HEALTH STATUS AMONG EMPLOYEES OF ASSEMBLY SERVICES SDN BHD, SHAH ALAM, SELANGOR

By

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ABSTRAK

Tujuan kajian ini adalah untuk mengkaji status kesihatan di kalangan pekerja Assembly Services Sdn Bhd, Shah Alam, Selangor Darul Ehsan (ASSB). Kajian ini adalah untuk mengetahui sama ada status kesihatan pekerja dipengaruhi oleh amalan aktiviti fizikal, tabiat pemakanan dan tabiat merokok. 400 soal selidik telah diedarkan di kalangan kakitangan ASSB. Saiz sample melibatkan semua peringkat kakitangan yang terdiri daripada tujuh bahagian utama, 75% adalah kakitangan operasi dan 25% adalah kakitangan pengurusan. Sejumlah 366 maklum balas soal selidik diterima dan hanya 357 maklum balas adalah sah untuk dianalisa. Data telah dianalisa dengan menggunakan Pakej Statistik Sains Sosial (SPSS) perisian analisis versi 19.0. Kajian korelasi dijalankan untuk menguji hubungan di antara status kesihatan dan amalan aktiviti fizikal, tabiat pemakanan dan tabiat merokok. Dapatan kajian menunjukkan aktiviti fizikal, tabiat pemakanan dan tabiat merokok mempunyai hubungan yang negatif dengan status kesihatan. Walaubagaimana pun, dapatan kajian regresi berganda menunjukkan hanya tabiat pemakanan dan tabiat merokok mempengaruhi status kesihatan, manakala aktiviti fizikal tidak mempengaruhi status kesihatan pekerja. Cadangan bagaimana untuk memperbaiki status kesihatan diperbincangkan dan ia sangat penting dan juga memberi manfaat kepada keseluruhan syarikat.

ABSTRACT

The purpose of this study was to examine health status among employees of Assembly Services Sdn Bhd, Shah Alam, Selangor Darul Ehsan (ASSB). This study was to examine whether the workers' health status is significantly influenced when they perform physical activity, by their nutrition behavior and smoking habits. This study distributed 400 questionnaires among ASSB employees. The sample size was from all levels of employees which include seven main divisions, 75% operational staff and 25% managerial staff. 366 feedbacks were received and only 357 were valid in the analysis. The data was analyzed using Statistical Package for Social Science (SPSS) software version 19.0. Correlation analysis was conducted to test the relationship between health status and physical activity, nutritional behaviour and smoking habits. The finding of this study showed that physical activity, nutritional behaviour and smoking habits have negative relationship to health status. However, multiple regression analysis result indicated that only nutrition behavior and smoking habit do influence health status, whereas physical activity does not influence health status. Recommendations on how to improve health status are discussed and it is absolutely important and also beneficial to the entire company.

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CHAPTER 1

INTRODUCTION

1.0 Background of Study

A healthy lifestyle involves all good habits in life. To be physically healthy, a person needs to exercise regularly, practice a balanced diet, and avoid smoking, all of which help to maintain or improve general health and lower many chronic health risks. As mentioned by Liow (2012), sedentary and stressful lifestyles, unhealthy food as well as alcohol and tobacco consumption had caused a high number of cases of chronic or long term non infectious conditions such as obesity, hypertension, heart diseases, cancer and diabetes. In addition, Malaysians do not perform ample physical exercise and spend most of their time in front of televisions and computers.

With regards to unhealthy eating habits, Norris-Ellis (2011) mentioned that as stated by Engbers (2006), an unhealthy workforce contracts many chronic diseases such as obesity. Norris-Ellis (2011) also reported that Center for Disease Control and Prevention (2009), mentioned that many working adults in the United States have chronic health problems related to overweight and obesity. Chronic health issues are therefore said to be associated with unhealthy eating habits and lack of physical activities.

Meanwhile, chronic diseases in Malaysia are increasing as per reported by Liow (2010),the Minister of Health said that the 2006 National Health and Morbidity study shows that adults with diabetes increased from 8.3% in 1996 to 14.9% in 2006, hypertension from 29.9% to 43.8%, overweight from 16.6% to 29.1% and

obesity from 4% to 24%. In the 10-year period, obesity increased by 220%, diabetes by 80%, overweight by 75% and hypertension by 44%.

Regarding tobacco consumption, Harder (2012) said that, as mentioned by American Lung Association (2008), in 2008, tobacco use contributed to 5.4 million deaths in the United States.

In addition, Liow (2011) also said that every year more than 5 million people die due to tobacco use or exposure, attributing to 63% of all non-communicable diseases. The 2006 National Health and Morbidity study revealed that 21.5% adult Malaysians smoke. Liow (2010) further mentioned that 1.7 million adult Malaysians are obese.

Many studies, including those mentioned above, have shown that smoking, poor diet and a lack of physical activity do contribute to health issues. In the same view, the researcher believes that health issues are of great concern and in general, the poor health statuses of employees will greatly impact a company's productivity. In addition to the studies mentioned, there have been numerous other studies on health status in Malaysia such as that by Abdul Hakim, Muniandy and Danish (2012) whose performed a study on the nutritional statuses and eating practices of university students in Selangor. Za'abar, Mohd Taib and Abu Saad (2011) also studied on physical activity, eating behavior and body image perception among young adolescents in Kuantan, Pahang. Ibrahim et al. (2013) studied on physical activity barriers related to body weight among Malaysian men in Klang Valley. Studies concerning smoking were also conducted by researchers

such as Yong and Naidu (2012) who studied the smoking behavior among adults in Malaysia. Study related to smoking was also conducted like Yong and Naidu (2012) who studied on smoking behavior among adults in Malaysia. As such, this study would aim to examine the relationship between physical activity, nutritional behavior, smoking habit and health status in Assembly Services Sdn Bhd (ASSB). ASSB is one of many automobile manufacturers in Malaysia and ASSB is wholly owned by UMW Toyota Motor Sdn Bhd. UMW Toyota Motor Sdn Bhd. manufactures, markets, and distributes non-national passenger cars, commercial vehicles, parts and equipments, and four-wheel drive vehicles in Malaysia. UMW Toyota Motor Sdn Bhd operates as a subsidiary of UMW Corporation Sdn Bhd and is based in Shah Alam, Selangor. 49% of UMW Toyota Motors shares are held by TOYOTA Motor Corporation, Japan.

ASSB is a Toyota vehicle assembly plant in Malaysia, which started its operation in 1968. ASSB is located at Section 15, Shah Alam, Selangor which is the only Toyota vehicle assembly plant in Malaysia. ASSB operates in two shifts with a total workforce of 2,600 with a maximum plant capacity of 70,000 vehicles per year. Among the products that have been produced by ASSB are the Vios, Hiace, Hilux, Fortuner and Innova models; mainly passenger and commercial vehicles.

The Major departments in ASSB are Plant Admin, QA Procurement and Production Control. The Plant Admin department is further divided into Human Capital, Cost Management, Environment, Safety and Health and Utilities; while QA Procurement is made up of Quality Assurance, Quality Engineering, Supplier Kaizen and Procurement. Meanwhile, Production Control consists of Vehicle

Management, Parts Planning, Logistics and Manpower Control. Departments involved in production processes are Complete Knocked Down (CKD), Local Content, Welding Department, Paint Department, Assembly Department and Quality Assurance Department.

The manufacturing process of a Toyota vehicle starts with the receiving of body panels at the CKD area, whereby all parts from overseas such as from Toyota Motor Corporation, Japan and Toyota Motor Thailand will be placed in this area before being transferred to the welding, paint and assembly processes. The final process of the sequence is quality process where completed vehicles are sent to the inspection line to ensure that the vehicles meet the quality requirements and satisfy customers' needs. These work processes involve labour intensive activities and require physical force.

1.1 Problem Statement

Within ASSB, there is a canteen to provide food up to extended office hours for the night shift; on top of the standard breakfast, lunch and dinner time meals. However, there are ASSB employees who choose to have their meals at nearby food establishments. Hence ASSB employees' diet depends mainly on the availability of healthy food at the canteen and nearby restaurants. There are also employees who bring their own food from home to consume at work. An ASSB Mart is also available, selling products such as biscuits, light snacks and beverages.

Physical activity mainly depends on employees' initiatives and carried out in their own spare time. However, in order to encourage physical activities, ASSB organises events and rents established facilities as follows:

i. Bi-Monthly badminton and futsal sessions

ii. Annual charity run, marathon and Malaysia International 'Ekiden' run

iii. Twice-a-week aerobic sessions

iv. Gymnasium facilities, which is located 500 meters from ASSB

v. Futsal and badminton facilities long-term rental, which are available to staff at any time

vi. Annual Treasure hunt

vii. Annual sport and games festival

90% of the ASSB workforce are males and it is estimated that more than 60% of the workers are smokers. The smokers are range of worker level, from production workers to management and expatriate levels.

Besides that due to the high number of smokers in ASSB, the management has designated smoking areas, equipped with proper facilities such as ashtrays and ventilation fans. These areas are displayed with information on smoking ethics and smoking dangers.

In ASSB, there is an in-house clinic facility which not only treats employees who are injured on the job but also provides a variety of medical care services to employees such as diagnosing medical symptoms and issuing prescriptions. Employees can have their medical issues checked out at work and this assists employees in increasing productivity by improving their health statuses and reducing absences. The in-house clinic records showed that since 2011, an average of 8 to 10 employees with diabetes, high blood pressure, cough and flu attended the clinic for medical treatment every month.

Many studies pertaining to the relationship between healthy lifestyles such as physical activity, nutritional behavior and smoking with health status have been conducted. For example in a research carried out by WHO (2003) concluded that unhealthy diets, physical inactivity and smoking are confirmed risk behaviors for chronic diseases.

Another study on healthy diet and physical activity by Norris-Ellis (2011) indicated that by consuming a healthy diet and exercising daily, employees can delay chronic illnesses and Norris-Ellis (2011) also mentioned that according to Engbers et.al. (2006), the World Health Organization (WHO) stated that a healthy diet could assist in preventing chronic diseases.

Related to smoking, Ezzati and Lopez (2003 reported that in 2000, an estimated 4.83 million premature deaths in the world were attributable to smoking.

In addition, chronic diseases are also a burden to employers. This is supported by Davis et al. (2009) who reported that the uptrend occurrences of chronic illnesses among workers cause financial burden on the employers' part due to employer-sponsored health care insurance as it has been found that an employee with a chronic disease incurred expenses two to three times higher than an employee without a chronic disease. Similar view shared by Norris-Ellis (2011) who stated that, Treacy (2008) believed healthy employees could help in reducing insurance expenses.

Based on data recorded by the ASSB in-house clinic, it is known that some of ASSB's employees suffer from chronic diseases. As many studies such as those conducted by Ezzati and Lopez (2003), Norris-Ellis (2011) and Davis et al. (2009) mentioned that the importance of good health status which could reduce diseases, hence the researcher would like to study the health status of ASSB employees.

Furthermore, several studies in Malaysia such as that by Lim et al. (2013) have indicated that the prevalence of smoking among Malaysian males remains high in spite of several population interventions over the past decade. According to Lim et al. (2013), smoking will likely remain a primary cause of premature mortality and morbidity in Malaysia. The NCD Prevention and Control (2010) also reported that, from 1996 to 2006, Malaysia saw a dramatic increase in the prevalence of behavior-linked diseases, including a 43% increase in hypertension, 88% increase in diabetes and 250% increase in obesity.

In addition, Noor (2002) also found, through a study of nutrition and health transition in Malaysia, the hospital admission rates for hypertension increased from 20 509 cases in 1985 to 28 226 cases in 1994; cancer cases doubled from 15 257 in 1985 to 37 294 in 1996; and diabetes mellitus increased from 14 767 in 1985 to 23 589 in 1996.

However, significant increase in non-communicable diseases (NCDs) such as obesity, diabetes and hypertension amongst Malaysians as mentioned by Tee (2013), statistics from the National Health & Morbidity Survey 2011 reported that the incidence of obesity has increased about three-fold, from 4.4% in 1996 to 15.1% in 2011, and this puts the number of obese Malaysians at about 2.5 million people. In the same article, Tee (2013) further mentioned that diabetes patients in Malaysia has also increased, from 11.6% in 2006 to 15.2% in 2011, and this accounts for about 2.6 million adults and the incidence of hypertension remains high at 35.1%, which represents about 5.8 million Malaysians, and an estimated 32.7%, or 6.2 million Malaysians, have been diagnosed with hypercholesterolemia.

Therefore, the objective of this study is to identify the relationship between nutrition behavior, physical activity, and smoking habit with employees' health status.

1.2 Research Questions

Based on the problem statement described, this study attempts to answer the following questions:

1. Does any relationship exists between physical activities performed by employees with their health statuses?

2. Does nutrition behavior has relationship with workers' health status?

3. Does any relationship exist between smoking habits and workers' health status?

4. Do all the independent variables (physical activity, nutrition behavior and smoking habit) influence the health status of the respondents?

1.3 Research Objectives

Based on the research questions above, the following research objectives are derived.

1.3.1 General Objective

The general objective of this study is to examine whether physical activity, nutritional behavior and smoking habit have significant influence on the health statuses of workers.

1.3.2 Specific Objective

The specific objective is to determine whether there is any influence between independent variables collectively with dependent variables as defined below:-

i. To examine any significant relationship between physical activity and the health statuses of the workers.

ii. To examine any significant relationship between nutrition behavior and the health statuses of the workers.

iii. To examine any significant relationship between workers with smoking habits and their health statuses.

iv. To examine whether independent variables (physical activity, nutrition behavior and smoking habit) influence the health statuses of the respondents.

1.4 Scope of Study

Several studies have been conducted in automotive plants in Malaysia, like studies related to job satisfaction such as Md. Dawal and Taha (2006) who studied the effects of job and environmental factors on job satisfaction. Md. Dawal, Ismail and Taha (2011) also studied further on human factors, ergonomics model and application in automotive industries which focused on job satisfaction. Occupational health related studies were also conducted in automotive plants in Malaysia such as that by Hariri et al. (2012) who study on health effect of welding fumes and Abdin et al. (2007) explored the relationship between psychosocial work factors and health related quality of life (HRQOL). Meanwhile, Ismail, Karagaratnan and Kadirgama, (2013) studied on thermal comfort and Rusli, Edimansyah and Naing (2008) studied on working conditions, self-perceived stress, anxiety, depression and quality of life.

