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## Fatigue as a mediator of the relationship between quality of life and mental health problems in hospital nurses

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### ABSTRACT

The aims of this study were to investigate the relationships among quality of life (QoL), mental health problems and fatigue among hospital nurses, and to test whether fatigue and its multiple dimensions would mediate the effect of QoL on mental health problems. Data were collected using questionnaires (including the World Health Organization Quality of Life-BREF [WHOQOL-BREF], General Health Questionnaire [GHQ-12] and Multidimensional Fatigue Inventory [MFI-20]) for evaluation of QoL, mental health problems and fatigue, respectively) from 990 Iranian hospital nurses, and analysed by generalized structural equation modelling (GSEM). The results indicated that QoL, mental health problems and fatigue were interrelated, and supported the direct and indirect (through fatigue) effects of QoL on mental health problems. All domains of the WHOQOL-BREF, and particularly physical (sleep problems), psychological (negative feelings) and environmental health (leisure activities) domains, were strongly related to the mental health status of the studied nurses. Fatigue and its multiple dimensions partially mediated the relationship between QoL and mental health problems. The results highlighted the importance of physical, psychological and environmental aspects of QoL and suggested the need for potential interventions to improve fatigue (particularly physical fatigue along with mental fatigue) and consequently mental health status of this working population. The findings have possible implications for nurses' health and patient safety outcomes.

### 1. Introduction

In almost all countries, nurses constitute the largest group of health care professionals. Working in a hospital or clinical setting, as a stressful environment, may impose a high level of physical and mental demands on this working population (Suzuki et al., 2004; Tzeng et al., 2009; Dianat et al., 2013; Suzuki et al., 2004). There is evidence that mental health problems are fairly common among nurses (Suzuki et al., 2004; Su et al., 2009), which may be attributed to working in mentally stressful work settings (e.g. direct contact with patients, role in quality of care, documented nurse shortages in health care settings, etc.) and to the need for developing new skills to cope with advances in medical care and technology (Suzuki et al., 2004; Parhizi et al., 2013).

Study on the quality of life (QoL) of health care workers in hospitals is also of particular interest. The World Health Organization Quality of Life Group (WHOQOL) defines QoL as: "individuals' perceptions of their

position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (Group, 1998). According to this definition, the QoL is a complex concept that includes physical and psychological health, emotional well-being, and social functioning. From an occupational point of view, the QoL is important because it is almost impossible to consider living and working conditions as two separate concepts. This means that there may be multi-dimensional interactions between the living and working conditions that influence the health and well-being of the employees. This problem seems to be worsening with the increasing working demands in modern complex working systems. Additionally, the International Ergonomics Association (IEA) declares its mission as follows: "to elaborate and advance ergonomics science and practice, and to expand its scope of application and contribution to society to improve the quality of life". Thus, as it has been acknowledged, we need to improve our understanding of QoL to better

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determine what it is we are trying to improve, or even to optimise, as a profession (Hancock and Drury, 2011). Some investigators have evaluated the associations of QoL with work ability (Sørensen et al., 2008), occupational stress (Hamaideh, 2011) and mental health problems (Tzeng et al., 2009) among different occupational groups including nurses.

Previous studies suggest that compared to other health care professionals, nurses may suffer from a higher level of fatigue (Hooper et al., 2010; Yoder, 2010; Geiger-Brown et al., 2012; Raftopoulos et al., 2012). Although there is no accepted definition of fatigue because of its complexity and multidimensional nature, fatigue is considered to be related to several physiological, psychological and behavioral processes in response to excessive demands with inadequate recovery (Aronson et al., 1999; Shen et al., 2006). Occupational fatigue, including fatigue in nursing work, is frequently defined as a multidimensional construct and includes mental, physical and total fatigue (Barker and Nussbaum, 2011; Parhizi et al., 2013). A recent study in the United States suggests that hospital nurses may be exposed to higher levels of mental than physical fatigue (Barker and Nussbaum, 2011). Evidence suggests that fatigue has a significant impact on nurses' safety and health, performance, stress, absenteeism, burnout and job satisfaction (Bing Yip, 2001; Josten and Thierry, 2003; Garrett 2008; Parhizi et al., 2013). Fatigue in this working group has serious implications for patients' safety and health care quality (Gaba and Howard, 2002). Thus, better understanding of fatigue and its multiple dimensions and possible adverse consequences of high work demands of the nursing job is a valuable tool to develop guidelines and recommendations for improving the working conditions of nurses.

