

From DEPARTMENT OF NEUROBIOLOGY, CARE SCIENCES AND SOCIETY

Karolinska Institutet, Stockholm, Sweden

**OCCUPATIONAL HEALTH  
AMONG IRANIAN NURSING  
PERSONNEL**

Narges Arsalani



**Karolinska  
Institutet**

Stockholm 2012

All previously published papers were reproduced with permission from the publisher.

Published by Karolinska Institutet. Printed by Universitetsservice US-A

© Narges Arsalani, 2012  
ISBN 978-91-7457-647-4

## ABSTRACT

**Background:** There is increasing global evidence that today's work environment results in a higher risk of adverse health among nursing staff than among many other professions. Since nurses constitute the largest group in the healthcare workforce and have a crucial role in providing care services, their impaired health might have an adverse effect on the quality of healthcare. The overall aim of this thesis was to explore work-related health and associated factors. A further aim was to describe the experience of managing work and family roles among Iranian nursing personnel.

**Methods:** The first of the four studies in this thesis used a qualitative method and the other three used a quantitative method. **Study I** focused on the process of managing work and family roles in the everyday life of Iranian female nurses. In **Study II** a questionnaire was culturally adapted and psychometrically evaluated in Persian, based on well-established instruments to measure work-related health, working conditions and family situation in the healthcare sector. This newly adapted questionnaire was then used in a cross-sectional study (**Studies III-IV**) among 520 nursing personnel from ten university hospitals to measure self-reported general and mental health and musculoskeletal disorders, and investigates how this was associated with organizational, physical and psychosocial working conditions and family situation.

**Findings:** The findings of **Study I** showed that nurses were striving for balance between work and family roles. In **Study II** the conceptual structure of the adapted questionnaire in Persian was found to be acceptable for measuring work-related health and associated factors. The results of **Studies III-IV** indicated an inadequate and low quality of manual patient transferring devices, as well as perceived over-exertion. The participants reported low influence at work, poor leadership and job dissatisfaction, along with inflexible work schedules. These physical, psychosocial and organizational work factors were associated with general and mental health, and with musculoskeletal disorders. However, nursing personnel perceived patient care as meaningful, and no associations between family demands and mental health were reported.

**Conclusion:** Iranian nurses' attempts to balance their demanding work role and high traditional family expectations, could lead to threatened health and life dissatisfaction.

Although adverse general and mental health and musculoskeletal disorders were associated with most of the working conditions; patient care was found to be meaningful, and family values were perceived as an important source of support and inspiration. Interventions such as flexible work schedules, and improvements in the physical and psychosocial work situation, along with the provision of child care and elderly care during shift work, would help nurses to play their work and family roles, which could lead to increased work efficacy and quality of healthcare.

**Key words:** General health, mental health, musculoskeletal disorders, working conditions, work-family roles, nurse, Iran

Narges Aarsalani

ISBN 978-91-7457-647-4

## LIST OF PUBLICATIONS

- I- Lagerström, M., Josephson, M., Arsalani, N., & Fallahi-Khoshknab, M. (2010). Striving for balance between family and work demands among Iranian nurses. *Nursing Science Quarterly*, 23(2), 166-172.
- II- Arsalani, N., Fallahi-Khoshknab, M., Ghaffari, M., Josephson, M., & Lagerström, M. (2011). Adaptation of questionnaire measuring working conditions and health problems Among Iranian Nursing Personnel. *Asian Nursing Research*, 5(3), 177-182.
- III- Arsalani, N., Fallahi-Khoshknab, M., Josephson, M., & Lagerström, M. (2012). Iranian nursing staff's self-reported general and mental health related to working conditions and family situation. *International Nursing Review* (In press).
- IV- Arsalani, N., Fallahi-Khoshknab, M., Josephson, M., & Lagerström, M. Musculoskeletal disorders and working conditions among Iranian nursing personnel (Submitted).

The papers will be referred to in the text by their roman numerals I-IV

# CONTENTS

1	<b>INTRODUCTION</b> .....	1
2	<b>BACKGROUND</b> .....	3
	2.1 Health.....	3
	2.1.1 Concept of health	
	2.1.2 Occupational health in healthcare worker	
	2.1.3 Self-rated general health and mental health	
	2.1.4 Musculoskeletal disorders	
	2.2 Working conditions .....	10
	2.2.1 Organizational factors	
	2.2.2 Physical working conditions	
	2.2.3 Psychosocial working conditions	
	2.3 Personal factors and family situation.....	13
	2.4 Iran, the context of this study.....	16
	2.4.1 Healthcare system	
	2.4.2 Health insurance organizations	
	2.4.3 Occupational health services	
	2.4.4 Nursing profession	
3	<b>RESEARCH AIMS</b> .....	24
	3.1 General aim .....	24
	3.2 Specific aims .....	24
4	<b>METHODS</b> .....	25
	4.1 Participants .....	26
	4.1.1 Participants in Study I	
	4.1.2 Participants in Study II	
	4.1.3 Participants in Studies III-IV	
	4.2 Data collection .....	28
	4.2.1 Data collection in Study I	
	4.2.2 Data collection in Study II	
	4.2.3 Data collection in Studies III-IV	
	4.3 Data analysis .....	33
	4.3.1 Data analysis in Study I	
	4.3.2 Data analysis in Study II	

4.3.3	Data analysis in Studies III-IV	
4.4	Ethical considerations .....	35
5	<b>FINDINGS</b> .....	36
5.1	Striving for balance between family and work demands (Study I) ....	36
5.2	Adaptation of a questionnaire in Persian (Study II) .....	38
5.3	General and mental health and musculoskeletal disorders (Studies III-IV) .....	40
5.4	Factors associated with health outcomes (Studies III-IV) .....	42
6	<b>DISCUSSION</b> .....	46
6.1	Striving for balance between work and family demands (Study I) ....	46
6.2	General and mental health and musculoskeletal disorders (Studies III-IV) .....	49
6.3	Factors associated with health outcomes (Studies III-IV) .....	50
6.4	Adaptation of a questionnaire in Persian (Study II) .....	54
6.5	Methodological considerations .....	55
6.6	Conclusion.....	60
6.7	Implications for nursing practice .....	60
7	<b>SAMMANFATTNING – summary in Swedish</b> .....	63
8	<b>ACKNOWLEDGEMENTS</b> .....	65
9	<b>REFERENCES</b> .....	68
10	<b>APPENDIX, Papers I-IV</b>	

## LIST OF ABBREVIATIONS

BMI	Body Mass Index
CI	Confidence Interval
COPSOQ	Copenhagen Psychosocial Questionnaire
CVI	Content Validity Index
DCS	Demand-Control-Support
ERI	Effort-Reward-Imbalance
ICC	Intra-Class Correlation coefficient
INO	Iranian Nursing Organization
MOH	Ministry Of Health
MUSIC	Musculoskeletal Intervention Center
NEXT	Nurse Early Exit Study
NMQ	Nordic Musculoskeletal Questionnaire
OR	Odds Ratio
PHC	Primary Health Care
RN	Registered Nurse
SF-36	Short Form-36
WHO	World Health Organization



# 1 INTRODUCTION

During my clinical experience as a registered nurse in Iran I have seen that nursing personnel have a challenging work situation. Nurses have usually been concerned about their demanding work situation and quality of patient care; however, most of them strive to maintain the quality of nursing.

When I was given the opportunity to carry out doctoral studies, I was eager to obtain a better understanding of the work situation in nursing. During the data collection for this thesis, nurses told their stories about handling their work and life roles and also shared their concerns, not only about their own health and work, but also about patient care. Often they ended with these words: "I hope somebody understands the possible consequences for nurses and patient care if there is no improvement in this work situation".