Besides studies on job satisfaction and occupational health, research on health related lifestyles such as regular physical activity, nutritional behavior and smoking habit is also vital because it can also affect a company's productivity, healthcare costs, compensation costs and morale of employees. Therefore, the researcher would like to study health related lifestyles in ASSB. Other than to fulfil the highlighted objectives of this study, the study undertaken also aims to provide ASSB with information on whether their workers' regular physical activities, nutritional behavior and smoking habits reflect individual health status. The outcome of this study should reflect the employees' health statuses and assist the employer in improving current activities and wellness programs in order to help workers decrease risk factors that can potentially lead to chronic illnesses.

1.5 Summary and Organization of the Thesis

In this study, survey design was used to determine if the regular physical activities, nutritional behavior and smoking habits will influence health statuses of ASSB employees.

In chapter 1, the discussion is on the overall concept of the study's framework. In chapter 2, the discussion is on the literature related to this research and support the need for the study.

Focus on research methodology is in chapter 3 while the analyses of the results and the recommendations of findings are presented in chapters 4 and 5 respectively.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter describes the legislation and literature review: relating health status to physical activity, nutritional behavior and smoking habit research model.

2.1 An Overview of Health and Safety Legislation

The principal food law in Malaysia is the Food Act 1983 and the Food Regulations 1985 which includes labelling requirements and advertising restrictions, standards of identity and product grades. These directly influence the kind of information consumers receive about food, and therefore affect their demands for food which relates to this study.

The Control of Tobacco Product Regulations 2010 (Amendment), which was issued under the Food Act of 1983, also relates to this study whereby in the regulation, it is stated that in Malaysia tobacco is considered a health threat and for example, to curb the smoking hazard, advertising of tobacco products is prohibited under section 36 of the act.

2.2 Review of Previous Research Studies

2.2.1 Health Status

Blaxter (1985) and Sermet and Cambois (2002) reported that, health status can be measured by many indicators such as mortality, morbidity, functional limitations, etc. (cited from Tubeuf et al.,2008).

As reported by Case (2004), self reported health has been shown to be a strong predictor of mortality, even when one controls current health status and behavior. Adams et al. (2004) said that health variables measured most illnesses, mortality, self rated health status, psychological well being and alternative measures such as wealth, education level, occupation and income. Illnesses in question were cancer, heart disease and stroke, as well as conditions such as arthritis, incontinence and falls. BMI was also calculated.

O'Neill and O'Neill (2007) also measured self perceived health status. They further measured major depression and pain that limits activities. Individual scores on the Health Utility Index (HUI) were based on the Comprehensive Health Status Measurement System (CHSMS) which was based on eight attributes- vision, hearing, speech, mobility, dexterity of hands and fingers, memory and thinking, emotion, pain and discomfort. Health conditions probed were asthma, arthritis, high blood pressure, emphysema, diabetes, heart disease, coronary heart disease and angina.

In summary, health status is a multi-dimensional concept that is usually measured in terms of mortality, absence of physical pain, physical disability, or a condition that is likely to cause death, emotional well-being and satisfactory social functioning.

2.2.2 Educational Level and Health Status

A strong positive relationship exists between education and health outcomes

whether measured by death rates (mortality), illness (morbidity), health behaviors or health knowledge (Higgins, Lavin & Metcalfe, 2008).

This is supported by Albano et al. (2007) who stated that educational attainment was strongly and inversely associated with mortality from all cancers combined in black and white men and in white women, and also based on Cutler, Lleras-Muney and Vogl (2008), more education is also associated with better self reported health. Similar as Cutler, Glaeser and Rosen (2007), they said that reduced smoking, better control of medical risk factors such as hypertension and cholesterol, and better education among the older population have been more important for mortality than the substantial increase in obesity.

This is consistent with the study by Anzai et al. (2000) who said that past studies in Europe and USA found that people with higher education levels have better health practices and in rural Japanese community, age groups younger than 70 years and people with higher education tended to exercise more.

Furthermore, Cutler, Lleras-Muney and Vogl (2008) found that more educated individuals in the United States reported better health and faced lower mortality risks. They also suffer less anxiety and depression, endure fewer functional limitations, and face decreased probabilities of being diagnosed with heart conditions, stroke, hypertension, high cholesterol, emphysema, diabetes, asthma, or ulcer.

There is increasing evidence that differences between education levels influence health status. For example, Cutler and Lieras-Muney (2008) mentioned that other analyses stress behavioral differences: the better educated are less likely to smoke,

drink, and (at least among women) to be obese. Marmot (2006) also reported that still other research suggests the possibility that high status individuals are less exposed to unalleviated stress.

While a study conducted by the U.S. Department of Health and Human Services (2010) found that the percentage of people in excellent health increased with increased levels of education and family income. Also, college graduates (39%) were more than twice as likely as people who had not graduated from high school (16%) to be in excellent health.

In addition, Asafu-Adjaye (2004) said that due to malnutrition, the low income groups are more likely to fall sick and be less able to work. Therefore, there is a need to increase expenditure on education as it has been shown to be a strong factor affecting health status.

Mocan and Altidag (2012) also stated that education provides people with knowledge about the benefits or harmful effects of health inputs (such as nutrition or smoking) and this knowledge alters health behavior and health outcomes. Gan and Gong (2007) developed a model, studied and concluded how an individual's education, health expenditure, and prior health status can influence his current health status.

In a research done by the Center for Disease Control and Prevention (2011), it was reported that the percentage of adults aged more than 25 years with health statuses of excellent or very good increased as education level increased, at 74.1% for degree holders or higher as compared to 38.3% for high school diploma

holders or less. It further reported high school diploma holders to be 4 times more likely to be in fair or poor health than higher level education holders.

Meanwhile, Meara, Richards and Cutler (2008) reported that after 1990, expectancies of those attending college increased by an additional 1.6 years with no change among those who did not go to college, yielding a 30 percent growth in life expectancy gaps through education. By 2000, college-educated 25-year olds were expected to live 7 years longer than their peers with less schooling. This is further supported by Rathore et al. (2000) who said that some studies, especially those focusing on medical care providers, show that advantaged individuals receive better and earlier care compared to their less advantaged counterparts.

Furthermore, studies in Malaysia such as that by Hock et al. (2013) who studied the smoking habits of Malaysian adult males showed that Malaysians with low socioeconomic statuses had greater smoking rates than those with high socioeconomic status. This pattern is similar in other countries. It is likely that individuals with low education, low level occupation, and low income have less access to adequate health care information and face financial difficulties that increase their stress levels, making them more susceptible to partake in unhealthy lifestyles or health risks such as smoking.

Ibrahim et al. (2013) also determined that education level as one of the barriers preventing men in the Klang Valley area from performing physical activities.

In summary, low education levels are likely to be linked to poor health statuses and increased risk to contract chronic diseases.

2.2.3 Physical Activity

2.2.3.1 How Physical Activity Mechanism Prevents Cancer

Physical activity is important for good health and well-being. Physical activity can help to prevent a range of health problems, including heart disease, diabetes and some cancers (Cancer Council NSW, 2013). From the review of literature such as Hobson (2006), physical activity may inhibit estrogen circulation which could cause some types of breast cancer, most probably by lowering body fat. Physical activity also could lower colon cancer risk by continuing to activate the digestive system and reducing exposure of colon tissue to carcinogens in food.

While a study conducted by Thomas and Davies (2007) on colon cancer where exercise may work by reducing the bowel transit time, therefore reducing the time that potentially carcinogenic substances are in contact with the bowel wall.

In addition, Chandler (2006) also mentioned that being physically active can help reduce risks of cancer by both directly and indirectly preventing weight gains. Physical activity affects endogenous sex and metabolic hormones, obesity and body fatness, insulin growth factors and immune function.

There is no doubt that while physical activity may reduce poor health status as indicated by the Get Ireland Active (2011), there are many other benefits of being active to physical and mental health; for example, being active assists the release of endorphins in the brain, impacts mood positively and further improves the heart, lungs, muscles and bones. Being active is also a fantastic method of stress

management. Diabetes, high blood pressure, coronary disease and cancer development control are increased by regular physical activity. Being active during childhood and at a young age assists in reducing health risks later in life. Raised levels of physical activity will assist in body fat reduction and maintain a healthy weight.

Meanwhile Hobson (2006) also emphasized that exercise boosts blood flow and encourages the release of artery relaxing and blood pressure lowering chemicals. It also simulates the release of cholesterol balancing enzyme, increasing good cholesterol and reducing the bad, artery clogging cholesterol. It also cuts system wide inflammation, which is related to heart and other diseases. Exercise also controls weight which also decreases adverse effect of excess fat.

Furthermore, a study on the importance of promoting physical activity for cancer survivorship was carried out in New Zealand and reported by Keogh and Jones (2011) reported projections that suggest that New Zealand will have over 22,000 new cancer cases in 2011, a substantial increase from the 15,000 cases reported in 2005. This increased number of new cancer cases may reflect the ageing of the population, insufficient levels of physical activity, poor dietary choices, other unhealthy lifestyle choices such as smoking as well as improvements in cancer detection .

As a summary, from the review of literatures, physical activity prevents cancers development.

2.2.3.2 Benefits of Physical Activity

Physical activity is not only important for good health and well being, it also helps to maintain a healthy body weight, improve mental well being and helps people feel better and sleep well (Cancer Council NSW, 2013).

This is supported by Thomas and Davies (2007) who also mentioned that there are now multiple researches that show a relationship between obesity, physical activity and colorectal cancers cases and mortality.

In addition, according to the U.S. Department of Health and Human Services (2011), benefits of physical activity include the decreased risk of fatal coronary disease and contracting high blood pressure, colon cancer and diabetes. It also assists in lowering blood pressure in hypertension person; sustain bones, muscles, and joints health. Furthermore, it can lessen symptoms of anxiety and depression and helps to develop improvements in mood and feelings of well-being. Exercise improves control, lean muscle development and body fat reduction.

Hobson (2006) in his study also said that there were indisputable facts that regular physical activity reduces the risk of range of diseases such as heart problems, cancer, osteoporosis, depression, high blood pressure, diabetes and obesity. The U.S Center For Disease Control and Prevention recommended moderate intensity exercise which increases heart rate but not to point of losing breath and unable to walk. Examples include biking, in line skating, using an elliptical trainer, and

swimming. Strength utilizing activities such as weight training can help to avoid bone and muscle loss and relieve joints stressed by arthritis or pain.

The U.S. Department of Health and Human Services (2008) also stated that regular physical activity reduces the risk of many adverse health outcomes and provides many health benefits.

Researchers like Roanne et al. (2003) who studied the effects of physical activity on prostate cancer patients who undergo deprivation therapy also revealed that androgen deprivation therapy is a common treatment in men with prostate cancer that may cause fatigue, functional decline, increased body fatness, and loss of lean body tissue. These physical changes can negatively affect health-related quality of life. Resistance exercise may help to counter some of these side effects by reducing fatigue, elevating mood, building muscle mass, and reducing body fat.

Thin people may have high blood pressure which can be reduced by exercising. Weight bearing exercises, such as walking, running and aerobics and strength training are important in maintaining strong bones (Hobson, 2006).

In addition, physical activity can also reduce joints stress, enhance bone density, improve mood and reduce mortality. In a study by Hobson (2006), inactivity was revealed to cause weight gain and put further pain to over stressed joints. Developing muscles with strength exercises assists in reducing stress to joints. Meanwhile, Gutin and Kasper (1992) said that older people who have been active for many years seem to exhibit generally enhanced bone density.

Besides that the Daily Mail (2008) also emphasized that on exercise days, people's mood noticeably increased after exercising. Moods did not change on non-exercise days but sense of calm decreased.

Besides chronic diseases, physical activity can also reduce Alzheimer's disease. In a research done by Hobson (2006), it was reported that functional fitness exercise and aerobics assist in reducing daily risks of falls and prevent dementia as well as Alzheimer's. Hobson (2006) also reported that, adults who engaged in Taichi classes 3 times a week in hourly sessions increased their balance, endurance and flexibility. This is consistent with the study by Carmichael (2007) who found that research shows that people who work out a few times a week contract Alzheimer less often that their counterparts who did not exercise.

With regards to study on benefits of physical activity, I-Min, Chung-cheng and Ralph (1995) revealed that their research data demonstrated a graded inverse relationship between total physical activity and mortality. Furthermore, vigorous activities were associated with longevity.

A study by Myers et al. (2004) on fitness and physical activity patterns in predicting mortality in men, revealed that being unfit carried a marked increase in risks even among persons who were comparatively active; likewise, being inactive was associated with a higher risk even among those who were relatively

fit. Because physical activity in part develops physical fitness, increasing physical activity should remain an important health care policy objective.

While a study conducted by Frank et al. (2000) stressed that during 8 years they documented 407 incidents of stroke (258 ischemic strokes, 67 subarachnoid hemorrhages, 42 intracerebral hemorrhages, and 40 strokes of unknown type). In multivariate analyses controlling for age, body mass index, history of hypertension, and other covariates, increasing physical activity was strongly inversely associated with the risk of total stroke.

In summary, the benefits of exercise extend far beyond weight management. Regular physical activity can help reduce risks for several diseases and health conditions, reduce joints stress, enhance bone density, improve mood and reduce mortality.

2.2.3.3 Physical Activity and Work Performance

It has been found that those who exercised experienced 21 per cent higher for concentration on work, 25 per cent for working without unscheduled breaks and 22 per cent higher for finishing work on time (Daily Mail, 2008).

This is supported by Pronk et al. (2004) who found that higher amounts of physical activity related to reduced decline in quality of work performance: higher cardio respiratory fitness related to decline decrements in amount of work performed and a decrease of extra effort put in to carry out the work; obesity related to more difficulty in getting along with co workers; severe obesity related

to a higher number of work loss days. It is concluded that lifestyle related changeable health risk factors drastically affect employee work performance.

Study by Stenson (2005) also revealed that British researchers studied about 200 workers at three sites: a university, a computer company and a life insurance firm. They found that 6 out of 10 workers said their time management skills, mental performance and ability to meet deadlines improved on days when they exercised. The amount of the overall performance boost was about 15 percent.

It can be concluded that physical activity increases work performance.

2.2.3.4. How to Perform Physical Activity

People of all ages can improve the quality of their lives and reduce the risks of developing coronary heart disease, hypertension, some cancers and type 2 diabetes with ongoing participation in moderate physical activity and exercise (Kravitz, 2007).