The occupation group of hospital nurses has a major impact on quality of care and patient safety. There is a lack of evidence in the literature concerning the relationships between QoL, mental health problems and fatigue among this working group. While earlier studies on mental health problems and fatigue have mostly focused on evaluation of the effects of organizational and job-related factors, little information is available on the relationship between these parameters and life outside work. In one of the few attempts to address this issue, Tzeng et al. (2009) evaluated the mental health status and QoL of health care workers in military hospitals in Taiwan and reported that mental health problems were associated with physical health domain of QoL in the studied workers in that environment. However, not much attention has been paid to the mediating role of fatigue and its multiple dimensions regarding the relationship between QoL and mental health problems. The findings from research in this area will help to better understand the role of aspects of life outside work as well as the impact of fatigue on mental health status of hospital nurses, which have significant implications for nurses' health and well-being and for patient outcomes.

### 1.1. Conceptual model

To examine the prediction that fatigue and its multiple dimensions would mediate the relationship between QoL and mental health problems, mediation model was tested with WHOQOL as the independent variable, GHQ-12 as the dependent variable, and MFI-20 as the mediator. A graphic presentation of this model is illustrated in Fig. 1. Mediation refers to a statistical method used to examine whether the relationship between an independent variable (e.g. QoL) and a dependent variable (e.g. mental health problems) is caused by a mediating variable (e.g. fatigue) (Baron and Kenny, 1986). For this, the independent variable should significantly predict both the dependent (path a) and mediator (path b) variables. The mediator should also significantly predict the dependent variable (path c). A fully mediated effect occurs when the relationship between the independent and dependent variables becomes null after controlling for the mediator (path á). If the path á is less significant than the path a, but still significantly different from zero (e.g. when the *p*-value is still < .05), the

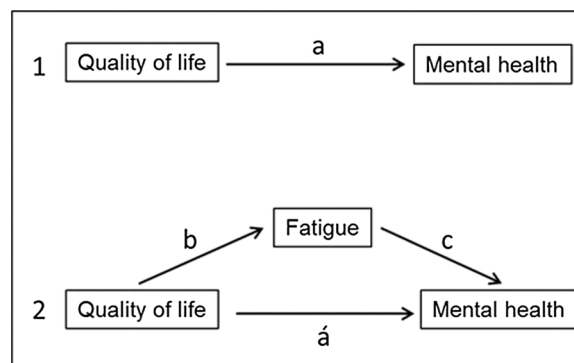


Fig. 1. Graphic representation of fatigue mediating the relationship between quality of life and mental health. Note: 1 shows the theoretical relationship between quality of life and mental health, while 2 shows the theoretical model where fatigue mediates the relationship between quality of life and mental health.

relationship is partially mediated (Preacher and Hayes, 2004, 2008). In other words, a fully mediated relationship occurs when the influence of the independent variable is fully transmitted via the mediator, while a partially mediated relationship occurs when the influence of the independent variable is transmitted both by a direct pathway (direct effect) and via the mediator variable (indirect effect).

### 1.2. Rationale

Based on the above mentioned background, this study was conducted to: 1) investigate the relationships among QoL, mental health problems and fatigue among a sample of hospital nurses in Iran, and 2) test whether fatigue and its multiple dimensions would mediate the effect of QoL on mental health problems. Fatigue was proposed to be the mechanism through which QoL would affect mental health problems, thus acting as the mediating variable.

## 2. Materials and methods

### 2.1. Study design, procedure and sample

This cross-sectional analytical study was conducted in seven large hospitals in Tehran, Iran. A questionnaire was used to collect data on demographic and job details as well as QoL, mental health status and fatigue in hospital nurses. All nurses working at least for one year with no physical disabilities or mental diseases, as determined by self-report, were asked to participate in the study. A total of 1450 questionnaires were distributed among eligible nurses, of which 990 (response rate = 68.2%) declared their agreement by completing and returning the questionnaires. The whole questionnaire took about 25 min to complete. The ethics committee of the Tabriz University of Medical Sciences reviewed and approved the study protocol. Each participating nurse signed a written informed consent form prior to the study.

### 2.2. Outcome measurements

Mental health status was assessed using the 12-item General Health Questionnaire (GHQ-12), which is a valid and widely used screening instrument for predicting mental distress (Goldberg and Williams, 1988). Each item was rated on a scale (less than usual = 0, no more than usual = 0, rather more than usual = 1, or much more than usual = 1), and the total score ranged from 0 to 12. The threshold for cases classification (e.g. poor mental health) used in this present study was GHQ score of 4 or higher (Suzuki et al., 2004). The Farsi (Iranian language) version of the GHQ-12, with an established validity and reliability (Montazeri et al., 2003), was used in this study.

The demographic details including the participant's age, gender,

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