One of the main roles in nursing is patient advocacy, and in the same way I have tried to reflect the wishes of the nurses by drawing attention to nurses' health, and making it the focus of my thesis. This is of primary importance for me as a researcher in the field of occupational health focusing on nursing personnel. The aim of this thesis was to gain insight and understanding with regard to management of work and family roles, as well as work-related health and associated factors, among nursing personnel in Iran. It is believed that improvements in the work situation could be achieved, based on occupational health research. Accordingly, in this thesis I hope to shed light on the work situation of nursing personnel as a first step towards a healthy workplace, which in turn could lead to increased work efficiency and quality of healthcare.



## **2 BACKGROUND**

The overall focus of this thesis is on work-related health among nursing personnel in Iran. To understand this focus, the background section provides a conceptual framework to explain the different aspects of work-related health. In occupational health research, health outcomes and working conditions are traditionally considered as two main concepts that are interrelated. Nowadays there is increasing evidence that other contributing factors such as personal, family and lifestyle factors should be included to achieve a comprehensive view (Hagberg et al., 2001; Kompier, 2002). Accordingly, the concept of health, work-related health, and the contributing factors in nursing which were focused on in this thesis, are presented below.

### **2.1 HEALTH**

#### **2.1.1 Concept of health**

The concept of health was defined by the World Health Organization (WHO) in 1948 as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”. This first view considered health in terms of physical, social and mental dimensions, and a general perception of health was also included in the definition, indicating that health is not merely the absence of disease. This definition paid attention to different aspects of health in comparison with the former focus on physical health (Saylor, 2004).

However, there was considerable criticism, as it was regarded difficult to measure the different dimensions of health or to achieve complete health. In addition, one of the basic questions was why some people suffer from diseases but at the same time feel well, while in this condition others might feel ill. Antonovsky (1979) presented this question based on the salutogenic model, in which he tried to define health in relation to the real lives of people in a rational way. This model considered a continuum of health, in contrast to the pathogenic model, which addressed two sides of the state of health: health versus disease. The salutogenic perspective identified that health has two poles, and people move continuously between excellent health and ill health and vice versa. Thus, health is not a static state – it changes over time – and if an individual's health is close to a pole, this depends on different factors (Antonovsky, 1979). Based on this perspective, Antonovsky developed the theory of Sense Of Coherence (SOC),

which proposed the individual or group ability to use and reuse available resources, “general resistance resources”, to promote health. Social activity and having a job provide opportunities for personal growth and stimulate individuals’ self-efficacy; thus, these can be considered as health promotive factors (Antonovsky, 1996).

Since health is considered a basic concept in the caring sciences, the various professions in healthcare and nursing have also focused on it. Consequently, ideas of health have been presented in nursing studies, for example by Lamberton (1983), who restated in connection with the continuum of health that health and ill health coexist. Human development and environment are two important concepts related to and interacting with health and ill health. Tripper-Reimer (1984) summarized the nursing literature on health and grouped the various definitions of health into three themes: health as a dichotomous variable (health–illness), health as a dynamic continuum of health and ill health, and also health as a holistic concept.

Various definitions of health have been suggested after the first attempts of the WHO to define health in a more meaningful way. During the Ottawa Charter for Health Promotion conference in 1986, the WHO attempted to provide a definition of health promotion (WHO, 1986). Based on the WHO perspectives on health promotion, O’Donnell (1986) stated that: “optimal health is a balance of physical, emotional, social, spiritual, and intellectual health”. These two WHO definitions of health generally reflect the different dimensions of health and furthermore focus on a combination of different dimensions to achieve a dynamic balance or optimal health. Over the past few years these definitions of health have presented a major challenge. The complexity of health can be seen in its definitions, including many dimensions, but it still suggests borders between these different dimensions rather than a more integrative approach of mind–body wholeness (Saylor, 2004).

To sum up, there is still no general agreement about the definition of health, and it is probably neither possible nor recommendable to reach an agreement in this matter. However, a common sense approach would be that each individual’s own view and perception is the basis for being balanced and healthy (Antonovsky, 1987). Thus, it is not surprising that health has different meanings in different contexts and also varies among individuals. Accordingly, a comprehensive context-based approach in

occupational health research is suggested, which can provide a dynamic and holistic perspective on work-related health in terms of focus on work, and also on contributing factors outside work, such as personal factors, family situation and socio-cultural factors (Kompier, 2002; McNeely, 2005).

### **2.1.2 Occupational health in healthcare workers**

Workers' health is determined not only by workplace hazards but also by social and individual situations and access to health services (WHO, 2007). Occupational health is the promotion and maintenance of the highest possible degree of physical, mental and social well-being of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work to people, and people to their jobs (Agius, 2011).

Healthcare is one of the largest work sectors in many countries and has a high rate of occupational hazard and illness. As healthcare workers provide healthcare for sick and injured people, they often face a more complex variety of workplace hazards than encountered in other sectors (The U.S. Equal Employment Opportunity Commission, 2007). These health hazards include several factors in the work environment, for example biological (infections), chemical (toxic gases), physical/ergonomic (noise, heavy lifting) and psychosocial (shift work, stress, violence) (WHO, 2012).

Healthcare workers may experience all kinds of hazards. However, since their mission involves providing healthcare service day and night, shift work is a common hazard for many healthcare jobs, such as nursing (The U.S. Equal Employment Opportunity Commission, 2007). Nursing personnel are responsible for meeting the basic needs of patients, which often involves heavy lifting and patient transferring tasks. Thus, risk factors in the nursing profession may include not only physical and ergonomic but also psychosocial working conditions (Choobineh, Movahed, Tabatabaie, & Kumashiro, 2010). It is believed that these work-related risk factors contribute to adverse health, for example to musculoskeletal disorders which constitute the most common problem (Gillen et al., 2007). Since nursing work is regarded as a stressful setting, the different work-related health outcomes such as adverse health, absenteeism, nurses' dissatisfaction and consequently errors in patient care might occur in threatening

physical and psychosocial work situations (Josephson, Lindberg, Voss, Alfredsson, & Vingard, 2008; Van Der Heijden, Van Dam, & Hasselhorn, 2009).

This thesis focuses on two health hazards of occupational health, namely physical and psychosocial factors and the two terms “occupational health” and “work-related health” have been used synonymously in this thesis.

### **2.1.3 Self-rated general health and mental health**

Nursing care is emotionally demanding work, which also involves a physical workload; it is therefore considered a setting for ill health (McNeely, 2005). Different aspects of the work-related health of nurses have been focused on. For example, the results of a longitudinal study showed that organizational factors and self-rated general health could predict sick leave among Swedish nurses (Josephson, Lindberg, Voss, Alfredsson, & Vingard, 2008). Similar studies in Denmark have found a significant relationship of self-rated mental and general health with psychosocial working condition among nursing staff (Aust, Rugulies, Skakon, Scherzer, & Jensen, 2007; Weyers, Peter, Boggild, Jeppesen, & Siegrist, 2006).

The complex interaction of health outcomes with a combination of job demands and work–family interference have been discussed broadly in the Nurses’ Early eXit sTudy (NEXT study), which is based on a longitudinal study started in 2002 among 1187 nurses who were working in ten different European countries with stable and transitional economies (Hasselhorn, Mueller, & Tackenberg, 2003; Simon, Kummerling, & Hasselhorn, 2004). For instance, one published NEXT study indicated that job demands and work–family interference together might contribute to the intention to leave nursing (van der Heijden, van Dam, & Hasselhorn, 2009). The NEXT research group also represented results of a study among 753 Dutch hospital nurses, which showed a relationship between job demands, general health and work–family interference (Van der Heijden, Demerouti, Bakker, & Hasselhorn, 2008). McNeely (2005) remarked that in occupational health studies aiming to investigate the specific health effects of nurses’ work, the total demands of nursing work are underestimated because researchers often look at either physical or psychosocial demands.