In a research done by the U.S. Department of Health and Human Services (2011), people of all ages gain from a reasonable quantity of daily physical activity. Reasonably intense activity for longer periods is equal to a more exhausting activity in shorter period for example 30 minutes of brisk walking is equal to 15-20 minutes of jogging.

Furthermore, Miles (2007) reported that the recommendation for adults is to have a total of 30 minutes of daily reasonably intense physical activity for 5 or more days a week. This amount of physical activity should be sustained throughout adulthood to decrease the risk of chronic diseases. The physical activity should

also be continued as age increases so as to offset muscle and bone age related loss, decline in cardiovascular system and reduce risks of osteoporotic fractures.

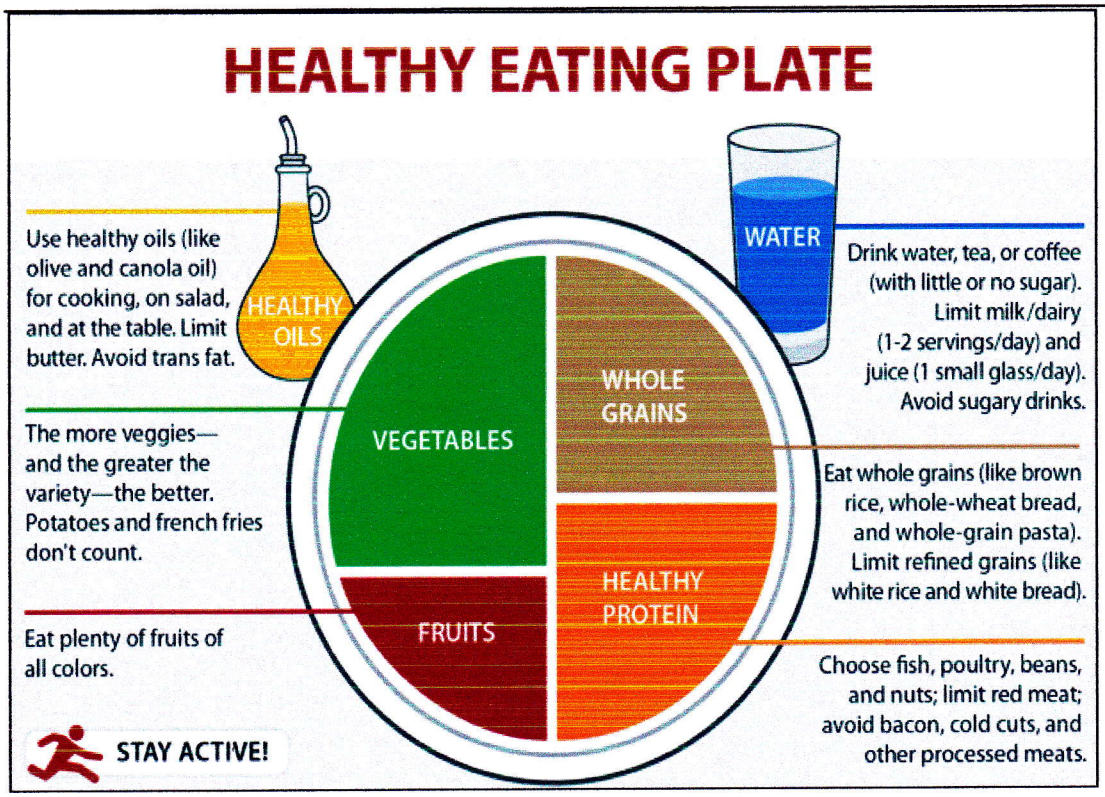
In addition, Hobson (2006) found that physical activity in a fairly small amount of time, 30 minutes almost daily will provide huge benefits and the best time for workout is the first thing in the morning.

From the literature reviewed above, it is recommended to have at least 30 minutes of daily exercise at moderate intensity.

2.2.4 Nutrition Behavior

2.2.4.1 Why Healthy Eating?

Healthy eating is fundamental to the maintenance of good health and well being. Food provides the energy (fuel) and nutrients our bodies need and protects a person against diseases (Lee, 2000). In a research done by World Cancer Research Fund/American Institute for Cancer Research (2007) said that low energy-dense foods have been shown to be foods that have high fiber content due to high water percentage. Such foods include cereals (grains), pulses (legumes), vegetables and fruits and also often micronutrient-dense, meaning high in vitamins, minerals, and other bioactive compounds. Likewise, high energy-dense foods especially sugary drinks and fast foods are most likely a cause of weight gain, overweight, and obesity. Such foods are typically high in fats and/or sugars, contain little water or dietary fiber, and low in micronutrients.



Source: Harvard School of Public Health (2012)
Figure 2.1 Healthy Eating Plate

Based on figure 2.1, the Harvard School of Public Health (2012) described that for healthy eating everybody should fill half of their plates with vegetables and fruit, the more varied the better and a quarter of their plate for whole grains. A healthy source of protein, such as fish, poultry, beans, or nuts, can make up the rest. The glass bottle is a reminder to use healthy oils, like olive and canola, in cooking, on salad, and at the table. Complete a meal with a cup of water, or tea or coffee with little or no sugar and MyPlate recommends limiting milk or dairy products to one to two servings per day. According to Mirizzi (2012), in general, the servings of dairy foods are counted in cups or ounces. For example 1 cup of yogurt, 1 cup of soy milk, 1 ½ ounces of natural cheese or 2 ounces of processed

cheese. Based on Ipatenco (2011), one serving of any type of milk is 1 cup, or 8 oz.

While a study conducted by Canadian Centre for Occupational Health and Safety (2008), by healthy eating and active living, it will reduce heart disease, cancer, anxiety and stress. It also will increase mood, energy and self-esteem.

Meanwhile Liow (2012) stressed that a study by the National Health and Morbidity Surveys (NHMS) revealed that cases of high blood pressure increased from 32.2% in 2006 to 32.7% in 2011. The NHMS study also discovered that one in five Malaysians have diabetes and the number of almost doubled from 1.5 million in 2006 to 2.6 million in 2011. High blood cholesterol cases increased from 20.7% in 2006 to 35.1% in 2011.

In summary, most of the above studies have indicated that a healthy, balanced diet provides essential nutrients to body and it can lower the risks of developing a range of chronic diseases.

2.2.4.2 The Role of Fruit and Vegetable

Healthy diets rich in fruits and vegetables may reduce the risk of cancer and other chronic diseases. Fruits and vegetables also provide essential vitamins and minerals, fibres, and other substances that are important for good health. Most fruits and vegetables are naturally low in fat and calories and are filling (Centers for Disease Control and Prevention, 2013).

This is supported by the National Center for Chronic Disease Prevention (2007), water and fiber in foods increase volume and thereby reduce energy density. In their natural state, fruits and vegetables have high water and fiber content and are low in calories and energy density.

Kader, Perkins and Lester (2004) also found that fruits and vegetables remain an important source of nutrients in many parts of the world, and offer advantages over dietary supplements because of low cost and wide availability.

The nutritive constituents of fruits and vegetables that have a positive impact on human health and their sources are mentioned in Table 2.1.

Table 2.1
Nutritive Constituents of Fruits and Vegetables that have a Positive Impact on Human Health and their Sources.

Constituent	Sources	Established or proposed effects on human-wellness
Vitamin C (ascorbic acid)	Broccoli, cabbage, cantaloupe, citrus fruits, guava, kiwifruit, leafy greens, pepper, pineapple, potato, strawberry, tomato, watermelon	prevents scurvy, aids wound healing, healthy immune-system, cardiovascular-disease
Vitamin A (carotenoids)	Dark-green vegetables (such as collards, spinach, and turnip greens), orange vegetables (such as carrots, pumpkin, and sweet potato), orange-flesh fruits (such as apricot, cantaloupe, mango, nectarine, orange, papaya, peach, persimmon, and pineapple), tomato	night blindness prevention, chronic fatigue, psoriasis, heart disease, stroke, cataracts
Vitamin K	Nuts, lentils, green onions, crucifers (cabbage, broccoli, brussel sprouts), leafy greens	synthesis of pro-coagulant factors, osteoporosis
Vitamin E (tocopherols)	Nuts (such as almonds, cashew nuts, filberts, macadamias, pecans, pistachios, peanuts, and walnuts), corn, dry beans, lentils and chickpeas, dark-green leafy vegetables	heart-disease, LDL-oxidation, immune-system, diabetes, cancer
Fiber	Most fresh fruits and vegetables, nuts, cooked dry beans and peas	diabetes, heart disease
Folate (folicin or folic acid)	Dark-green leafy vegetables (such as spinach, mustard greens, butterhead lettuce, broccoli, brussels sprouts, and okra), legumes (cooked dry beans, lentils, chickpeas and green peas), asparagus	birth defects, cancer heart disease, nervous system
Calcium	Cooked vegetables (such as beans, greens, okra and tomatoes) peas, papaya, raisins, orange, almonds, snap beans, pumpkin, cauliflower, rutabaga	osteoporosis, muscular/ skeletal, teeth, blood pressure
Magnesium	Spinach, lentils, okra, potato, banana, nuts, corn, cashews	osteoporosis, nervous system, teeth, immune system
Potassium	Baked or sweet potato, banana & plantain, cooked dry beans, cooked greens, dried fruits (such as apricots and prunes), winter (orange) squash, and cantaloupe	hypertension (blood pressure) stroke arteriosclerosis

Source: Kader, Perkins & Lester (2004).

In a study done by Norris-Ellis (2011) found that many working adults do not meet the suggested daily minimum of five servings of fruit and vegetables and do not perform the suggested amount of daily exercise. In terms of fruits and vegetables serving size, Jegtvig (2013) mentioned that, the United States Department of Agriculture (USDA) sets a serving size for fruits or vegetables to be equal to about one-half cup. For example, greens like spinach and lettuce have a serving size equal to one full cup. One serving of sliced fruit is equal to one-half cup. However, a single piece of fruit such as an apple or an orange, counts as one serving.

In addition, Akamatsu et al (2005) said that Japanese adults listed "eating a nutritionally balanced diet" and "eating plenty of vegetables" as the most important definitions of healthy eating.

In a research done by Kiefer et al. (2004), they found that on supplementation with mixed fruit and vegetable juice concentrates increased serum antioxidants and folate in healthy adults. The research revealed that significant increases in blood nutrient levels after active supplementation were observed for β-carotene, vitamin C, vitamin E, selenium and folate. Ranges measured, after supplementation, often fell into those associated with a reduced risk for disease.

With regards to the studies on benefits of fruit and vegetable intake, Liu (2003) said Knekt et al. (1996) reported a study in Finland which showed the intake of apples and onions, both high in quercetin, was inversely correlated with total mortality and coronary mortality. This is consistent with the study by Arai et al.

(2000) who reported that the intake of quercetin alone was inversely related to total cholesterol and LDL plasma levels among Japanese women.

It can therefore be concluded that fruits and vegetables provide sources of fiber, vitamins and minerals which essential for the body to function well.

2.2.4.3 Fat and Cholesterol Intake

Good fats are monounsaturated and polyunsaturated fats which lower disease risks. Foods high in good fats include vegetable oils (such as olive, canola, sunflower, soy, and corn), nuts, seeds, and fish. Bad fats are saturated fats, especially trans fats which increase disease risks. Foods high in bad fats include red meat, butter, cheese, and ice cream, as well as processed foods made with trans fat from partially hydrogenated oil. The key to a healthy diet is to choose foods that have more good fats than bad fats (Harvard School of Public Health, 2013).

The British Dietetic Association mentioned that the average man and woman should eat no more than 30g and 20g of saturated fat per day respectively. A total fat intake of more than 20g of fat per 100g is considered high and 3g of fat or less per 100g is considered low. Whereas for saturated fat, an intake of more than 5g of fat per 100g is high and 1.5g of fat or less per 100g is considered low (NHS Choices, 2013).

Cholesterol in the blood is carried by particles called lipoproteins. There are two kinds of lipoproteins which are Low-density lipoproteins (LDL) cholesterol and

High-density lipoproteins (HDL) cholesterol. Low-density lipoproteins (LDL) cholesterol makes up the majority of the body's cholesterol. LDL is known as "bad" cholesterol because having high levels of LDL can lead to a buildup in the arteries and result in heart disease. High-density lipoproteins (HDL) cholesterol absorbs cholesterol and carry it back to the liver, which flushes it from the body. High levels of HDL, or "good" cholesterol, reduce the risk of heart disease and stroke (Centers for Disease Control and Prevention, 2010).

Study on consumption of fat and cholesterol related to health status, Houghton, Neck and Cooper (2009) mentioned that Neck et al. (2004) reported that a healthy diet means reducing the intake of unhealthy fats (e.g. saturated fat and trans fats) and cholesterol. Hence people whose diets are high in fat are more prone to be obese as compared to people with low fat diets. Not all fats are dangerous to health. The monounsaturated fats in nuts and olive oil and omega 3 fatty acids in fish and flaxseeds may assist in increasing mood and energy, reducing hunger and regulating blood cholesterol levels. Trans fat or hydrogenated fat mostly found in processed and fried foods are likely the worst type of fat to consume.

Another study by Kuklina et al. (2013) on the impact of low-density lipoprotein cholesterol intake to cardiovascular disease found that as reported by Roger et al. (2012), each year, more than 2 million Americans suffer from acute cardiovascular events that account for approximately one-fourth of the total cost of inpatient hospital care and also reported by Baigent et al. (2010) Control of

low-density lipoprotein cholesterol (LDL–C) has been shown to substantially reduced cardiovascular disease morbidity and mortality.

From the studies above it can be concluded that, to reduce cholesterol is by maintaining a healthy and balanced diet. It is important to keep diet low in fatty food, especially food containing saturated fat, and eat lots of fruit, vegetables and wholegrain cereals.

2.2.4.4 Obesity and Poor Diet

Obesity is a term used to describe somebody who is overweight with a high degree of body fat. The most widely used method to assess obesity is the body mass index (BMI), where a person's weight (in kilograms) is divided by their height in metres squared. A person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 25 is considered overweight. A BMI of over 40 is considered very obese and known as 'morbidly obese' (NHS, 2012).

On this issue, the World Cancer Research Fund/American Institute for Cancer Research (2007) reported that as mentioned by Chandler (2006), nearly two-thirds of the UK population is now overweight or obese, due to unhealthy diets coupled with a sedentary lifestyle. The World Cancer Research Fund/American Institute for Cancer Research (2007) further reported that it is consensually agreed that the sharp increase of overweight and obesity cases is a public health nutrition emergency worldwide. In addition, according to World Health Organization (2003) among public health measures for the prevention of obesity are the need to

restrict the consumption of energy-dense snacks and sugar-sweetened soft drinks and to increase the consumption of whole grains and energy-dilute vegetables and fruits.

