34	0.482	<b>0.636</b>	0.526	0.473
BW35	0.315	<b>0.471</b>	0.386	0.351
BW36	0.455	<b>0.496</b>	0.449	0.446
BW37	0.433	<b>0.416</b>	0.367	0.479
BW38	0.492	<b>0.555</b>	0.504	0.475
BW4	0.512	<b>0.608</b>	0.526	0.483
BW5	0.433	<b>0.554</b>	0.482	0.432
BW6	0.558	<b>0.614</b>	0.543	0.503
BW7	0.541	<b>0.623</b>	0.500	0.495
BW8	0.519	<b>0.647</b>	0.576	0.501
BW9	0.474	<b>0.500</b>	0.403	0.425
MC1	0.404	0.481	<b>0.573</b>	0.436
MC10	0.533	0.538	<b>0.565</b>	0.456
MC2	0.406	0.493	<b>0.576</b>	0.425
MC3	0.391	0.372	<b>0.455</b>	0.441
MC4	0.413	0.458	<b>0.532</b>	0.395

MC5	0.513	0.503	<b>0.629</b>	0.489
MC6	0.549	0.556	<b>0.630</b>	0.531
MC7	0.479	0.538	<b>0.639</b>	0.453
MC8	0.623	0.545	<b>0.626</b>	0.627
MC9	0.530	0.565	<b>0.662</b>	0.514
PM1	0.381	0.398	0.396	<b>0.447</b>
PM10	0.561	0.498	0.472	<b>0.658</b>
PM11	0.381	0.431	0.392	<b>0.482</b>
PM12	0.536	0.428	0.424	<b>0.597</b>
PM13	0.332	0.427	0.383	<b>0.432</b>
PM14	0.514	0.442	0.498	<b>0.598</b>
PM15	0.340	0.428	0.394	<b>0.435</b>
PM16	0.674	0.620	0.637	<b>0.739</b>
PM17	0.630	0.574	0.542	<b>0.705</b>
PM18	0.477	0.481	0.464	<b>0.561</b>
PM2	0.642	0.516	0.517	<b>0.690</b>
PM3	0.512	0.566	0.499	<b>0.560</b>
PM4	0.261	0.222	0.204	<b>0.289</b>
PM5	0.331	0.375	0.332	<b>0.423</b>
PM6	0.601	0.514	0.509	<b>0.647</b>
PM7	0.593	0.493	0.525	<b>0.648</b>
PM8	0.460	0.473	0.475	<b>0.553</b>
PM9	0.536	0.471	0.465	<b>0.562</b>

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (O/STERR)
BF11 <- BF	0.209501	0.209418	0.019963	0.019963	10.494306
BF12 <- BF	0.216755	0.216435	0.019889	0.019889	10.897976
BF13 <- BF	0.242735	0.242604	0.016757	0.016757	14.485380
BF14 <- BF	0.261637	0.261481	0.016581	0.016581	15.779035
BF16 <- BF	0.225778	0.224906	0.018194	0.018194	12.409151
BF19 <- BF	0.247084	0.247327	0.018222	0.018222	13.559515
BW1 <- BW	0.232924	0.232443	0.018724	0.018724	12.439579

BW2 <- BW	0.233217	0.232770	0.017474	0.017474	13.346620
BW28 <- BW	0.221846	0.221919	0.020889	0.020889	10.619978
BW29 <- BW	0.237536	0.237096	0.019330	0.019330	12.288217
BW4 <- BW	0.243292	0.243628	0.019023	0.019023	12.789165
BW6 <- BW	0.229946	0.230530	0.016605	0.016605	13.847652
MC5 <- MC	0.351282	0.350415	0.021191	0.021191	16.576990
MC7 <- MC	0.306357	0.306997	0.021459	0.021459	14.276353
MC8 <- MC	0.376634	0.375596	0.023921	0.023921	15.745195
MC9 <- MC	0.355121	0.355854	0.018705	0.018705	18.985052
PM10 <- PM	0.140200	0.140244	0.012306	0.012306	11.393032
PM12 <- PM	0.124588	0.124311	0.013295	0.013295	9.370744
PM14 <- PM	0.163614	0.163156	0.013363	0.013363	12.244149
PM16 <- PM	0.185975	0.186183	0.011727	0.011727	15.858397
PM17 <- PM	0.159008	0.159146	0.010972	0.010972	14.492062
PM2 <- PM	0.156099	0.155909	0.011859	0.011859	13.163440
PM6 <- PM	0.160856	0.160893	0.013693	0.013693	11.746979
PM7 <- PM	0.171971	0.171539	0.013724	0.013724	12.531084
PM9 <- PM	0.146443	0.145872	0.013141	0.013141	11.144237





## **APPENDIX G: Nvivo Models and Pictures during Observation**

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