In health assessment research, health status can be measured in different ways, e.g. by mortality rates, biochemical data, healthcare consumption, behavioural data on smoking, alcohol, medication, and also subjective indicators such as self-rated disorders and disability (Bowling, 1997). Self-rated health reflects a comprehensive perception of health and can predict future health in terms of mortality and morbidity (Eriksson, Unden, & Elofsson, 2001). Thus, the different measures of health have generally been sorted into two main categories: “objective” data versus “subjective” data.

Generally the term “objective” is used when the aim of a study is to quantify physiological data, and the term “subjective” indicates individual perception and evaluation, for example when answering a questionnaire (Borg & Kristensen, 2000; Kompier, 2005). By using a questionnaire to study self-rated health, including multiple types of questions, the reliability and validity of the instrument may be increased (Bowling, 2005). The number of response options in a self-rated questionnaire varies but usually ranges between three and five. There are three types of single question to combine and include in a self-rated health questionnaire: general non-comparative, age-comparative and time-comparative questions. The general non-comparative question is more common than the two other types of questions and has been considered as the standard measure of general health; for example, “In general how would you rate your own health?” (Bowling, 2005; Eriksson, et al., 2001).

Mental health questions mainly evaluate positive and negative emotions or feelings such as happiness, distress and anxiety (Keyes & Lopez, 2002); for example, “Have you been a happy person during the past month?” One well-known questionnaire that included multiple questions to measure health is the Short Form-36 (SF-36), which contains eight dimensions of health including physical functioning, role limitation in terms of physical problems, bodily pain, general health perception, vitality, social functioning, emotional problems, and perceived mental health (Eriksson, et al., 2001; Montazeri, Goshtasebi, Vahdaninia, & Gandek, 2005). In this thesis the two dimensions of the SF-36, comprising general health and mental health, were used to operationalize health status.

#### **2.1.4 Musculoskeletal disorders**

Musculoskeletal disorders are the most common causes of disability pension, long-term sick leave and occupational disorders in the developed and developing countries (Choobineh, Movahed, Tabatabaie, & Kumashiro, 2010; Punnett & Wegman, 2004). Musculoskeletal disorders account for one out of three of all registered occupational diseases in the United States and the Nordic countries (Punnett & Wegman, 2004). Furthermore, many studies have reported a rapidly increasing rate of musculoskeletal disorders in different parts of Asia (A. Alipour, Ghaffari, Shariati, Jensen, & Vingard, 2008; Karahan, Kav, Abbasoglu, & Dogan, 2009; Mehrdad, Dennerlein, Haghighat, & Aminian, 2010; Roh, 2003; Tezel 2005). The economic loss due to such disorders affects not only individuals and their families but also the workplace and society as a whole; for example, low back pain is the most common reason for sick leave and results in ten million people being off work daily in the USA (Roh, 2003; Waters, Collins, Galinsky, & Caruso, 2006).

Musculoskeletal disorders include a wide range of inflammatory and degenerative conditions affecting the muscles, tendons, ligaments, joints, peripheral nerves, and supporting blood vessels. The body regions that are commonly affected are the neck, shoulder, hand, upper and low back, knee and foot (Punnett & Wegman, 2004).

Epidemiological studies have reported more musculoskeletal disorders among women, which might be due to a number of conditions and factors, e.g. the methodology that is implemented; psychological, social and cultural factors, or bio-physiological mechanisms (McBeth & Jones, 2007; Punnett & Herbert, 2000); or muscle capacity and design of the workplace and work tools based on male anthropometric data (Danna & Griffin, 1999; Greenspan et al., 2007).

The reported prevalence rate of musculoskeletal disorders varies between studies. These differences might be explained by variation in methodology, measurement tools, studied groups, context and location. Other impact factors seem to be the time point or period that is considered when measuring prevalence rate, and also the definition of musculoskeletal disorders (Hestbaek, Leboeuf-Yde, & Manniche, 2003). The one year prevalence rate of musculoskeletal disorders in three body regions (neck,



low back and knee) among hospital nurses in six different countries measured by the Nordic Musculoskeletal Questionnaire (NMQ) is shown in Table 1.

Table 1. One year prevalence rate of musculoskeletal disorders among hospital nurses in six countries.

<i>Country</i>	<i>Neck %</i>	<i>Low back %</i>	<i>Knee %</i>	<i>Any body region %</i>	<i>Sample size</i>	<i>Reference</i>
Iran	46	73	69	94	317	(Mehrdad, et al., 2010)
Japan	28	59	16	78	305	(Smith, Ohmura, Yamagata, & Minai, 2003)
China	45	56	-	70	282	(Smith, Wei, Zhao, & Wang, 2004)
South Korea	63	72	-	94	330	(Smith et al., 2005)
Turkey I	54	69	-	90	120	(Tezel, 2005)
United States II	46	47	-	73	1163	(Trinkoff, Lipscomb, Geiger-Brown, & Brady, 2002)

I: among nursing staff, II: among nurses in hospital and community

Musculoskeletal disorders occur in some professions with rates up to three or four times higher than those of the general population. High-risk sectors include nursing, air transportation, mining, food processing, leather tanning, and heavy and light manufacturing (Punnett & Wegman, 2004). Healthcare workers often experience musculoskeletal disorders at a rate exceeding that of workers in construction, mining, and manufacturing. These injuries are mainly due to repeated manual patient handling activities, often involving heavy manual lifting associated with transferring and repositioning patients, and working in awkward postures (Waters, et al., 2006). Based on the data of a large insurance company in Germany, Simon et al. (2008) stated that 56% of all sick days of nurses were related to musculoskeletal disorders. Thus, musculoskeletal disorders could be considered as the most common cause of sick leave and disability pension, leading to shortage of staff, which is a global challenge in nursing (Fochsen, Josephson, Hagberg, Toomingas, & Lagerstrom, 2006; Simon et al., 2008).

Musculoskeletal disorders are regarded as a multi-factorial health problem, associated with work-related physical and psychosocial factors as well as organizational structure of work. Personal factors including demographic data, lifestyle factors and family variables are also non-work contributory factors (Kim, Geiger Brown, Trinkoff, & Muntaner, 2010; Simon, et al., 2008). Results of contemporary work-related health studies, especially among those conducted in Asian countries, showed that musculoskeletal disorders have rapidly increased (Roh, 2003), possibly related to lifestyle factors. Lifestyle factors such as physical exercise and transfer habits are changing due to current rapid urbanization, and should also be included in the assessment (Borg & Kristensen, 2000; Lindell, Johansson, & Strender, 2010).

Accordingly, factors contributing to health outcomes (general and mental health and musculoskeletal disorders) in this thesis, including working conditions and personal factors, are explained below.

## **2.2 WORKING CONDITIONS**

Working conditions are mainly concerned with organizational factors, physical and psychosocial working conditions.