The research by Thomas and Davies (2007) on the increasing number of overweight population mentioned that it is estimated that being overweight or obese could account for 14% of male and 20% of female cancer deaths in the UK.

Meanwhile, Gavin (2010) mentioned that when the calorie intake is more than the consumption, the body stores the excess as fat. A few pounds of extra body fat is not a health risk to most people but when people develop a habit of taking more calories than burning them, fat will gradually develop in their bodies. As they grow older, overweight children and teens tend to contract diabetes and heart disease. Obesity has adverse impacts on body and mind. It could cause tiredness and discomfort. Excess weight creates extra stress on the body, particularly in the bones and joints of the legs.

In the case of poor eating habits and diseases, Norris-Ellis (2011) mentioned that as found by CDC (2009), as unhealthy eating habits and lack of physical activity combined to account for more than 300,000 deaths in American adults.

A study on the relationship between the consumption of sugar-sweetened drinks and childhood obesity by Ludwig, Peterson and Gortmaker (2001) indicated that the odds of becoming ratio of becoming obese among children increased 1.6 times for each additional can or glass of sugar sweetened drink that they consume every day. School children who drink an average of 265 mL or more of soft drinks daily

consumed almost 835 kJ more total energy every day than those drinking no soft drinks.

It is a fact supported by Liebman et al. (2003) who found, in a study of rural communities in the USA, that subjects who drank one or more servings of pop soda per week were more likely to be overweight or obese than those who drank less.

Another study on sugar-sweetened soft drink, obesity and type 2 diabetes by Apovian (2004) found that one 12 oz can of sugar sweetened soda contains 150 kcal and 40 to 50 grams of sugar and daily intake of a can lead to 6.75 kg weight gain in a year.

In summary, there are increasing evidence that obesity is a major risk factor for a number of chronic diseases. Dieting and physical exercise are the main treatments for obesity. Diet quality can be improved by reducing the consumption of energy-dense foods such as those high in fat and sugars.

2.2.4.5 Factors of Poor Healthy Eating Habits

Poor healthy eating habits include under or overeating, not having enough of the healthy foods which the human body needs each day, or consuming too many types of food and drink, which are low in fibre or high in fat, salt and/or sugar (SA Health, 2012).

Study by Chen and Raymond (2010) found that, even though most literature mentioned that obesity is as a result of overconsumption of unhealthy food especially fast food, there is significant evidence to suggest that limited geographical access to healthy food is also a factor in the obesity epidemic.

Cummins and MacIntyre (2006) also said that environmental influences on diet are partly considered to involve two pathways: access to foods for home consumption from supermarkets and grocery stores, and access to ready-made food for home and out-of-home consumptions (e.g. takeaways, restaurants).

It is supported by Houghton, Neck and Cooper (2009), the nutritional labels on packaged foods furnish information of calories, amount of calories from fat, and percentages of monounsaturated, polyunsaturated and saturated fat. These labels help customers make the right healthy food choice. Even though not all foods have nutritional labels, vegetables and fruits are always good choices due to their fat free nature.

In a research done by Kafatos and Mamalakis (1993) and Kafatos et al.(1999), the main reasons for negative health indices are, apart from a limited awareness of health and dietary issues, poor dietary habits and the sedentary lifestyles of contemporary Greeks (cited from Manios et al., 2002).

In addition, Amos, Intiful and Boateng (2012) reported that the study on 150 students from a population of senior high school students in Ghana, to find out whether factors such as parental, peer and media influences eating habits. Findings revealed that peers negatively and significantly correlated with eating habits and were also the only predictor of eating habits.

With regards to fast food and energy-dense foods, Nielsen, Siega-Riz and Popkin (2002) and Nielson and Popkin (2003) mentioned that a number of environmental factors encourage over-consumption including the increasing availability of fast-food establishments, the wide variety of inexpensive energy-dense foods and the

large portion sizes of those foods (cited from Satia, Galanko and Siega-Riz ,2004).

From the findings above, it can be concluded that many factors influence people's poor diet choices such as limited geographical access to healthy food, easy access to ready-made food for home and out-of-home consumption, peer influences and also limited awareness of health and dietary issues

2.2.4.6 Food and Disease Risk Factor

Food is an important factor in determining cancer incidences in many countries and regions (Sugimura, 2002).

Research by the World Cancer Research Fund/American Institute for Cancer Research (2007), on factors in cancer development, human adults consist of approximately 10 000 000 000 000 cells which are constantly renewed and replaced. Around 5-10 percent of cancer cases are as a result of inheriting cancer related genes but most of the cases are caused by alterations or damage built up over time to genetic material within cells. The damage is caused by endogenous (internal) and exogenous (environmental) factors. Food, nutrition and physical activity are main environmental factors in cancer development. This is supported by Chandler (2007) who mentioned that while certain components in food are chemoprotective, others may be carcinogenic.

It is also supported by Chandler (2006) who mentioned World Cancer Research Fund/American Institute for Cancer Research (2007) reported that cancer

development is influenced by the intake of beverages, dietary component (or their balance in diet) as well as technique in food preparation manufacturing processing and preservation.

With regards to the study on the health status in Germany, Mensink and Beitz (2004) mentioned that East Germans tended to have a higher mean systolic blood pressure level than West Germans and differences in nutritional habits may partly be responsible for this. Mensink and Beitz (2004) also mentioned that according to Thamm (1999), the prevalence of hypertension have been previously reported to be higher in the eastern part and the World Health Organization (WHO) mentioned that blood pressure classification, in East Germany about 40% of men and 35% of women were hypertensive in 1998 compared with 32% of men and 30% of women in West Germany. This situation may be due to the higher consumption of alcohol and sausages (with high salt and fat content) in East Germany.

Also as per lifestyle study in Greek, Manios et al. (2002) found that as reported by Kafatos et al. (1991), Voukiklaris et al. (1996) and Kafatos and Papoutsakis, (1998), the need for comprehensive, longitudinal, health education programmes is increasingly obvious in view of the rising rates of morbidity and mortality in the Greek adult population caused by chronic diseases associated with contemporary lifestyles and nutritional habits which involve a lack of significant exercise, unsatisfactory nutritional habits and smoking.

In addition, Pekka, Pirjo and Ulla (2002) mentioned that a program to influence diet and other lifestyles as a prevention to cardiovascular disease by North Karelia project was launched in 1972 has reported that evaluation has shown how the diet (particularly fat consumption) has changed and how these changes have led to a major reduction in population serum cholesterol and blood pressure levels. It has also shown how ischaemic heart disease mortality in a working-age population has declined by 73% in North Karelia and by 65% in the whole country from 1971 to 1995.

In summary, the above review of literatures in this section indicates that a healthy diet helps maintain or improve general health. It is thought to be important for lowering disease risks factor, such as cancers, cardiovascular disease, also reducing rates of morbidity and mortality.

2.2.5 Smoking Habit

2.2.5.1 Effects of Smoking

The prevalence of smoking among Malaysian males remains high in spite of several population interventions over the past decade. Tobacco will likely remain a primary cause of premature mortality and morbidity in Malaysia (Hock et al., 2013).

On this issue, the Department of Health (2000) reported that, at present, two out of three UK deaths are related to cancer and circulatory diseases and two main causes of those diseases are tobacco smoking and poor diet. 120,000 UK citizens are said to have died from smoking. Smoking is the cause of 1 in 3 of all UK

cancers, accounted for 90% of all lung cancers and primary case of mouth, nasal passage, larynx, bladder and pancreas cancer.

Furthermore, Harder (2012) also stated that as mentioned by Murray and Lopez (1997) smoking has been determined to be a major cause of disability adjusted life years (DALYs). In 1990, tobacco was a leading cause of DALYs in established market and formerly socialist economies in Europe with an estimated of 15 deaths and 12% of DALYs.

Besides that, Peto (2001) mentioned that the World Cancer Research Fund/American Institute for Cancer Research (2007) reported dietary components between food in overall diet and between diet and behavioral e.g. physical activity and smoking are closely related. The link between cigarette smoke and lung cancer became evident during the post-war years.

A study done by Lambert, Dibsdall and Frewer (2002) reported that quitting smoking and improving consumption of fruits and vegetables are the top two public health focus for present government action to lower cases of cancer and heart disease.

As reported by Beaglehole and Watt (2004), in the UK, 120,000 people die prematurely due to tobacco use that is 330 deaths every single day. Beaglehole and Watt (2004) also found that, as mentioned by Royal College of Physicians Tobacco Advisory Group (2000), a smoker's life span is shortened by about five minutes for each cigarette smoked and this is about the amount of time that is spent smoking a cigarette.

With regards to smoking related death, Morris (2011) mentioned that Smith, Tally, Hubbard and Winn (2008) found cigarette smoking is the main cause of avoidable deaths and morbidity in the United States. About a quarter of the population smoke, with almost 443,000 fatalities stemming from smoking related illnesses.Known health risks attributed to smoking include cancers as described above, cardiovascular disease including coronary heart disease, stroke, aneurysm, sudden cardiac death and respiratory illnesses such as asthma, bronchitis, emphysema and chronic obstructive pulmonary disease (COPD). Annually one out of five deaths can be blamed on smoking

A research by Makrides et al. (2008) on the impact of a coronary risk factor after 3 months modification program for employees, the outcome revealed that there were statistically significant differences in coronary risk score improvement after the program of smoking cessation, increase of physical activity level, reduction in body mass index and serum cholesterol.

Study on asthma related to smoking as reported by Alison and Michael (2010) stated that the impact of smoking is more prevalent among individuals with asthma than those without. Smoking is also associated with decreased asthma control, increased risk of mortality, asthma attacks and exacerbations. Smokers with and without asthma may have different risk factors for smoking onset as well as different smoking motives and outcome expectancies. Smoking cessation is associated with improvements in lung functions and asthma symptoms.

Boffetta (2008) also said that tobacco smoking is the main known cause of urinary bladder cancer in humans. Epidemiological studies on tobacco smoking and risk of bladder cancer conducted in different populations have shown a linear relationship between intensity and duration of smoking and risk. Quitting smoking reduces the risk of bladder cancer. In addition, Dhawan, Mathur and Seth (2001) also mentioned that a significant difference was observed amongst the different groups of smokers depending on the extent of smoking. An age-dependent effect in DNA damage was also observed. This preliminary study has, for the first time, revealed differences in the extent of DNA damage in the normal Indian population depending on their eating and smoking habits as well as age.

Eisner et al. (2005) also revealed that exposure to environmental tobacco smoke (ETS) exposure may be an important cause of chronic obstructive pulmonary disease (COPD). Consequently, public policies aimed at preventing public smoking may reduce the burden of COPD-related death and disability, both by reducing direct smoking and ETS exposure.

In term of smoking cause increase in medical cost, Warner, Hodgson, and Carroll (1999) found that smoking-related disease cost regularly contributed for 6-8% ($8.2-50 billion) of American personal medical expenditures between 1975 and 1993 (after adjusting for inflation) (cited from Harder ,2012).

Furthermore, research by Peto et al. (2000) reported that the cumulative risk of death from lung cancer by age 75 (in the absence of other causes of death) rose from 6% at 1950 rates to 16% at 1990 rates in male cigarette smokers, and from

1% to 10% in female cigarette smokers. Among both men and women in 1990, however, the former smokers had only a fraction of the lung cancer rate of continuing smokers, and this fraction fell steeply with time since stopping.

Further reported by Peto et al. (2000), for men who quit smoking at ages 60, 50, 40, and 30 the cumulative risks of lung cancer by age 75 were 10%, 6%, 3%, and 2% respectively. In addition, people who stop smoking, even well into middle age, avoid most of the subsequent risks of lung cancer; and stopping before middle age allow them to avoid more than 90% of the risk attributable to tobacco.

In case of the effects of cessation program, Peto et al. (2000) also revealed that the ratio of the risk of lung cancer in those who have stopped smoking to that in continuing smokers becomes progressively lower as the time since cessation increases, although it never gets quite as low as in lifelong non-smokers.

Based on researched by the Centers for Disease Control and Prevention (2005), it has found that from 1997 to 2001, cigarette smoking and exposure to tobacco smoke resulted in approximately 438,000 premature deaths in the United States, 5.5 million of potential life lost (YPLL) and 92 billion dollars in productivity losses annually. In addition the World Health Organization (2012) mentioned that according to the Malaysian Ministry of Health, tobacco use in Malaysia accounts for 35% of in-hospital deaths, principally from cancer, heart disease and stroke. More than 10 000 Malaysians die from smoking-related illnesses each year.

Based on the above findings, it can be concluded that smoking is an unhealthy habit which increase smoking related diseases such as numerous cancer types.

2.3 Conclusion

From the literature, it is clear that major health problems related to physical inactivity, unhealthy nutrition intake and smoking habit were reviewed. The syndrome consists of components that increase a person's risk for diabetes, stroke, and heart disease.

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

A survey was conducted to collect data on ASSB employees' perceptions, attitudes, and behaviors related to physical activity, nutrition behavior and smoking habit.

The survey contains information on the participants' socio-demographic characteristics, their stated concerns about health and physical activity, their nutrition behavior and their smoking habit.

The structure of the survey is presented in figure 3.1. The survey is a particularly valuable tool that allows researchers to get a better understanding of ASSB's employees concerns and preferences towards their health and diet issues of their employees.

3.1 Research Frame Work and Hypotheses of Study

Figure 3.1 is the research framework of this study where health status is the dependent variable and physical activity, nutrition behavior and smoking habits are the independent variables.

