A COMPUTATIONAL MODEL TO SIMULATE TEMPORAL DYNAMICS IN CHRONIC FATIGUE SYNDROME

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ABSTRACT

People who are exposed to chronic fatigue have the risk of developing physiological and psychological problems. Hence, it is essential to comprehend the development of chronic fatigue in order to support the persons with such risk. The main objective of the study was to develop a computational model for temporal dynamic change during chronic fatigue. The methodology that was used to explore human cognitive processes in chronic fatigue consisted of four phases: identification of local and non-local dynamic properties, formalization of local and non-local dynamic properties, simulation, and evaluation. This kind of model brings benefits to psychologists in terms of acquiring more insight pertaining to chronic fatigue by simulating multiple conditions on digital environments. The factors that were identified to have direct/ indirect influence on chronic fatigue syndrome were negative personality factors, periodic over-activity, low job control, psychological stressors, physiological stressors, viral infection, mental load, emotional demand, work demand, short term stress, long term stress, viral susceptibility, immune system production, immune response, short term resistance level, long term resistance level, short term exhaustion, long term exhaustion, short term fatigue, long term fatigue, and chronic fatigue syndrome. The factors were used to construct the computational model. The model was simulated by applying it to five different scenarios, healthy person (scenario #1), moderate person (scenario #2), high risk individual (scenario #3), person with lack of planning (scenario #4), and embattled personality (scenario #5). The computational model was verified using mathematical analysis. Results showed that the computational model was able to show the effect of CFS to different types of scenarios.

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HOUZIFA M.SALAHDEEN HINTAYA

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List of Abbreviations

CFS	Chronic Fatigue Syndrome
ME	Myalgic Encephalomyelitis
CDC	Centre for Disease Control
CBT	Cognitive Behavioural Therapy
GET	Graded Exercise Therapy
F&S	Fatigue and Somatic
REBT	Rational Emotive Behavioural Therapy
IO&NS	Inflammatory, Oxidative and Nitrosative Stress

CHAPTER ONE
INTRODUCTION

This chapter briefly explains the study background, problem statement, objectives, significance and scope of the study.

1.1 Background of the Study

In recent years, an increasing amount of research has focused on the issue of chronic fatigue and chronic fatigue syndrome (CFS) (Kato et al., 2006). In organizational, chronic fatigue has been implicated in poor performance (Rose et al., 1994) and people's behaviours (Arnold et al., 1991). CFS is one of many descriptions of an illness known in the United Kingdom as "Myalgic Encephalomyelitis (ME)", or in the United States as "chronic fatigue and immune deficiency syndrome" (Wessely, 1997). CFS probably appeared during the middle of the 19th century, although some argue that similar illnesses were described as early as the 17th century. (Evengaerd et al., 1999).

Chronic fatigue is a widespread phenomenon which recognized as a serious symptom of different chronic illness that can significantly impair a person's functioning and decreases the life quality as well as workplace productivity (Bombardier et al., 1996). It is characterized by a wide range of cognitive, physiological, neurological, and emotional symptoms that last over time. Fatigue is one of the most common problems faced in modern life by men, women, as well as children. It is very well-known in the communities and regular complaint in primary care clinics including acute and chronic

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