### **2.2.1 Organizational factors**

Organizational factors consist of work process design, working time, work schedule (e.g. day work and shift work) and also the way that tasks are distributed among workers. There is increased evidence that healthcare workers experience adverse physical and psychosocial working conditions due to shift work (Nabe-Nielsen, Tuchsén, Christensen, Garde, & Diderichsen, 2009). The results of a study by the NEXT research group indicated that scores on work involvement, satisfaction with pay and motivation were higher among nurses with fixed night shifts than those on rotating shifts. Sleep and satisfaction with working hours were lower in nurses with shift work compared with day work (Camerino, et al., 2008). McNeely (2005) remarked that recent healthcare studies have shown that conditions in healthcare organizations are more stressful than ever.

### **2.2.2 Physical working conditions**

Physical and ergonomic conditions in nursing refer to heavy lifting, manual handling, bending, and working in uncomfortable positions. Generally these physical working conditions evaluate workload in terms of its intensity, frequency and duration (Trinkoff, et al., 2002; Trinkoff, Lipscomb, Geiger-Brown, Storr, & Brady, 2003). Nursing studies have addressed an association of ergonomic hazards with ill health outcomes (Aust, et al., 2007) and specifically with musculoskeletal disorders (Kim, Geiger Brown, et al., 2010).

The relationship between physical hazards and health problems is complex and should not be considered in an interaction with only two factors. The link between physical working conditions and work-related outcomes often seems to be a physiological relation. When physical workload is high, this situation in combination with lack of control over the work could lead to a stimulation of stress hormones, which in turn results in pathological symptoms and ill health (Danna & Griffin, 1999). Additionally, workers are typically exposed to a synergetic effect of multiple factors at the workplace. For example, results of a study among public sector workers by Vingard et al. (2000) addressed a relationship between work-related low back pain and physical and psychosocial exposures.

Recent occupational health studies have reported that physical factors alone, or in combination with other work and non-work factors, contribute to health outcomes. For instance, in a longitudinal study among homecare workers in the USA, Kim et al. (2010) found that the physical demands of caring work constitute significant risk factors for musculoskeletal disorders. Different combinations of work factors (physical and psychosocial) with living and contextual factors might also increase the risk of ill health among nurses (Josephson, et al., 2008), and musculoskeletal disorders among employees in Sweden and Finland (Aittomäki, Lahelma, Rahkonen, Leino-Arjas, & Martikainen, 2007; Leijon, Lindberg, Josephson, & Wiktorin, 2007). In conclusion, to measure physical workload in occupational health studies, a combination of other contributory exposures such as psychosocial, organizational and individual variables is recommended.

### **2.2.3 Psychosocial working conditions**

Psychosocial work factors can be defined as the result of an interaction between work organization and employees. Thus, this concept incorporates the way that an individual is affected by organizational factors and the social work environment, and how each individual in turn affects them (Karasek Jr, 1979; Siegrist, 1996). Studies on the work situation in nursing have relied on a wide range of interpersonal relationships, in terms of communication with patients and their families, and with nursing staff (Aust, et al., 2007; Fakhr-Movahedi, Salsali, Negharandeh, & Rahnavard, 2011; Gunnarsdottir, Rafnsdottir, Helgadottir, & Tomasson, 2003). The results of a review study by Bambra et al. (2007) indicated an association between psychosocial working conditions and adverse health outcomes among employees. There has been a focus on psychosocial conditions in a large number of occupational health studies over the past three decades; consequently, several theories have been created in this area to conceptualize work stress and job satisfaction (Kompier, 2002; Kristensen, Hannerz, Hogh, & Borg, 2005).

#### *2.2.3.1 Theories of psychosocial working conditions*

Two prominent models of psychosocial working conditions that have been widely used are the Demand-Control-Support (DCS) model (Karasek and Theorell, 1990) and the Effort-Reward-Imbalance (ERI) model (Siegrist, 1996). The DCS model predicts that high psychosocial work demands in combination with low control over the work increases work-related stress, which could lead to adverse effects on the health of employees. Thus, protecting factors in this process are high level of decision latitude and support from supervisors and colleagues (Howard, 1990).

The Effort-Reward-Imbalance model is based on increasing consensus about the definition of work-related stress in a person-based interaction. When demands from the work environment exceed the employee's ability to cope with or control that, stress is experienced. The model predicts that a great effort followed by a small reward might lead to emotional stress, which in turn may affect the employee's health (Siegrist, 1996).

Concerning the importance of employees' health, many recent studies have commented that the health of employees may also be affected by leadership styles. It has been suggested that leadership behaviour and the relationship between leader and subordinates should be considered as two main dimensions of leadership. Leadership

could emerge from personality, experience and knowledge of each leader. A model that has been broadly used in this area was originally from the Ohio and Michigan study (Ekvall, 1993). The Michigan researchers identified two leadership orientations, namely production-centred and employee-centred (Michigan, Likert 1967), and the Ohio researchers identified two orientations which they called initiating structure and consideration (Ohio, Fleishman & Harris 1962). Both the Ohio and the Michigan researchers came to an agreement that effective leadership depends on an interaction between employee orientation (consideration) and production orientation (initiating structure) (Sellgren, Ekvall, & Tomson, 2006). These leadership styles have developed with more focus on change in the organization and are seen as a combination of the three dimensions: change, production and employee/relations (Ekvall & Arvonen, 1991).

Different psychosocial aspects of nursing work are included in this thesis by using the Copenhagen psychosocial questionnaire (COPSOQ), which was developed based on these psychosocial work models. The COPSOQ questionnaire has been used among nursing personnel in different countries. For instance, in a study of 4590 Danish healthcare workers, day workers were compared with non-day workers on fixed shifts. The result showed that the latter group was more exposed to low job control, low support from managers, violence and high physical demands, but was less exposed to high psychosocial demands compared with day workers (Nabe-Nielsen, et al., 2009). Another study was performed among 3088 female hospital nurses in China, and the results of this longitudinal study indicated that increased emotional demands, decreased meaning of work, decreased commitment to the workplace and decreased job satisfaction were associated with intention to leave nursing work (Li, et al., 2010).

### **2.3 PERSONAL FACTORS AND FAMILY SITUATION**

It has been suggested that not only personal and lifestyle factors but also the family situation of employees should be included in order to understand health outcomes. Thus, a holistic approach in occupational health studies can provide a broad perspective on the contribution of the exposures, outcomes and confounders. Several studies have addressed a complex interaction of personal and lifestyle factors, and work risk factors, with health outcomes (Borg & Kristensen, 2000; Lindell, et al., 2010). In some studies,

for example, lifestyle factors such as physical activities, alcohol consumption and smoking were associated with cardiovascular diseases or other health outcomes among shift workers (Clausen, Christensen, & Borg, 2010; Dellve, Lagerstrom, & Hagberg, 2003; Nabe-Nielsen, et al., 2009). In terms of the interaction between living conditions and health outcomes, Leijon et al. (2007) found in a study of public-sector workers that a combination of these factors increased the risk of persistent musculoskeletal disorders.

Prolonged work-related stress and parental demands can affect health of female workers, as additional hours spent on household duties and care of children meant less time for recovery and recreation (Greenhaus, Parasuraman, & Collins, 2001; Grzywacz, Frone, Brewer, & Kovner, 2006). Over the past few decades, workforce demographics, family roles, and the relationship between work and family have changed dramatically, which has led to increased research focusing on the dynamic of work and family roles (Kompier, 2002; Simon, et al., 2004). Conflict and strain often arise when participating in both work and family roles, because role expectations are often incompatible (Schluter, Turner, Huntington, Bain, & McClure, 2011).