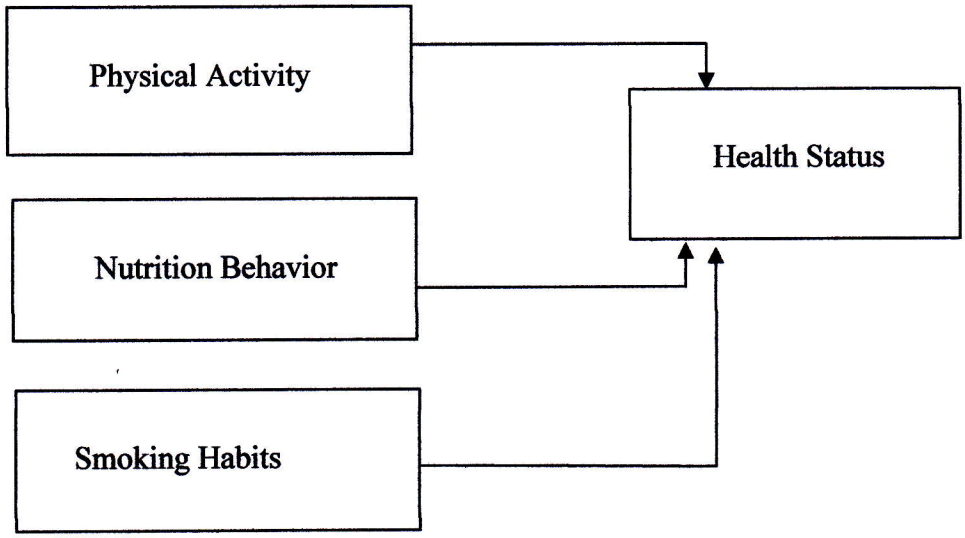


Figure 3.1 Frame Work of the Study

3.1.1 The Relationship between Physical Activity and Health Status.

Many studies emphasized on the effectiveness of physical activity in reducing the risk of many adverse health effects such as the research by Thomas and Davies (2007) who mentioned that there are now multiple researches that show a relationship between obesity, physical activity and colorectal cancers cases and mortality.

This is supported by the U.S. Department of Health and Human Services (2008) found that regular physical activity reduces the risk of many adverse health outcomes and provides many health benefits.

Hobson (2006) in his study also said that there were indisputable facts that regular physical activity reduces the risk of range of diseases such as heart problems, cancer, osteoporosis, depression, high blood pressure, diabetes and obesity. The U.S Center for Disease Control and Prevention recommended moderate intensity exercise which increases heart rate but not to the point of losing breath and being unable to walk. Example of exercises includes biking, in line skating, using an elliptical trainer, and swimming. Strength utilizing activities such as weight training can help to avoid bone and muscle loss and relieve joints stressed by arthritis or pain.

In addition, study by Myers et al. (2004) on fitness and physical activity patterns in predicting mortality in man, revealed that being unfit carried a marked increase in risk even among persons who were comparatively active; likewise, being inactive was associated with a higher risk even among those who were relatively fit. As physical activity in part develops physical fitness, increasing physical activity should remain an important health care policy objective.

Thus, the hypothesis 1 is to study the relationship between workers performing regular physical activity and their health status.

HA1: There is a relationship between worker's performing regular physical activity and their health status.

3.1.2 The Relationship between Nutrition Behavior and Health Status.

Maintaining overall healthy eating habits offers other several health benefits for example the Canadian Centre for Occupational Health and Safety (2008) mentioned that by eating healthily and having an active life, it will reduce heart disease and cancer. It would also improve mood, energy and self-esteem, anxiety and stress.

Supported by World Cancer Research Fund/American Institute for Cancer Research (2007) said that low energy-dense foods are usually foods that are high fiber content due to high water percentage. Such foods include cereals (grains), pulses (legumes), and vegetables and fruits, and are also often micronutrient-dense, meaning they are high in vitamins, minerals, and other bioactive compounds. Likewise, high energy-dense foods especially sugary drinks and fast foods, are most likely a cause of weight gain, overweight, and obesity. Such foods are typically high fats and/or sugars, contain little water or dietary fiber, and low in micronutrients.

In addition, according to the World Health Organization (2003) among public health measures for the prevention of obesity are the need to restrict the consumption of energy-dense snacks and sugar-sweetened soft drinks and to increase the consumption of whole grains and energy-dilute vegetables and fruits.

In research done by Drewnowski and Specter (2004), obesity has been linked with the excessive consumption of both sugars and fats. Low-cost, energy-dense diets are likely to contain added sugars and vegetable fats. Such diets have been and will continue to be associated with obesity and overweight.

Furthermore, cancer development is influenced by the intake of beverages, dietary component (or their balance in diet) as well as technique in food preparation manufacturing processing and preservation (World Cancer Research Fund/American Institute for Cancer Research, 2007).

Meanwhile Liow (2012) stressed that a study by National Health and Morbidity Surveys (NHMS) reveals that cases of high blood pressure increased from 32.2% in 2006 to 32.7% in 2011. NHMS study also discovered that one in five Malaysians has diabetes and cases increased to almost double from 1.5 million in 2006 to 2.6 million in 2011. High blood cholesterol cases increased from 20.7% in 2006 to 35.1% in 2011.

Therefore hypothesis 2 of this study is regarding the relationship between nutritional behaviors with their health status.

HA2: There is a relationship between nutritional behaviors and their health status.

3.1.3 The Relationship between Smoking Habit and Health Status.

Smoking is one of the leading causes of preventable deaths globally. Based on research done by Morris (2011) found that cigarette smoking is the main cause of avoidable death and morbidity in the United States.

Supported by Peto (2001) mentioned that the link between cigarette smoke and lung cancer became evident during the post-war years.

Study on asthma related to smoking as reported by Alison and Michael (2010) stated that the impact of smoking is more prevalent among individuals with asthma than those without. Smoking is also associated with decreased asthma

control, increased risk of mortality, asthma attacks and exacerbations. Smokers with and without asthma may have different risk factors for smoking onset as well as different smoking motives and outcome expectancies. Smoking cessation is associated with improvements in lung functions and asthma symptoms.

Based on researched by the Centers for Disease Control and Prevention (2005) reported that findings indicated that, from 1997 to 2001, cigarette smoking and exposure to tobacco smoke resulted in approximately 438,000 premature deaths in the United States, 5.5 million of potential life lost (YPLL) and 92 billion dollars in productivity losses annually. In addition, the World Health Organization (2012) mentioned that according to the Malaysian Ministry of Health, tobacco use in Malaysia accounts for 35% of in-hospital deaths, principally from cancer, heart disease and stroke. More than 10 000 Malaysians die from smoking-related illnesses each year.

In addition, Boffetta (2008) also said that tobacco smoking is the main known cause of urinary bladder cancer in humans. Epidemiological studies on tobacco smoking and risk of bladder cancer conducted in different populations have shown a linear relationship between intensity and duration of smoking and risk. Quitting smoking reduces the risk of bladder cancer.

Thus the hypothesis 3 of this study is about relationship between workers' smoking habit towards their health status.

HA3: There is a relationship between workers' smoking habit and their health status.

3.1.4 The Relationship between Physical Activity, Nutritional Behaviors and Smoking Habit and Health Status.

This study is also to investigate whether all the independent variables (physical activity, nutritional behaviors and smoking habit) will influence the health status of the respondents.

Many studies were conducted pertaining to the relationship between healthy lifestyles such as physical activity, nutrition behavior and smoking with health status. For example in a research done by the World Health Organization (2003), it was concluded that unhealthy diets, physical inactivity and smoking are confirmed risk behaviors for chronic diseases.

Furthermore, study on the importance of promoting physical activity for cancer survivorship was carried out in New Zealand and reported by Keogh and Jones (2011), projections suggest that New Zealand will have over 22,000 new cancer cases in 2011, a substantial increase from the 15,000 cases reported in 2005.This increased number of new cancer cases may reflect the ageing of the population, insufficient levels of physical activity, poor dietary choices, other unhealthy lifestyle choices such as smoking as well as improvements in cancer detection .

While study conducted by Canadian Centre for Occupational Health and Safety (2008), by healthy eating and active living, it will reduce heart disease, cancer, anxiety and stress. It also will increase mood, energy and self-esteem.

Besides that, Peto (2001) mentioned that, World Cancer Research Fund/American Institute for Cancer Research (2007) reported that dietary components, between

food in overall diet and between diet and behavioral e.g. physical activity and smoking are closely related. The link between cigarette smoke and lung cancer became evident during the post-war years.

A research by Makrides et al. (2008) on the impact of a coronary risk factor after 3 months modification program for employees, the outcome revealed that there were statistically significant differences in coronary risk score improvement after the program of smoking cessation, increase of physical activity level, reduction in body mass index and serum cholesterol.

Thus the hypothesis 4 of this study is about influences of physical activity, nutritional behaviors and smoking habit towards their health status.

HA4: The physical activity, nutritional behaviors and smoking habit influences the health statuses of the respondents.

3.2 Research Design

The design of this research is known as survey research in which the correlation technique is used to examine any relationship between physical activities, nutrition behavior and smoking habit with their health status and regression analysis was used to examine whether physical activities, nutrition behavior and smoking habit influence the health status of respondents.

3.3 Operational Definition

The conceptual definitions are as below.

3.3.1 Health Status

Frank (2002) defined health as complete physical, mental and social well-being, not merely negatively as the absence of disease or infirmity.

Furthermore, Rivera (2004) found that health should be defined not simply as lack of infirmity but rather as a state of physical and psychological well-being which allows the individual to carry out both work and leisure activities. So defined, there are three types of variables which influence an individual's health status: life-style, environment and the consumption of both goods and health services.
This study uses all both operation definition of health where the total physical, mental and social well-being which allows the individual to carry out both work and leisure activities.

3.3.2 Physical Activity

The term of physical activity is explained by Norris-Ellis (2011) as any bodily movement produced by the contraction of skeletal muscles that increases energy expenditure above basal level and the World Health Organization (n.d) defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure.

On the other hand, the U.S Department of Health and Human Services (2008) explained the term physical activity to generally refer to bodily movement that enhances health.

Therefore this study uses the definition by Norris-Ellis (2011) and the U.S Department of Health and Human Services (2008), which is any bodily active which improve health status.

3.3.3 Nutrition Behavior

The definition of nutrition behavior as mentioned by Gedrich (2003), nutrition behavior is framed by biological, anthropological, economic, psychological, socio-cultural and home economics related determinants and it is shaped by individual situation. Hence this study uses the definition by Gedrich (2003) where nutrition behavior provide a whole set of means to involve in people's food choices.

3.3.3.1 Healthy Food

In term of healthy food, Tremblay & Arguin (2011) stated that healthy food should sufficiently contribute to micro nutrient consumption and adequate protein and fiber content. It also should supply lipids and carbohydrates with an optimal composition. Furthermore, focusing on obesity avoidance, healthy food should encourage appetite control, i.e. promotes satiety with less energy intake. Hence, a healthy fulfilling food should have a high nutrient density but with low energy density. Thus, the healthy food which relates to nutrition behavior, which will be mentioned in this study refers to the definition above.

3.3.3.2 Obesity

Obesity is the state where energy intake is more than energy output for extended periods of time. Lvovich (2008) mentioned that as described by the World Health Organization (2000), definition of obese as a person having a Body Mass Index (BMI) of over 30. BMI is determined by dividing square height with individual weight. Standard weight is in BMI ranging from 18.5–25. Obesity cut-off usually starts at 30-35 and severe obesity at 35–40.

In addition, Center for Disease Control and Prevention (2012) defines overweight and obesity as both labels for range of weight that are greater than what is generally is considered healthy for a given height.

Therefore, the definition of obesity which relates to nutrition behavior of this study uses the above definition by Lvovich (2008) and Center for Disease Control and Prevention (2012).

3.3.4 Smoking Habit

Morris (2011) said the Meriam –Webster (2011) definition of smoking as a derivative of the intransitive verb "smoke" meaning "to inhale and exhale the fumes of burning plant material and especially tobacco".

The Medical Dictionary (2012) and California State University (2012) define smoking as the inhalation of the smoke of burning tobacco encased in cigarettes, pipes and cigar. Thus, this study uses the definition by Medical Dictionary (2012) and California State University (2012) where smoking is a practice in which a substance, most commonly tobacco is burned and the smoke is tasted or inhaled. The most common method of smoking is through cigarettes, pipes and cigars.

3.4 Sampling Procedure

3.4.1 Population and Sample Size of the Study

ASSB, Shah Alam Selangor has a population of 2,600. Referring to table 3.1, based on the guideline of sample size by Krejcie and Morgan (1970), if the population is 2,600, a sample of 335 is sufficient to represent the entire population. For this study, data were collected by distributing questionnaires for 400 samples.

Table 3.1

Determining Sample Size Based on Population

Population Size	Sample Size
2,200	327
2,400	331
2,600	335
2,800	338
3,000	341

Source: Krejcie& Morgan (1970)

The sample sized involved all levels of employees which include seven main divisions i.e. Welding, Painting, Assembly, Logistic, Quality Assurance, Maintenance and Office staff. The respondents ranged from operational staff which consists of Operator, Team Leader, Specialist and Planner; to managerial staff consisting of Clerk, Group Leader, Chief Leader, Executive, Engineer, Assistance Manager, Managers, Department Head and General Manager.

The questionnaires were distributed to 75% (300 respondents) of operational staff and 25% (100 respondents) of managerial staff.

As shown in table 3.2, the sample size was selected by using stratified random sampling technique in which the researcher divides the entire target population into different subgroups.

Table 3.2

Calculation of Sample Size Selected

Department	Population (%)	Sample	
		Management	Operation
Welding	53 (13)	3	50
Painting	63 (16)	3	60
Assembly	64 (16)	4	60
Logistic	78 (20)	3	75
Quality Assurance	37 (9)	2	35
Maintenance	23 (6)	3	20
Office	82 (20)	82	0
Total	400 (100%)	100	300

3.5 Selection of Survey Instruments

The questionnaires were adopted from different sources. There are two sections in the questionnaires; section one of the questionnaire is on demography. Section two of the questionnaires is regarding the three independent variables.

The questionnaire consists of 78 items to measure the independent variables (physical activity, nutrition behavior and smoking habits). Most of the items were evaluated using a six-points Likert Scale and indicated as 1 to 6, where 1 = "Strongly Disagree', 2 = "Disagree", 3 = "Slightly Disagree", 4 = "Slightly Agree" 5= "Agree "and 6 = "Strongly Agree".

Simple wording were used and tapping to the variables. In order to keep the information of the respondents confidential, the questionnaires were designed to be anonymous and were only marked with numbers for proper identification.

The questionnaire that was used in this study is as attached in Appendix A and the sources of questionnaire are as shown in table 3.3 to table 3.6.