Based on the source of incompatibility between work and family roles, there are three different forms of work–family conflict: time-based, strain-based, and behaviour-based. Time-based work–family conflict refers to problems in allocating available time to both domains, e.g., overtime work versus family activities. Strain-based conflicts arise when the fulfillment of one role causes strain, and this in turn spills over into the other domains. For example, fatigue due to heavy workload might lead to low attention to family roles. Behaviour-based work–family conflict describes difficulties in changing behaviour between the roles in the two domains (Simon, et al., 2004). Strain-based conflicts, where the negative impact of one domain (mainly the work domain) affects the other domain, were initially explained as the negative spillover perspective by Greenhaus & Beutels (1985). However, according to the dynamic of work–family interface, many authors then developed the role strain approach to include the positive spillover, resulting in role-enhancement models (Grzywacz & Marks, 2000).

Another characteristic of work–family roles is the direction of incompatibility, which could be related to both, in that the work role can interfere with the family, and vice

versa. However, work interference with family was more reported (Grzywacz, et al., 2006; Simon, et al., 2004). It is believed that, being balanced in the work–family roles interface means approaching each role with an equal level of attention, time, involvement, and commitment (Greenhaus, Collins, & Shaw, 2003). It has been shown that increased interference of work role with family role is experienced more among shift workers. Therefore, recent studies on work–family roles have focused on female nurses with shift work (Grzywacz, et al., 2006; Simon, et al., 2004; Van der Heijden, et al., 2008).

In the light of these challenges, studies of work–family issues among female workers in different countries could represent how family and work roles have been experienced in various contexts. The interaction of work factors and living factors in different countries varies and contributes to the research setting and social view (Karimi, 2008). However, while many studies on work–family issues have been carried out in the developed countries, little is known in the developing countries.

Based on the traditional women's role, there is considerable pressure on women to give priority to family roles. In a traditional society, such as Iran, where women have the main responsibility for taking care of children and running the house, men are responsible mainly for work outside the home. In this context, the public view regards women as the main housekeeper, who should be present at home before the other members of the family (Ahmad-Nia, 2002). In this context, when women as wives and mothers have to leave the house for shift work, the situation could become complicated.

Another important context-based view in Iran is the meaning of family. 'Family' means not only parents and children but also spouses, parents, siblings, other relatives such as uncles, aunts, cousins, neighbours and close friends, i.e. an extended family. The family is an important source of support and influence, involving responsibilities and obligations towards each other (Karimi, 2008). A few studies have shown that a demanding family situation could adversely affect the health of female workers in Iran (Ahmad-Nia, 2002) but, to our knowledge, there is a lack of studies to show how work–family roles interact with the health of nurses. Further studies are needed to show the contribution of work and family factors in different professional groups and contexts.

## 2.4 IRAN, THE CONTEXT OF THIS STUDY

Iran, with an area of 1.648 million km<sup>2</sup>, is the fourth largest country in Asia and consists of 31 provinces (Figure 1) (WHO, 2008). Tehran, the capital city, is located in the north and central part, with about 13 million inhabitants. Around 30% of public-sector workers and half of all industrial companies are located in this urban area (Municipality of Tehran, 2011).



Figure1. Map of Iran (Google map)

The population of the country was reported to be 74 million in 2009 (WHO, 2009). Due to a high growth rate, the total population doubled in the course of the last two decades of the 20th century. After this, as a result of a family planning programme, the high growth rate decreased to the present rate of less than 1.5 (Mehryar & Ahmad-Nia, 2004). However, the age distribution in the population was affected and has dramatically changed over the last three decades, as shown in the population pyramids in Figure 2 (NationalMaster, 2011)



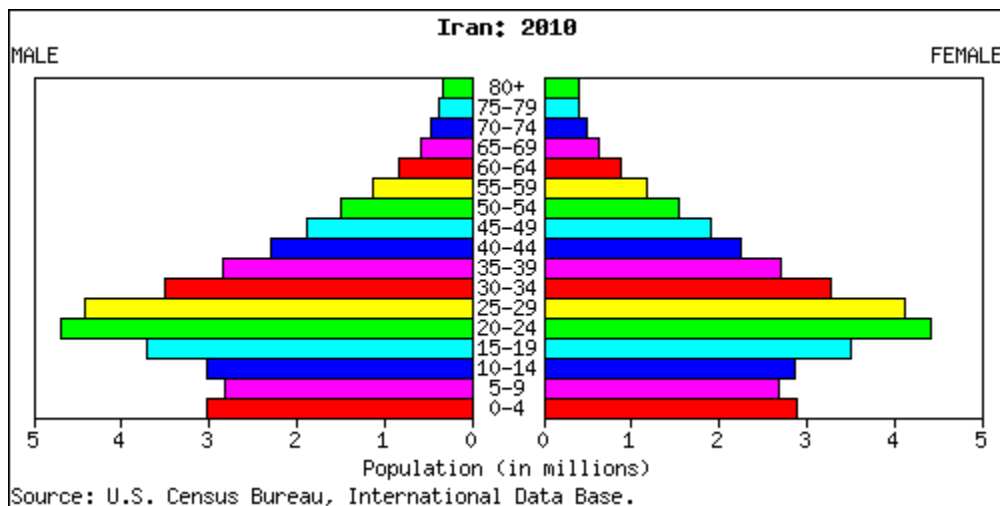
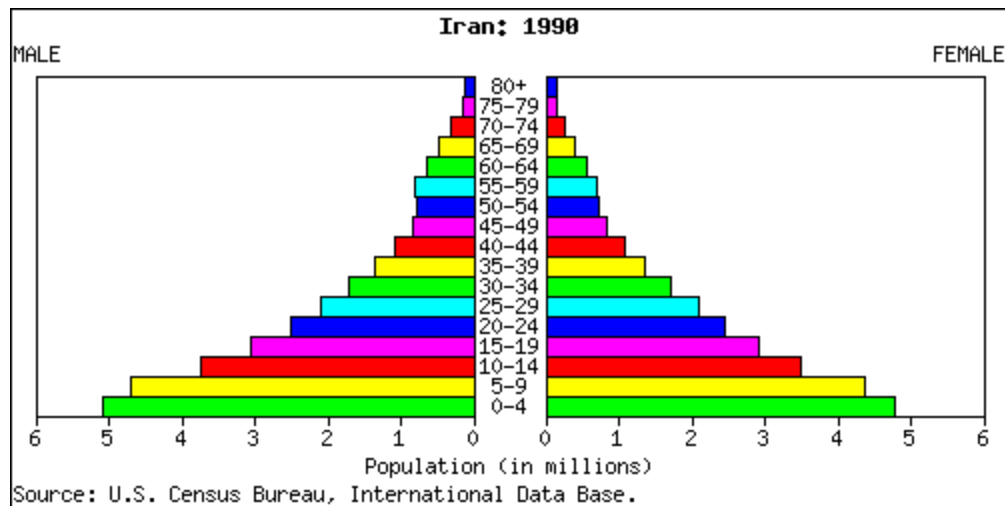


Figure 2. Age distribution in Iran's population pyramid, years 1990 & 2010

With this age distribution, the entrance of children into the school system, starting in 1984, led to many difficulties in the educational system. The ongoing entry into the labour market from around 1995 has contributed to the current unemployment crisis. The future departure from the labour market in the early 2040s appears to be a major threat to the social security system in terms of providing social facilities for elderly people (Mehryar & Ahmad-Nia, 2004). Furthermore, the unemployment rate in Iran is higher among women and young adults (Vigeh & Mazaheri, 2009) due to the transitional characteristics of the labour market over the last 20 years, from a low-educated and male-dominant workforce to a more educated one with increasing female participation (Ghaffari, Alipour, Farshad, Yensen, & Vingard, 2006).

Another significant demographic trend is rapid urbanization during the last three decades, from less than half of the population in 1980 to about 70% in 2009 (WHO, 2009). The country is going through both a demographic and an epidemiological transition, and faces burdens of chronic diseases at present and in the future (Mehryar & Ahmad-Nia, 2004).

#### **2.4.1 Healthcare system**

The Ministry of Health and Medical Education (MOH) is responsible for the planning, provision and supervision of health in both the private and the public sector, and also all aspects of medical education in the country. The health system is highly centralized, and almost all decisions regarding general goals, policies and allocation of resources are made at the central level. There is at least one medical university in each province affiliated to the MOH, which is responsible for establishing healthcare services and medical education in the university hospitals and healthcare centres of the province (Mehrdad, 2009).

Healthcare services are provided by both the public and the private sector. Public healthcare services are categorized in three levels: primary, secondary and tertiary, with a strong emphasis on primary healthcare (PHC), which is provided across the whole country. The public sector also provides secondary and tertiary levels but these are generally in remote and rural areas. PHC is mostly free of charge, and the secondary and tertiary healthcare services are paid for by a combination of public expenditure, consumer co-payment and revenue that is raised from a contract between health insurance organizations and medical universities (Mehrdad 2009).

Private healthcare mainly focuses on secondary and tertiary levels in urban areas. The tariff for healthcare services is determined by the High Council of Medical Services Insurance. However, the private sector and private hospitals do not follow this, so almost all service is charged according to their own fees. Private hospitals do not have agreements with the main insurance organizations related to low tariffs, which means extra paperwork and postponements in payment (WHO, 2006).

### **2.4.2 Health insurance organizations**

There are at least four main health insurance organizations covering 90% of the population in Iran: Social Security Insurance, Medical Services Insurance, the Imam Khomeini Relief Committee (which covers poor people and rural areas), the Army Medical Service Insurance Organization, and other small retirement and insurance foundations (more than 15 different insurance companies, which mainly provide complementary insurance covering the middle-class population) (Mehrdad, 2009).

In the case of retirement, work injuries and disabilities as well as other unexpected events and diseases, lack of guardian and revenue cuts or reductions, the insurance system runs according to people's income and insurance rules (Ghaffari, 2007). For example, sick-leave benefits are paid based on the definite condition. In the case of sick leave for one week or less, an ordinary medical certificate is needed. Sick-leave lasting more than one week must be approved by the physicians of the related insurance company and also granted by a higher medical commission. It is generally a slow administrative process to acquire this medical certificate (Ghaffari, Alipour, Jensen, Farshad, & Vingard, 2006). To get full payment at retirement, two requirements must be fulfilled. First, the individual must be of retirement age, which is 60 years for men and 55 for women; and second, 30 years of working experience is demanded (Parast, 2009).

### **2.4.3 Occupational health services**

The establishment of occupational health for industries and factories was initiated in 1987. Accordingly, to provide an occupational health service in workshops and factories with 20-49 workers, one of the workers was chosen as the occupational health provider after passing a three-week training course. In workshops and factories with 50-500 workers, an occupational hygienist was recruited. In factories with more than 500 workers, a healthcare centre including a physician and other experts was set up. However, the main focus of these occupational health centres is medical and treatment services rather than preventive interventions (Ghaffari, 2007).

The previously mentioned MOH is responsible for all areas of healthcare services; thus the provision of occupational health services is the responsibility of the affiliated universities. In each university, the Occupational Health Department is responsible for

regular visits to workplaces and filling in standard checklists and reporting to the MOH. More than 4000 full-time occupational hygienist and inspectors work under MOH supervision. In recent years the number of work units has increased rapidly. There are 2 million work units in Iran with 16 million employees, including service workers (45%), agricultural workers (30%) and industrial workers (25%). However, the number of occupational hygienists and inspectors has not increased proportionately and there is a shortage of occupational health staff. Occupational health coverage for service work, as the largest occupational sector, is not clearly identified. In sum, there are some challenges in the occupational health sector, not only related to the number of professionals but also to their distribution in terms of participation in all work sectors (Vigeh & Mazaheri, 2009), which could be related to the nationwide misdistribution of healthcare professionals (Mehrdad, 2009). Another challenge is the lack of multi-disciplinary occupational health services. Consequently, at present the main focus is on treatment or environmental hygiene inspections, not the whole process of occupational health such as screening and preventive interventions (Ghaffari, 2007).

The most commonly reported diseases are musculoskeletal disorders, respiratory disorders and noise-induced hearing loss. Occupational injuries remain an important problem but under-reporting is an issue. In 2006, more than 20,000 workers had occupational injuries, with particularly high rates in the two big cities: Tehran and Isfahan. The work-related fatality rate in Tehran is three times higher than the country average (3% and 1%, respectively). These rates are much higher than in the European Union and have been increasing in recent years (Vigeh & Mazaheri, 2009).

In brief, the labour market in Iran is characterized by a high unemployment rate, incomplete social insurance and a shortage of occupational health services. This creates a challenging situation that might affect employees' health.

#### **2.4.4 Nursing profession**

In Iran, nursing is seen as a female occupation, with about 20% male participation. There are three levels of nurses: registered nurses (RN), technicians and auxiliary nurses. RNs must complete a 4-year bachelor's degree at a university (Nikbakht Nasrabadi, Emami, & Parsa Yekta, 2003). Operating room technicians study at university for two years and then work in operation rooms. Auxiliary nurses complete a

3-year vocational training programme, which does not require a high school diploma (Choobineh et al., 2010). Another job group working in hospital wards consists of “aids” or “healthcare assistants”, who as a rule, are healthcare workers. In Iran they are included in the category of nursing personnel, but are not considered as nurses. They do not receive nursing training courses and they perform procedures such as patient transportation and preparation of equipment (Nasrabadi, Lipson, & Emami, 2004).

Nursing education in Iran is acceptable in comparison with the current level worldwide. Nurses can study at universities from the level of a bachelor's degree to a doctoral degree. In master's programmes, nurses are educated in different nursing care specialties such as medical-surgical, psychiatry, community health and paediatrics. However, most nurses work in hospitals where they carry out several in-patient nursing tasks. Thus, they do not experience different areas of nursing work such as nursing care at home and in the community (Joolaei, Nikbakht-Nasrabadi, Parsa-Yekta, Tschudin, & Mansouri, 2006; Nasrabadi, Lipson, & Emami, 2004).

Zarea et al. (2009) argued that the number of working nurses in the private and public healthcare sector totally were ~ 90 000, and the country population was ~ 70 million. Thus, for every 10 000 people there were 12 nurses, but 30 nurses would be a reasonable number instead. Consequently, they concluded that there was understaffing in nursing. In Iran there are many newly unemployed young graduated professionals and nurses, but too few employment positions to recruit them to the healthcare sector, which leads to a high patient-to-nurse ratio (Zarea, Negarandeh, Dehghan-Nayeri, & Rezaei-Adaryani, 2009). In most other countries, the shortage of nurses often depends on a high rate of turnover (Li et al., 2010; van der Heijden, van Dam, & Hasselhorn, 2009). Thus, the definition of nursing shortage in Iran is unique and different from the usual meaning of nursing shortage in other countries.

There is no local system of recruitment to any university hospital, as the Ministry of Health employs staff and nursing personnel and allocates them to the medical universities (Hagbaghery, Salsali, & Ahmadi, 2004). Furthermore, choosing how many hours to work, e.g. being a part-time employee, is not an option. Due to this problematic work situation and lack of opportunity to use the full range of their nursing skills, most postgraduate nurses prefer to work as nursing teachers rather than working

as clinical nurses, or not working as a nurse (Joolaei, et al., 2006); hence the current criticism in terms of the gap between education and practice in nursing (Nasrabadi, et al., 2004; Zarea, et al., 2009).