Table 3.3

Source of Questionnaires for Health Status

Source	Question	Scale
Das (2011)	I rate my present health is excellent In general , I rate my health is much better now than one year ago. During the last 4 weeks, I have been bothered with bodily pain	1 =Strongly Disagree 2 = Disagree 3 = Slightly Disagree 4 = Slightly Agree 5 =Agree 6= Strongly Agree
Bahrs (2011)	I am always concerned about my health	
Mirzaaiinama badi (2005)	I always take dietary supplements such as vitamins	
Norris-Ellis (2011)	I have been advised to always follow-up of previously identified chronic medical condition such as blood pressure, diabetes, high blood pressure, diabetes, high cholesterol or similar condition	

Continue to next page

Source	Question	Scale
Spitzer, Williams &Kroenke(2005)	During the last 4 weeks, I have been bothered of the following problem: Chest pain Feeling my heart pound or race Shortness of breath Feeling tired or having little energy Poor appetite or overeating Trouble staying asleep or sleeping too much Getting tired very easily Feeling restless so that it is hard to sit still	1 = Strongly Disagree 2 = Disagree 3 = Slightly Disagree 4 = Slightly Agree 5 =Agree 6= Strongly Agree
Merrick (2009)	Have you ever been told by a physician that you have any of the following health conditions: a.Chronic bronchitis (lung disease) b.Heart disease, e.g. coronary artery disease, congestive heart failure c.Diabetes d.High blood pressure e.High cholesterol f.Arthritis (Joint pain) #Joint: area where 2 bones meet. g.Osteoporosis (thinning of bone tissue / loss of bone density over time) h.Other chronic conditions i.Any kind of cancer	
Shabana (2007)	How would you describe your weight? I have been hospitalized due to health problem during the past 2 years Currently I am taking medications prescribed by doctor	1 = Yes 2 = No

Continue to next page

Table 3.4

Source of Questionnaires for Physical Activity

Source	Question	Scale
Magno (2010)	I engage in physical exercise on daily basis	1 = Strongly Disagree 2 = Disagree 3 = Slightly Disagree 4 = Slightly Agree 5 =Agree 6= Strongly Agree
	*When I don't exercise I feel guilty	
	*Sometime I feel like I don't want to exercise, but I go ahead and push myself anyway	
	When I miss an exercise session, I feel concerned about my body possibly getting out of shape	
	If I miss a planned workout, I attempt to make up for it the next day	
	If I feel I have overeaten, I will try to make up for it by increasing the amount I exercise	
	I keep a record of my exercise performance, such as how long I work out, how far, fast I run	
	I exercise more than three days per week	
Norton (2003)	I think my weight change is the result of poor exercise habits	
	I stick to my exercise even I have excessive demands at work	
	I stick to my exercise program when I have household chores to do	
	I set aside time for a physical activity program at least 30 min, three times per week	
Harrison (2008)	In the past 7 days, I did exercise at least 20 minutes that made me sweat and breathe hard such as soccer, running, fast bicycling, aerobic or similar exercise	

*Negative Item

Continue to next page

Source	Question	Scale
Das (2011)	Regular physical activity would help me relieve tension I think I would be too tired to do my daily work after being physically active Regular physical activity would take too much of my time	1 = Strongly Disagree 2 = Disagree 3 = Slightly Disagree 4 = Slightly Agree 5 =Agree 6= Strongly Agree

Table 3.5

Source of Questionnaires for Nutrition Behavior

Source	Question	Scale
Harrison (2008)	I generally eat a healthy diet I am concerned about the quality of my diet I am too busy to eat a healthy diet I eat more snacks now than I did in the past I tend to graze (snack or pick) throughout the day My snacks tend to be cakes, chips, colas, energy bars or drinks or other beverages My snacks tend to be fruits, vegetables, juices, or whole grain foods	1 = Strongly Disagree 2 = Disagree 3 = Slightly Disagree 4 = Slightly Agree 5 =Agree 6= Strongly Agree
Shabana (2007)	I eat three meals every day	
Toress (2011)	Preparing nutritious meals are time consuming	
Chamanifard (2011)	I read the ingredient labels on food products very carefully I concern about obesity	

Continue to next page

Source	Question	Scale
Harrison (2008)	Aware of the calories content of food that I eat	1 = Strongly Disagree 2 = Disagree 3 = Slightly Disagree 4 = Slightly Agree 5 =Agree 6= Strongly Agree
Magno (2010)	Particularly avoid food with a high carbohydrate content (i.e bread, rice, potato etc)	
	Feel extremely guilty after eating	
	Avoid foods with sugar in them	
	I always drink milk	
	Eat diet food	
	*Feel that I can't control what I eat.	
	*Feel uncomfortable after eating sweets	
	Like my stomach to be empty	
Spitzer, Williams &Kroenke (2005).	*Feel that I can't control how much I eat.	

*Negative item

Table 3.6

Source of Questionnaires for Smoking Habit

Source	Question	Scale
Bahrs (2011)	I have smoke everyday	1 = Strongly Disagree 2 = Disagree 3 = Slightly Disagree 4 = Slightly Agree 5 =Agree 6= Strongly Agree
	I always consider smoking a cigarette	
	I use medication to not smoke	
	I have stopped smoking but I thought about returning to smoke again	
Morris (2011)	I have smoke since I was teenager	
	I grow up with a family member who smoked?	
	I have received smoking cessation advice from my health care provider	

Continue to next page

Source	Question	Scale
Morris (2011)	I have a family member who suffered a serious health consequence related to smoking.	1 = Strongly Disagree 2 = Disagree 3 = Slightly Disagree 4 = Slightly Agree 5 =Agree 6= Strongly Agree
Ross (2011)	Smoking around children is okay	
	I currently want to stop smoking	
	I can quit any time I choose	
	I will quit one day in the future	
Das (2011)	Which of the following is best describes your current smoking status	1 = Never smoke 2 = Smoking in the past 3 = 1-2 cigarette per day 4 = 3-5 cigarette per day 5 = 6-10 cigarette per day 6 = More than 10 cigarettes per day

3.6 Reverse-Scored Items and Back Translation

Reversed scoring was done for questionnaires with negative wordings to ensure that a particular score means the same thing on all items. Thus, the scale was changed to the following values: scale 1= scale 6, scale 2 = scale 5, scale 3= scale 4, scale 4 = scale 3, scale 5 = scale 2 and scale 6 = scale 1.The questionnaires with negative wording are shown in table 3.4 and table 3.5.

In terms of back translation, Stansfield and Bowles (2007) mentioned that as found by Marin and Marin (1991), cross-cultural psychologist Richard Brislin was interested in examining the consistency of traits and constructs across cultures. Back translation involves asking a bilingual to translate the original test to the target language and then having a different bilingual translate it back to English. The two English versions are then compared, and points of disagreement

are used to identify problems in the initial translation. The forward translation is then modified accordingly. The process of creating a back translation and comparing it with the source document is repeated until the source document and back translation agrees.

3.7 The Pilot Study

A pilot study was conducted in June 2012. The questionnaires were distributed to 85 respondents in Assembly Services Sdn Bhd. 85 employees were gathered in a room and therefore all the samples were returned to the researcher. This study was conducted to determine whether any modifications needed to be done. Based on the feedback, minor changes were made to improve the clarity of the survey.

3.8 The Data Collection Procedure

The questionnaire functions as an instrument in this research survey. The type of questionnaire used is self-administered questionnaires and the researcher informed the respondents of the voluntary nature of survey and study.

Study approval was gained through the ASSB management prior to data collection. Participants were informed of any possible harm of participation and the data will be kept private, only to be used for the study purposes. The questionnaires provided were equipped with contact information should they require further information about the study or feel the need to talk with someone after completing the survey. Coding the questionnaire using numbers on the header of the questionnaire sheets was done to ease the tracking process. The

researcher was able to assemble some groups of employees, in a room and get them to respond to the questionnaire. By gathering the respondents, it gave the opportunity to the researcher to introduce and briefly explain the research topic to clear any doubts. Immediate clarification was also done towards doubts on the questionnaires and the questionnaires could be completed and collected within a short period of time. Thus with this strategy, it motivated respondents to give honest answers. Another method of distribution and collection of the questionnaires was by giving the questionnaires to the department managers and asking them to distribute the questionnaires to their subordinates. A small gift was given to the respondents as a token of appreciation. With good support from department managers, the researcher managed to obtain a satisfactory number of returned questionnaires.

3.9 Analysis of the Data

The main analytical tests performed were descriptive analysis and parametric test including cross tabulation, correlation, and regression analysis to achieve the research objectives. Data collected from respondents were analyzed using Statistical Package for Social Science (SPSS) software version 19.0. Data was analyzed and interpreted and the results are discussed in the next chapter.

3.9.1 Data Screening

Data was inspected, and erroneous entries were corrected. Data cleaning was done during the stage of data entry. The data was also analyzed for missing values and quality of the data was checked using normality (skewness).

3.9.2 The Reliability of the Instrument

Reliability analysis is important for checking the reliability of the data.

Cronbach alpha coefficient was used to measure the core reliability. The closer the reliability coefficient gets to 1.0, the more reliable the instrument is and George and Mallery (2003) provided the following rules of thumb:"_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and _ < .5 – Unacceptable". The reliability test of the variables in this study was comfortably above 0.8. Thus the scales are satisfactorily reliable for subsequent analysis.

3.9.3 Descriptive Statistics

Relating to descriptive analysis, Zikmund (2000) mentioned that descriptive analysis refers to adjustment of the data according to the survey questions for better understanding and interpretation of data. In descriptive analysis there are three entries : min, median and mod. Data are also checked against data entry error by running descriptive statistic for minimum and maximum.

3.9.4 Hypotheses Testing

i. Pearson Correlation Coefficient

Pearson Correlation Coefficient was used to test the hypothesis. It assists the researcher in determining whether there is a relationship between the dependent variables and independent variables. The result will be significant if the probability value (P Value) is smaller than 0.05 ($p<0.05$). It means that there is a relationship between dependent and independent variable. But if probability value is greater than 0.05 ($P>0.05$), then there is no relationship between the dependent and independent variables.

As mentioned by Sekaran (2000), a Pearson product-moment correlation coefficient describes the relationship between two continuous variables or when researcher is interested in defining the important variables that are associated with the problem.

ii. Multiple Regression Analysis

Multiple regression analysis is done to examine the simultaneous effects of several independent variables on dependent variables. Multiple regression analysis aids in the understanding of how much of the variance in the dependent variables is explained by a set of independent variables (predictors).

3.10 Approval from Certain Organization

An application letter was sent to the ASSB management before the survey was conducted. The questionnaires were attached together with the letter, explaining the purpose of the survey, assuring no risks as well as confidentiality.

3.11 Summary

This chapter explains the operational definition, research methodology, populations, types and design used in the research. The variables and instrument designed for the study are also identified. The population and samples for the research are stated in this chapter including how the items of the questionnaires are sourced. Lastly, the data analysis and process were discussed. Results and discussion of the findings will be discussed in the next chapter.

CHAPTER 4

RESULT AND DISCUSSIONS

4.0 Introduction

This chapter presents the results of the statistical analysis in seven sections. The first section illustrates the overview of the data collected. The second section presents the respondents' demographic profile and the third section explains pilot survey. The fourth section covers the results from reliability of the instrument and the fifth section describes the descriptive statistics. The sixth section presents the hypothesis testing and finally the last section will be a summary discussion of the findings.

4.1 Overview of Data Collection

4.1.1 Number of Return

The numbers of samples distributed for this study are as shown in table 4.1

Table 4.1:

Number of Sample

Item	Quantity (%)
Population of ASSB	2,600
Sample distributed	400
Sample returned	366 (92)
Sample discarded	9 (2)
Sample analyzed	357(89)

Out of 400 distributed questionnaires, 366 were returned which gave a response rate of 92%. 9 (2%) of the questionnaires were discarded due to incomplete data. Thus, a total 357(89%) of respondents sample had been analyzed.

4.1.2 Normality Test

The normality test was conducted before further statistical tests were carried out. Normality test is used to determine whether a data set is well-modeled by a normal distribution or not, or to compute how likely an underlying random variable is to be normally distributed.

Kolmogorov-Smirnov test was used for checking normality. Normality was assessed graphically from histogram, stem-and leaf plot and also normal probability plot. According to Kenney and Keeping (1962), the skewness value provides an indication of departure from symmetry in a distribution. A symmetric distribution has a skewness value of zero. Negative values indicate data that are left skewed and positive values indicate data that are right skewed (cited from Ahad et al., 2010). Miles and Shevlin (2001) also mentioned that kurtosis is a measure of whether the data are peaked or flat relative to a normal distribution (cited from Ahad et al., 2010). As per mentioned by Kline (1998), if the data are non normal, the data shall be transformed.

4.2 Demographic Information

Detailed descriptive statistics of the respondents' demographic characteristics are presented in Table 4.2.The majority of respondents were at the age of 20-30 years old and there were about 90.5% male and 9.5% female comprising of three major ethnic groups of Malaysia: Malay (93.8%), Indian (2,8%) Chinese (2.2%) and others (0.9%). About 46.2% were SPM holders, 20.4% Certificate holders, 17.6% Diploma holders, 11.5% Degree holders, 1.7% SRP holders. Others qualifications include Master degree and PhD. Most of them are either permanent staff (78.7%) or contract staff (21.3%). Job positions of the respondents were those of operator, Team Leader, Group Leader, Clerk, Specialist, Supervisor, Chief Leader, Executive, engineer, Assistant Manager, Manager and General Manager. 34% of the respondents have worked for 6-10 years and 23% have worked for less than 1 year. As for working mode, majority (64.1%) worked in the normal shift, while 35.9% worked in shift work arrangement.

Table 4.2

Demographic Characteristic of the Respondents

Demographic	Categories	Frequency (%)
Gender	Male	323 (90.5)
	Female	34 (9.5)
Age	Below 20 years	27 (7.6)
	20-25 years	93 (26.1)
	26-30 years	101 (28.3)
	31-35 years	66 (18.5)
	36-40years	34 (9.5)
	Above 40 years	36 (10.1)
Race	Malay	335 (93.8)
	Chinese	8 (2.2)
	Indian	10 (2.8)
	Others	4 (0.6)
Designation	General manager	1 (0.3)
	Sr Manager/manager	13 (3.6)
	Asst Manager	10 (2.8)
	Executive/Engineer	38 (10.6)
	Chief Leader	10 (2.8)
	Planner/Supervisor	37 (10.4)
	Specialist	9 (2.5)
	Clerk	6 (1.7)
	Group Leader	4 (1.1)
	Team Leader	35 (9.8)

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Demographic	Categories	Frequency (%)
Designation	Operator	128 (35.9)
	Others	66 (18.5)
Educational	SRP/PMR	6 (1.7)
	SPM	165 (46.2)
	Certificate	73 (20.4)
	Diploma	63 (17.6)
	Degree	41 (11.5)
	Others	9 (2.5)
Shift	Shift	128 (35.9)
	Normal	229 (64.1)
Employment Status	Permanent	281(78.7)
	Temporary	76 (21.3)
Years of Service	Below 1 year	82 (23)
	2-5 years	63(17.6)
	6-10 years	122(34.2)
	11-15 years	44(12.3)
	More than 15 years	46 (12.9)

4.3 The Pilot Survey

The purpose of performing the pilot study was to determine whether or not the respondents understood the items in the instrument. By performing a pilot study, the feasibility of the study was investigated; hence the potential problems could be identified and resolved before commencing with the actual study. The information gained was used to improve the methods or instruments in which the researcher could remove the questions that were considered to be unclear to the participants. The pilot study was conducted based on 85 target respondents at ASSB in the first week of June 2012.