The growing number of postgraduate nurses (holding a MSc in nursing with different specialties or a PhD in nursing) resulted in the establishment in 2003 of a national association for academic nurses called the 'Iranian Scientific Nursing Association' (Iranian Scientific Nursing Association, 2012). There are numbers of other non-governmental nursing organizations in Iran for instance Iranian Nursing society (1990), Islamic society of Iranian nurses (2002), Nurse's home, and Iranian Nursing Organization (INO) (2002). These organizations in parallel with some governmental offices such as Nursing administrative office, Nursing Board, and Nursing Council which are related to the Ministry of Health attempt to improve the different aspects of nursing profession.

INO as the largest organization for nurses follow the aim of providing a better work situation and improving the quality of patient care. To reach the main goal, INO actions are centred on persuading healthcare authorities to decrease the number of ordinary working hours (now 44 hours/week) and recruit more nurses. According to the INO's report (2011), the current number of working nurses should be tripled in order to achieve the required standards in the nursing workforce. Now nursing personnel support the INO and one nurse in each hospital acts as the INO nurses' representative to link nurses to the INO, and vice versa. The aim of the INO is to convey the working situation of nurses to the media, parliament and government; as a result, the Ministry of Health is designing a plan to decrease working hours and is recruiting a large number of nurses. To improve the work situation of Iranian nursing personnel, more scientific research is needed to recognize the different aspects of nursing work and consequently to perform evidence-based work promotion.

## **2.5 RATIONALE OF THE THESIS**

A literature review of the working conditions of Iranian nursing personnel showed a difficult work situation and understaffing (Nasrabadi, et al., 2004; Zarea, et al., 2009). It is believed that demanding work factors adversely affect nurses' health, which in turn might decrease the quality of patient care (van der Heijden, et al., 2009). Current Iranian studies on the nursing occupation have reported various job difficulties, but lack of a comprehensive perspective to consider overall demands, and all contributing factors in terms of work, personal, family and socio-cultural aspects. The aim of this thesis was to provide a comprehensive view in order to understand work-related health and investigate how this is associated with work factors, and also with the personal, family and socio-cultural background of nursing personnel in Iran, where work and family roles seem to be challenging.

## **3 RESEARCH AIMS**

### **3.1 GENERAL AIM**

The overall aim of the thesis was to explore work-related health and associated factors, among Iranian nursing personnel. A further aim was to describe nurses' experience of managing work and family roles.

### **3.2 SPECIFIC AIMS**

- To describe Iranian female nurses' experience of managing work and family roles; and to explore the antecedents and consequences of work and family roles interference (Study I).
- To adapt a questionnaire in Persian, to assess personal factors, working conditions and health problems among Iranian nursing personnel (Study II).
- To investigate self-reported general and mental health, and the association with organizational, physical and psychosocial working conditions and with family situation, among Iranian nursing personnel (Study III).
- To investigate the prevalence of musculoskeletal disorders, and the association with organizational, physical and psychosocial working conditions, among Iranian nursing personnel (Study IV).



## **4 METHODS**

To generate knowledge and a better understanding of work-related health as a multi-dimensional issue, it has been suggested that research should be conducted using a comprehensive view (Dahlgren, Emmelin, Winkvist, & Lindhgren, 2004; Kompier & Taris, 2004). Thus, we decided to use both qualitative and quantitative methods to cover the main aim and focus of this thesis.

Study I focused on Iranian nurses' experience of managing work and family roles and the antecedents and consequences of this process, based on qualitative method using grounded theory analysis. In Study II, a questionnaire which was obtained from well-established questionnaires was translated and culturally adapted in Persian and then evaluated in terms of psychometric properties. Finally, the newly adapted questionnaire was used in a cross-sectional study to assess general and mental health and musculoskeletal disorders, and to investigate how this is associated with work conditions as well as personal and family factors, among Iranian nursing personnel (Studies III-IV). An overview of the methods used in this thesis is shown in Table 2.

Table 2. Overview of the methods used in Studies I-IV

	<i>Study I</i>	<i>Study II</i>	<i>Studies III-IV</i>
<i>Design</i>	Qualitative method	Quantitative method: Cross-cultural adaptation Psychometric evaluation	Quantitative method: Cross-sectional
<i>Participants</i>	Female nurses (n=22)	Face validity; nursing personnel (n=30) Reliability and construct validity tests; nursing personnel (n=92)	Nursing personnel (n=520)
<i>Data collection</i>	Interview, focus group discussion	Questionnaire, Individual Interview	Questionnaire
<i>Data analysis</i>	Based on the grounded theory method analysis	Descriptive statistics Content validity index Internal consistency Test-retest Convergent correlation	Descriptive statistics Chi-square test Logistic regression analysis

#### 4.1 PARTICIPANTS

Studies I-IV were conducted among nursing personnel who all worked in general university hospitals in Tehran, affiliated to the Ministry of Health. Three different samples were included in this thesis. The participants in Study I consisted of female RNs. The participants in Study II and Studies III-IV comprised two job groups: nurses with three different levels of education, i.e. registered nurses, technicians and auxiliary nurses, and "aids or nursing assistants". The sampling in this thesis is described below.

#### **4.1.1 Participants in Study I**

The participants from two hospitals were recruited to Study I, which was based on the following inclusion criteria: 1. Female, 2. Living with family, 3. Full-time employed registered nurse, and 4. More than one year of work experience. A total of 22 volunteered nurses participated in 13 individual interviews and two focus group discussions, one in each hospital (two interviewees also participated in the focus group discussions, one person in each). To meet the sampling criteria of the grounded theory method, first only purposeful sampling was used; this was then continued simultaneously with theoretical sampling. The participants varied in terms of socio-demographic and organizational factors. They were informed at their hospitals, both orally and in writing, about the purpose and design of the study. By signing the consent form they were then recruited to the study.

#### **4.1.2 Participants in Study II**

For face validity, 30 nursing personnel were recruited, and to test reliability and construct validity, 92 nursing personnel – considered as the main sample in this study – were included via convenience sampling from two hospitals in Tehran. They were all full-time employed nurses with more than one year of work experience. Both these conventional samples varied in terms of socio-demographic and organizational characteristics.

#### **4.1.3 Participants in Studies III-IV**

Full-time nursing personnel from ten general university hospitals with more than one year of work experience (n=1818) were initially considered for participation. Based on the personnel information that was provided in the nursing office of each hospital, one in three of the nursing staff, working in different types of wards and shifts, were selected and invited to participate in the study (n=606). Of these, eight persons were unavailable during the data collection period. Thus, 598 questionnaires were distributed, of which 554 completed questionnaires were returned (response rate=92%). A total of 520 were considered for analysis after the exclusion of 34 questionnaires due to a history of severe disease, pregnancy and serious stress during the past year.

The main professional group comprised RNs (76%), followed by technicians, auxiliary nurses, and aids (24% together). Of all participants, 79.4% were females and 20.6% were males. The mean number of years of work experience was 12 (8.1 SD), range 1-30 years. Poor financial status was reported by 74% of the participants. Most participants who had children (81%) reported a shortage of time to care for them; moreover, 79 % of them allocated their own spare time to household duties. In terms of lifestyle factors, regular exercise was reported by a few participants (14%); also, more than half were in the normal range of BMI (20-24).