Referring to table 4.3, the Cronbach's Alpha value for all variables are greater than 0.7.

Therefore the reliability of the questionnaires acceptable. This is based on Nunnaly (1978) who has indicated 0.7 to be an acceptable reliability coefficient.

Table 4.3

Cronbach's Alpha Values for Pilot Study

Variables	No of Items	Cronbach's Alpha
Health Status	14	0.868
Physical Activity	16	0.887
Nutrition Behavior	21	0.742
Smoking Habits	12	0.857

4.4 The Reliability of the Final Study Instrument

A reliability test is commonly conducted to determine the stability and consistency of an instrument. Reliability analysis was performed in this study to test whether all the items used to measure the research variables are reliable and can be used to achieve the objective of the study.

Cronbach's Alpha statistic shows the internal reliability of all instruments used in this study as per table 4.4.

Table 4.4

Cronbach's Alpha Values for Actual Study

Variables	No of Items	Cronbach's Alpha
Health Status	14	0.840
Physical Activity	16	0.864
Nutrition Behavior	21	0.815
Smoking Habits	12	0.883

The Cronbach's Alpha value of each variable is illustrated in table 4.4 that is Cronbach's Alpha values for health status is 0.840, Physical Activity is 0.864, Nutrition Behavior is 0.815 and Smoking Habit is 0.883. All values are above 0.70, according to Nunnaly (1978) who has indicated 0.7 to be an acceptable reliability coefficient. Therefore the items used in measuring the variables are considered acceptable.

4.5 Descriptive Statistics

i. Descriptive Statistics of the Study Variables

Mean and standard deviation are techniques used to describe the characteristic of a data set and to compare the results. The mean is the best known measure of central tendency that reveals what sets of measure are like on average. Table 4.5 shows the results of the descriptive analysis.

Table 4.5

Descriptive Statistics of the Study Variables

Variables	Mean	Standard Deviation
Health Status	4.02	0.82
Physical Activity	3.25	0.76
Nutrition Behavior	3.41	0.62
Smoking Habits	2.59	1.21

Table 4.5 highlights the result of the descriptive analysis in terms of means and standard deviations for internal scale variables. The results indicate that overall mean scores fall between the range of 2.59 and 4.02 in which the mean for health

status is 4.02, physical activity 3.25, nutrition behavior is 3.41 and smoking habit is 2.59. It can be interpreted that on average, the respondents agreed with all the items stated.

ii. Gender and Health Status

Table 4.6

Cross Tabulation between Gender and Health Status

	Health Status	
Gender	Disagree	Agree
Male	133(90.2%)	158 (90.7%)
Female	14(9.8%)	2 (9.3%)

Table 4.6 highlights that males believed that their health status rate is a bit lower (133 respondents; 90.2%) as compared to females (14 respondents; 9.8%) i.e. "During the last 4 weeks, I have experienced getting tired very easily"; in which more males agreed on this matter than female.

iii. Age and Physical Activity

Table 4.7

Cross Tabulation between Age and Physical Activity

	Physical Activity	
Age	Disagree	Agree
Below 20 years	2 (7.1%)	1 (9.7%)
20-25 years	20 (25.4%)	6 (29%)
26-30 years	26 (29.5%)	4 (22.6%)
31-35 years	10 (18.3%)	3 (19.4%)
36-40 years	3 (8.5%)	2 (14.5%)
Above 40 years	4 (11.2%)	1 (4.8%)

Table 4.7 highlights that the highest number of respondents who think that they rarely perform physical activity is among the respondents with age below 20 years i.e. "I engage in physical activity on a daily basis".

iv. Age and Nutrition Behavior

Table 4.8
Cross Tabulation between Age and Nutrition Behavior

	Nutrition Behavior	
Age	Disagree	Agree
Below 20 years	2 (7.7%)	1 (6.4%)
20-25 years	21 (25.5%)	5 (29.8%)
26-30 years	24 (27.7%)	5 (31.9%)
31-35 years	11 (18.4%)	2 (19.1%)
36-40 years	3 (9.7%)	1 (8.5%)
Above 40 years	4 (11.0%)	1 (4.3%)

Table 4.8 highlights respondents aged below 20 as the highest number of those who do not consume nutritious food i.e. Disagreeing with the statement "I generally eat a healthy diet".

v. Age and Smoking Habit

Table 4.9
Cross Tabulation between Age and Smoking Habit

Age	Smoking Habit				
	Never Smoke	1-2 Cigarettes/day	3-5 Cigarettes/day	6-10 Cigarettes/day	More Than10 Cigarettes/day
Below20 years	1 (2.9%)	1 (23.5%)	1 (9.3%)	1 (11.1%)	1 (8.6%)
20-25 years	7 (21.9%)	3 (35.3%)	6 (33.3%)	4 (28.9%)	5 (27.6%)
26-30 years	8 (24.1%)	1 (23.5%)	4 (25.9%)	9 (42.2%)	7 (32.8%)
31-35 years	6 (19.7%)	1 (11.8%)	2 (16.7%)	1 (13.3%)	3 (20.7%)
36-40 years	2 (10.9%)	1 (5.9%)	1 (11.1%)	1 (4.4%)	1 (8.6%)
Above 40 years	6 (20.4%)	0 (.0%)	1 (3.7%)	0 (.0%)	1 (1.7%)

Table 4.9 shows that the highest number of those who smoked more than ten cigarettes per day are aged between 26-30 years old (32.8%).

vi. Designation and Smoking Habit

Table 4.10
Cross Tabulation between Designation and Smoking Habit

Designation	Smoking Habit				
	Never Smoke	1-2 Cigarettes/day	3-5 Cigarettes/day	6-10 Cigarettes/day	More Than10 Cigarettes/day
Gen. Mgr	1 (.7%)	0 (.0%)	0 (.0%)	0 (.0%)	0 (.0%)
SrMgr/Mgr	1 (5.8%)	0 (.0%)	1 (3.7%)	0 (.0%)	1 (1.7%)
Asst Mgr	1 (4.4%)	0 (.0%)	0 (.0%)	1 (2.2%)	1 (1.7%)
Exec/Eng	5 (17.5%)	1 (5.9%)	1 (1.9%)	1 (4.4%)	1 (6.9%)
Chief Leader	1 (5.8%)	0 (.0%)	0 (.0%)	0 (.0%)	1 (1.7%)
Plan/Sup	3 (13.9%)	0 (.0%)	1 (7.4%)	1 (8.9%)	1 (6.9%)
Specialist	1 (2.9%)	0 (.0%)	1 (1.9%)	1 (2.2%)	1 (1.7%)
Clerk	1 (3.6%)	0 (.0%)	0 (.0%)	0 (.0%)	0 (.0%)
G. Leader	1 (1.5%)	1 (5.9%)	1 (1.9%)	0 (.0%)	0 (.0%)
T. Leader	1 (5.1%)	0 (.0%)	1 (13.0%)	2 (15.6%)	1 (12.1%)
Operator	9 (25.5%)	4 (47.1%)	10 (42.6%)	9 (44.4%)	14 (48.3%)
Others	3 (13.1%)	3 (41.2%)	5 (27.8%)	3 (22.2%)	3 (19.0%)

Table 4.10 shows that operators are among the highest number of smokers who smoke more than ten cigarettes per day (48.3%).

vii. Frequency Analysis of Health Status

Table 4.11

Frequency Analysis of Health Status

		Frequency	Percent
Being Hospitalized due to Health Problem	Yes	37	10.4
	No	320	89.4
Currently Taking Medication Prescribed by Doctor	Yes	60	16.8
	No	297	83.2

Table 4.11 shows that only 10.4% were hospitalized due to health problems and 16.8% are currently taking medications prescribed by doctors.

4.6 Hypotheses Testing

4.6.1 Correlation

Correlation is executed to test the strength of relationships between variables. It is also used to examine the potential issue of multicollinearity that exists when two explanatory variables are highly correlated.

i. Relationship between Physical Activities and Health Status.

The first hypothesis (HA1) stated that there is a relationship between physical activities and health status.

Table 4.12

Correlations between Physical Activities and Health Status

Health Status	Physical Activity
Pearson Correlation	-.201**
Sig. (2-tailed)	.000

**. Correlation is significant at the 0.01 level (2-tailed).

From Table 4.12, it shows that there is a negative correlation between physical activity and health status, where r = -0.201, n = 357, p < 0.000. Thus, the alternative hypothesis is accepted. Overall, there is a low negative relationship between physical activity and health status (20.1%).

ii. Relationship between Nutrition Behavior and Health Status.

The second hypothesis (HA2) states that there is a relationship between nutrition behavior and health status.

Table 4.13

Correlations between Nutrition Behavior and Health Status

Health Status	Nutrition Behavior
Pearson Correlation	-.378**
Sig. (2-tailed)	.000

**. Correlation is significant at the 0.01 level (2-tailed).

From Table 4.13, it shows that there is a negative correlation between nutrition behavior and health status, where r = -0.378, n = 357, p < 0.000. Thus, the

alternative hypothesis is accepted. Overall, there is a low negative relationship between nutrition behavior and health status (37.8%).

iii. Relationship between Smoking Habit and Health Status.

The third hypothesis (HA3) states that there is a relationship between smoking habit and health status.

Table 4.14

Correlations between Smoking Habit and Health Status

Health Status	Smoking Habits
Pearson Correlation	-.294**
Sig. (2-tailed)	.000

**. Correlation is significant at the 0.01 level (2-tailed).

From Table 4.14, it shows that there is a negative correlation between smoking habit and health status, where $r = -0.294$, $n = 357$, $p < 0.000$. Thus, the alternative hypothesis is accepted. Overall, there is a low negative relationship between smoking habit and health status (29.4%).

4.6.2 Regression Analysis

Multiple regression was used to assess the ability of three variables (physical activity, nutrition behavior and smoking habit) to predict the level of health status.

Table 4.15

Regression Analysis

Model	Unstandardized Coefficients Beta	Standardized Coefficients Beta	t	Sig.
(Constant)	6.090		25.681	.000
Physical Activity	-.025	-.023	-.420	.674
Nutrition Behavior	-.451	-.339	-6.162	.000
Smoking Habits	-.175	-.257	-5.400	.000
Note :	R Square = 0.208	F = 30.957	Sig = 0.000	

Physical activity, nutrition behavior, and smoking habit will influence health status.

Multiple regression analysis was used to evaluate the effects of independent variables (physical activity, nutrition behavior, and smoking habit) on dependent variable (health status). As depicted in Table 4.15, the regression results revealed an R square value of 0.208. This indicates that 20.8 percent of variance that explained the dependent variable (health status) was accounted for by the independent variables (physical activity, nutrition behavior, and smoking habit) where the F value = 30.957 at $p < 0.000$. Further, of the three dimensions (independent variables), only nutrition behavior ($\beta = -6.162$, $p < 0.000$), and smoking habit ($\beta = -5.400$, $p < 0.000$) were significant predictors of health status.

Thus, the alternative hypothesis was accepted for nutrition behavior and smoking habit while null hypothesis had to be accepted for physical activity.

4.6.3 Summary Result of Hypothesis Testing

The summary of the hypothesis test are displayed in the table 4.16. From the analysis of the study, it is summarized that all of the developed hypothesis can be accepted when the 'p' value is less than 0.01.

Table 4.16

Summary of the Hypothesis Test

	Hypothesis	Outcomes
HA1	There is a relationship between Physical Activity and Health Status.	Accepted
HA2	There is a relationship between Nutrition Behavior and Health Status.	Accepted
HA3	There is a relationship between Smoking Habit and Health Status.	Accepted
HA4	All the Independent Variables (physical activity, nutrition behavior and smoking habit) influence Health Status.	Rejected (Physical Activity) Accepted (Nutrition Behavior) Accepted (Smoking Habit)

4.7 Discussion of Findings

4.7.1 Hypotheses Testing Results

The discussion of this study was based on the research objective developed as well as literature review that had been mentioned in the previous chapter.

i. Relationship between Regular Physical Activity and Health Status.

The research objective for this testing was "to examine any significant relationship between physical activity and health status". From this study, there was a low negative correlation between physical activity and health status. Thus this showed that even though there is lack of reasonable quantity of daily physical activity but it still does not significantly relate with the respondents' health statuses. From this study, 75% of the respondents were operational level employees whereas 25% were managerial level of employees. 80.5% of respondents are between the ages of 20 until 35years old.

From previous study by Hobson (2006) reported that there were indisputable facts that physical activity reduces the risk of range of diseases such as heart problems, cancer, osteoporosis, depression, high blood pressure, diabetes and obesity. The same author also mentioned that physical activity simulates the release of cholesterol balancing enzyme, increase good cholesterol and reduce bad, artery clogging cholesterol. This is supported by the U.S. Department of Health and Human Services (2008) who stated that regular physical activity reduces the risk of many adverse health outcomes and provides many health benefits.

Thus, this study is consistent with studies by them where there is relationship between physical activity and health status. Meanwhile this study differ with studies by Hobson (2006) and U.S. Department of Health and Human Services (2008) in term of correlation between physical activity and health status where studies by Hobson (2006) and U.S. Department of Health and Human Services (2008) found that positive correlation between physical activity and health status.

In addition, only 20% of ASSB's processes are in automated mode whereas 80% of the processes are manual operations. For example processes such as to take out parts from complete knock down (CKD) and local parts from boxes or cases, arrangement of the parts to trolleys, assembly line process, rectification task and many other processes are fully manual operations. These processes require extensive physical movements. Only a portion of the welding and painting processes are equipped with robotic operations. Furthermore, the operational area is in a non air-conditioning environment, resulting in frequent sweating and this condition might be one of the factors they perform less physical activities. On the other hand, referring to the definition of physical activity as explained in chapter 3, the term of physical activity is explained by Norris-Ellis (2011) and the World Health Organization (n.d), as any bodily movement produced by the contraction of skeletal muscles that increases energy expenditure above basal level and defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure and physical activity generally refers to bodily movement that enhances health. Referring to those definitions and based on the

nature of their work which is manual handling, we could classify their task as performing physical activity as well.

Further to this, it is recommended 30 minutes reasonable quantity of daily physical activity as reported by Miles (2007), the recommendation for adults is to have a total of 30 minutes of daily physical activity for 5 or more days a week and Hobson (2006) also mentioned that physical activity in fairly small amount of time, will provide huge benefits. In ASSB case, operation hours is more than six hours per shift, hence this could be considered much more sufficient than recommended time for physical activity.

ii. Relationship between Nutrition Behavior and Health Status.

The research objective for this testing was "to examine any significant relationship between nutrition behavior with their health status". The result of hypotheses testing revealed that there is in fact a negative relationship between dependent variable and independent variables for nutrition behavior with health status in which nutrition behavior contributes to the highest mean of 37.8%. This clearly shows that even though respondent have good nutrition behavior, it does not reflect the employees' health status.

From the previous review of literature by Houghton, Neck and Cooper (2009), mentioned that the role of a healthy diet is to reduce the intake of unhealthy fats (e.g. saturated fat and trans fat) and cholesterol. Thus, this study is consistent with study by Houghton, Neck and Cooper (2009) where there is relationship between nutrition behavior and health status. Meanwhile this study differs from Houghton,

Neck and Cooper (2009) in term of correlation between nutrition behavior and health status where they found that positive correlation between nutrition behavior and health status.

Besides that, other studies found that good health status is combination of good physical activity and nutrition behavior for example research studies by Hobson (2006) and Norris-Ellis (2011) highlighted that combining physical activity and good nutritional behavior can reduce the risks of diseases.

In addition, Norris-Ellis (2011) also mentioned that as stated by CDC (2009), unhealthy eating habits and lack of physical activity combined accounted for more than 300000 deaths in US adults.

This could be explained by the fact that ASSB management employees are entitled for periodical medical checkups, hence they are aware their health statuses. On the other hand, operational employees are not entitled for periodical medical checkup and responded on their health status based on their own initiatives. In addition, from this study 75% of respondents are from operational level employees and most of them are at age 20 until 35years old which most of them might not know their actual health status since according to National Heart Association of Malaysia (2008) mentioned that most disease will usually first detected between age of 35 and 50.

In reality, employees could be contracting illness or disease, but the symptoms are not visible due to their age

iii. Relationship between Smoking Habit and Health Status.

The research objective for this testing was "to examine any significant relationship between workers with smoking habit and workers health status". This study found that there is a negative relationship between smoking habit and health status.

As compared to previous studies conducted by Morris (2011) mentioned that smoking is the main cause of avoidable death and morbidity in the United States and according to Harder (2012), as mentioned by Warner, Hodgson and Carroll (1999), indicated that tobacco-related disease cost regularly contributed for 6-8% ($8.2-50 billion) of American personal medical expenditures between 1975 and 1993 (after adjusting for inflation). Furthermore, research by Peto et al. (2000) reported that the cumulative risk of death from lung cancer by age 75 (in the absence of other causes of death) rose from 6% at 1950 rates to 16% at 1990 rates in male cigarette smokers, and from 1% to 10% in female cigarette smokers. Among both men and women in 1990, however, the former smokers had only a fraction of the lung cancer rate of continuing smokers, and this fraction fell steeply with time since stopping.

Further reported by Peto et al. (2000), for men who stopped smoking at ages 60, 50, 40, and 30 the cumulative risks of lung cancer by age 75 were 10%, 6%, 3%, and 2%. In addition, people who stop smoking, even well into middle age, avoid most of their subsequent risk of lung cancer, and stopping before middle age avoids more than 90% of the risk attributable to tobacco.

Thus, this study is consistent with studies by Morris (2011), Harder (2012) and Peto et al.(2000), where there is relationship between smoking habit and health status and this study is also consistent with studies by Morris (2011) ,Harder (2012) and Peto et al.(2000), in term of correlation between smoking habit and health status where they found that negative correlation between smoking habit and health status.

Meanwhile, smoking is an addiction that is hard to break and all members of society need to be convinced that smoking is medically hazardous. This will make everyone understand that smoking is a noxious and dangerous habit. In relation to that, many anti smoking awareness campaign conducted by government of Malaysia is very important to reduce smoking related disease. For example, 'Tak Nak Merokok', raising tobacco price, banning the smoking of all tobacco products in public and using scare tactics such as printing of graphic pictures on cigarette packets. This supported by Peto et al. (2000) revealed that the ratio of the risk of lung cancer in those who have stopped smoking to that in continuing smokers gets progressively lower as the time since cessation gets longer, although it never gets quite as low as in lifelong non-smokers.

A successful national endeavor is best achieved when the private sector works hand-in-hand with government.

iv. **Physical Activity, Nutrition Behavior and Smoking Habit Influence the Health Status of the Respondents.**

The research objective for this testing was "to examine whether independent variables (regular physical activity, nutrition behavior and smoking habit) influence the health status of the respondents". From this study, multiple regression analysis results indicate that physical activity does not influence health status, whereas nutrition behavior and smoking habit do influence the respondents' health status.

Previous research by the Department of Health (2000) mentioned that Department of Health (2000) reported that two out of three UK deaths are related to cancer and circulatory diseases and two main causes of those diseases are smoking habit and poor nutrition behavior and this is further supported by Lambert, Dibsdall and Frewer (2002), reported that quitting smoking and improving consumption of fruits and vegetables are the top two public health focus for present government action to lower cases of cancer and heart disease.

Thus this study is consistent with studies by Department of Health (2000) and Lambert, Dibsdall and Frewer (2002) where nutrition behavior and smoking habit have been found to influence health status.

Meanwhile other studies found that all three independent variables are influence health status. For example studies by World Health Organization (2003) concluded that unhealthy diets, physical inactivity and smoking are confirmed risk behaviors for chronic diseases. There is also evidence on the importance of

promoting physical activity for cancer survivorship was carried out in New Zealand and reported by Keogh and Jones (2011), projections suggest that New Zealand will have over 22,000 new cancer cases in 2011, a substantial increase from the 15,000 cases reported in 2005.This increased number of new cancer cases may reflect the ageing of the population, insufficient levels of physical activity, poor dietary choices, other unhealthy lifestyle choices such as smoking as well as improvements in cancer detection.

Even though this study showed that the physical activity does not influence health status, but as per highlighted before based on the nature of their work which is manual handling, we could classify them as performing physical activity as well. People's food choices and dietary intake which rise of poor nutrition behavior. From the previous review of literature by Satia, Galanko and Siega-Riz (2004) said that Nielsen, Siega-Ri and Popkin (2002) and Nielson and Popkin (2003) mentioned that a number of environmental factors encourage over-consumption including the easy availability of fast-food establishments, the wide variety of inexpensive energy-dense foods and the large portion sizes of these foods.

Thus, due to ASSB is located in a centre of Shah Alam, Selangor, in which easily accessible to nearby food restaurant with variety of food choices including fast food, this may influence health status of employees. In term of physical activity, as highlighted before, the nature of their work which are manual handling and working in non air-conditioning environment, resulting in frequent sweating and this condition might be one of the factors they perform less physical activities.

4.8 Conclusion

This chapter describes the demographic characteristic of 357 respondents and the results of correlation and regression analysis. The results indicated that only nutrition behavior and smoking habit have significant influence on the health status. Among these variables, nutrition behavior is the strongest contribution to explain the health status.

The result of the study revealed that from independence variables only nutrition behavior and smoking habit have significant impacts towards employees' health status whereas the physical activity does not have any significant to employee's health status.

The research conclusion and recommendation are discussed in Chapter 5.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The conclusion is discussed in this final chapter. It includes the limitation of the study, suggestion for future research, recommendation and conclusion.

5.1 Summary of Key Findings

The summaries of key findings are as follows.

The first hypothesis (HA1) stated that there is a relationship between physical activities and health status. The result of this study showed there was low negative relationship between physical activity and health status, therefore alternative hypotheses is accepted.

The second hypothesis (HA2) stated that there is a relationship between nutrition behavior and health status. This study revealed that there was low negative relationship between nutrition behavior and health status, thus alternative hypotheses is accepted.

The third hypothesis (HA3) stated that there is a relationship between smoking habit and health status. This study found that there was low negative relationship between smoking habit and health status, thus alternative hypotheses is accepted.

The fourth hypothesis stated that physical activity, nutrition behavior, and smoking habit will influence health status. The result of this study showed that physical activity does not influence health status whereas nutrition behavior and smoking habit do influence health status. Thus, null hypotheses had to be accepted for physical activity and alternative hypotheses were accepted for nutrition behavior and smoking habit.

5.2 Limitations and Future Research Directions

There are some limitations in this study and this section explains the limitation and suggestion for future research

5.2.1 Limitations

There are several limitations to the study. Firstly, the study conducted was confined to ASSB employees only. Therefore it reflected only the response of employees in the area. Secondly, some of the factors were excluded from theoretical framework for example sleeping pattern, ergonomic and other potential variables. The inclusion of such factors could have made the study more meaningful. Finally, operational employees are not entitled for periodical medical checkup, therefore during this study; they responded their health status based on their own initiative assessment.

5.2.2 Suggestions for Future Research

Future research also should be geared towards a relative study of other areas or elements which could contribute to health status.

Firstly, this study was restricted to employees in ASSB as one of automotive assembly plant of Toyota. It would be beneficial for future research expansion to other Toyota subsidiaries. Employees' health status will also help the organizations to improve their lifestyle and productivity. Hence, the study will give benefit to the organization as a whole.

Secondly, ASSB employees are working in shifts and therefore it is vital to study the relationship between health status and sleeping patterns.

Finally, since 80% of production process in ASSB that involves manual handling, future research may consider ergonomic study for operational employees to reduce risk development of Work Related Musculoskeletal Disorder (WMSD).

5.3 Recommendations

Based on literature review, the summary and conclusions from the study, the following recommendations are put forward:

i. Improve Health Awareness

The researcher suggests that ASSB should focus on improving employees' awareness on health especially for operational employees since they are not entitled for the company's periodical health check. Frequent health campaigns should be organized and held within the organization in order to increase employees' health awareness. Therefore it could enhance their knowledge on the

importance of adopting healthy life styles and educate them with the importance of starting living in healthy life styles from a young age. This can be done in collaboration with government bodies, NGOs, medical clinics and other corporations. The activities may include talks, video presentations on health awareness, health screening, exhibitions on disease awareness/information, health consultations by expert.

ii. Encourage Physical Activity and Good Nutrition

As discussed previously, previously, combining physical activity with good nutrition can reduce the highlighted risks of diseases. Therefore the researcher suggests ASSB to encourage employees to get actively involved in physical activities and being aware of good nutritional intake. Education on the importance of both physical activities and good nutrition behavior should be stressed. The ASSB management should encourage their employees to utilize the gymnasium and sports facilities which ASSB are currently renting from the Shah Alam municipal council.

Furthermore, ASSB shall establish canteen policy in which the policy is a formal document developed by the canteen committee and endorsed by the ASSB top management. The canteen policy sets out the objectives of the canteen and guidelines for its operation within ASSB premise. The policy is both for ASSB and canteen operators as it details out the common objective of nutritional food intake.

The ASSB canteen should also sell more nutritious food such as low fat food instead of oily or coconut milk based food. In order to allow employees to

determine their calorie intake, the canteen committee should take the initiative to display nutrition educational posters and calorie count of the dishes being sold. As part of the process of ensuring basic hygiene standards, to ensure the food served is safe and to avoid food poisoning incidents, food hygiene inspections should be conducted.

The canteen committee is responsible for monitoring the operations of the canteen and implementing and reviewing the canteen policy. They will also be responsible for specific decisions as specified in the canteen policy, such as employing staff, authorizing major purchases, or authorizing changes in the menu.

ASSB Mart also should reduce selling junk food.

iii. Encourage Smoking Cessation

From this study, 48.7% of respondents are smokers and 16.2% smoke more than ten cigarettes per day, therefore researcher strongly suggests that ASSB to channel more effort to encourage smoking cessation.

5.3.1 Action Plan Proposal

Below is the action plan proposal for ASSB to enhance their employees' health status.

Table 5.1

Action Plan Proposal

No	Item	Activity	Person in Charge	Target
1	Proposal and approval of activities' plan.	Concept paper presentation to top management. • Stress the objective and benefit to company.	Safety & Health department	First quarter
2	Working committee formation	Appointment letter by top management.	Safety & Health department	First quarter
3	Health awareness	3.1 Plant wide health campaign. Stage 1- health talks and video presentation on physical activity, nutrition behavior and smoking habit. Stage 2 – Health screening. Stage 3 – Exhibition on diseases. Stage 4 – Consultation by expertise.	Working committee	First and second quarter
		3.2 Health campaign for employee and family. Incorporate family day activity with healthy life style promotion.	Working committee and family day committee	Family day yearly schedule
4	Physical activity	Encourage employees to actively involved in physical activity. a. Utilize company gymnasium and sport facilities.	Human Resource department	Second quarter

Continue to next page

No	Item	Activity	Person in Charge	Target
4	Nutrition behavior	Establish canteen policy Review food selling in ASSB canteen and mart. a. Propose to sell healthy food. b. Hygiene inspection and enforcement activity. c. Display nutrition educational poster. d. Display calories amount for all dishes of food being sold at canteen.	Working committee and canteen committee	Third quarter
5	Smoking habit	Smoking cessation program.	Working committee	Fourth quarter

5.4 Conclusion

The study was designed to determine whether physical activity, nutrition behavior and smoking habit will influence employees' health status.

The findings found that combining physical activity and good nutrition behavior will improve human health status. Hence, the management team should take these aspects into serious consideration by finding ways to improve employees' health especially on wellness program. This is done in order to enhance knowledge related to health consequences on unhealthy lifestyle and to create a true culture of health. It is crucial to stay healthy since healthy workers improve productivity, reduction of medical related absenteeism, lower healthcare costs, decrease in workers compensation cost, improve employees relation and morale.

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