## **4.2 DATA COLLECTION**

### **4.2.1 Data collection in Study I**

The data collection period for Study I was from September 2006 to March 2007. Individual interviews and focus group discussions were used to gain a deeper insight into nurses' experiences of the interrelationship between work and family roles. The individual interviews and focus group discussions were semi-structured and less structured with regard to time, allowing the interviewees to discuss freely. They were led by the author (NA), based on an interview guide. All interviews were held in a comfortable place, and the procedures for both interview methods were principally the same. Each focus group discussion was held with 5-6 nurses and lasted about 85 minutes; the duration of the individual interviews was about 70 minutes. Data were collected using a sound-recorder, and then transcribed verbatim and analysed. Data collection went on until data saturation was reached as suggested by Polit & Beck (2008).

All interviews began with a warm-up activity consisting of participants being asked to introduce themselves and respond to a broad question followed by the question that contained the following themes: experience of work–family roles in everyday life, affecting factors during work and family roles, responding and coping with the problems related to work–family roles, and the final consequences of these problems. At the end of all interviews the key ideas were checked, and it was possible to add ideas that had not been considered as recommended by Dahlgren et al. (2004).

#### 4.2.2 Data collection in Study II

The design of Study II was based on using an expert panel method and psychometric evaluation to adapt a questionnaire measuring personal and work factors, and health problems, among Iranian nursing personnel.

##### 4.2.2.1 *The questionnaire*

The study questionnaire was mainly based on well-established questionnaires including the NEXT study, the COPSQ, the Musculoskeletal Intervention Center (MUSIC) and the Nordic Musculoskeletal Questionnaire (NMQ). The study questionnaire contained three domains: personal factors, working conditions, and health.

*Personal factors:* This domain contained three different parts, covering socio-demographic information and organizational factors such as working hours and shifts, family situation and lifestyle items. Items concerning socio-demographic information and family situation were selected from the NEXT study questionnaire. The NEXT study, which was conducted in several European countries, is based on data from nurses (Hasselhorn, Mueller, & Tackenberg, 2003; Hasselhorn, Muller, & Tackenberg, 2005). Lifestyle items were selected from the Persian version of the MUSIC questionnaire (Vingard et al., 2000). The Swedish MUSIC questionnaire had previously been used to investigate health and risk factors for musculoskeletal disorders among staff working in the public sector and nursing personnel in Sweden. The outcome of the adaptation into Persian and its psychometrical evaluation has been reported earlier (A Alipour, Ghaffari, Jensen, Shariati, & Vingard, 2007).

*Working conditions:* This domain included two parts: physical and psychosocial working conditions. The physical items, which were selected from the NEXT study questionnaires, concerned manual patient transferring devices (wheelchair and stretcher) and awkward physical positions. The scores ranged from 1 to 4, where high scores indicated high exposure. The final score for each subject was then estimated to range from 0 to 100<sup>1</sup> (Camerino, Estryn-Behar, Conway, & van Der Heijden, 2008).

---

<sup>1</sup> The final score to obtain a rating between 0 and 100 was computed according to this formula: [(mean score of the physical items×5)/4]×20.

Items on psychosocial working conditions were from the medium length Copenhagen Psychosocial Questionnaire (COPSOQ). This was developed in 1997 as a valid and reliable comprehensive tool for measuring psychosocial work environment factors (Kristensen, et al., 2005). Nine scales were selected: quantitative demands, emotional demands, influence at work, meaning of work, role clarity, quality of leadership, sense of community, insecurity at work, and job satisfaction. The scale value for the COPSOQ is computed by gathering the points of the included questions, giving equal weight to each question. Each question has a five-ranking response and the weights are 0, 25, 50, 75, and 100. If a respondent has answered at least half of the questions, the scale score is calculated as the average of the questions answered by the same individual, but if less than half of the questions are answered, this is considered as a missing value (Kristensen, et al., 2005).

*Health problems:* This domain contained two parts: general health and mental health, and the NMQ questionnaire. The general health and mental health scales were from the Short Form-36 (SF-36) (Ware, Snow, Kosinski, & Gandek, 1993), which has previously been translated and validated in Persian in a population-based assessment (Montazeri, et al., 2005). These scales were also included in the COPSOQ; therefore the scale values were calculated in the same way as for the COPSOQ (Kristensen, et al., 2005). The last instrument used was the NMQ, which is a dichotomous questionnaire that measures problems (aches, pain and discomfort) experienced in nine body regions (neck, shoulder, elbows, hands, upper back, low back, thighs, knees, feet) during two time periods: the past 12 months and the past week. This questionnaire was developed by Kuorinka et al. (1987), and also adapted and psychometrically evaluated in Persian previously (Choobineh, Shahnava, & Lahmi, 2004).

#### 4.2.2.2 Translation process

The purpose of this study was to translate selected scales of the COPSOQ and the physical scale of the NEXT study into Persian – based on an agreement with the developers of these questionnaires. The translation process, including two forward- and two back-translations each by bilingual translators, was performed based on the adaptation process guidelines in the literature (Beaton, Bombardier, Guillemin, & Ferraz, 2000a; Beaton, Bombardier, Guillemin, & MB Ferraz, 2000b). An overview of the adaptation process of the questionnaire is shown in Figure3.




	Performance	Performer
Step 1	Selecting the contents	First expert panel (4 persons)
	Translation into Persian, back-translation into English.	Professional translators
Step 2	Validity : Content Validity Index(CVI)	Second expert panel and four nursing lecturers (9 persons)
	Face validity by questionnaire and interview.	30 nursing personnel
Step 3	Reliability (Cronbach's alpha and test-retest)	92 nursing personnel
		
Step 4	Construct validity (Spearman's correlation coefficient)	92 nursing personnel

Figure 3. An overview of steps in the adaptation process of the questionnaire (Study II)

Use of an expert panel method to adapt the questionnaire was agreed upon in our research team. The expert panel consisted of two groups: one expert group in Sweden and another expert group in Iran, from relevant fields and specialities. In addition, two Iranian members of the first expert group (in Sweden) were also members of the second expert group (in Iran), which provided for continuity and collaboration in the adaptation process. Selecting relevant questionnaires as a basis for generating a new questionnaire was the main decision by the first group.

The aim of the second expert panel was to supervise the translation and psychometric evaluation of the questionnaire. Accordingly, cultural and vocabulary adaptations were approved in an agreement meeting of the translators and the second expert panel (Figure 3, step 1). Some wordings were modified, for example the use of “family and close relatives” instead of “family”. In Iran the meaning of “family” is different from that in western societies, and refers to an extended family rather than nuclear family members. This term focused on a social norm in Iran that means responsibilities and

commitment towards extended family members (Karimi, 2008). In the last part of the translation process, the second expert panel confirmed the back-translated version in English.

#### *4.2.2.3 Data collection procedure*

The second expert panel, in collaboration with four nursing lecturers, participated in the content validity assessment of the questionnaire in terms of the Content Validity Index (CVI) for questionnaire scales concerning relevance, clarity and simplicity of each item (Polit & Beck, 2008).

In the face validity assessment, 30 participants completed the questionnaire that included an information sheet on the first page about the aim and how to answer the questions, and further an open question on the last page for the participant's comments. This was followed by interviews to investigate if each item meant the same thing to the respondent as to the investigators (Figure 3, step 2). The interviews were conducted by the author (NA). After this, the second expert panel studied the outcomes of the questionnaires and the interviews, and reached a consensus in modifying the questionnaire. In the next step the questionnaire was tested for reliability assessment and construct validity among nursing personnel from two hospitals (n=92). In the reliability assessment, internal consistency and stability (test-retest) were performed. The test-retest was calculated for half of the participants (T1; n=46); after a three-week period the retest (T2) was performed among the 42 participants who returned the questionnaires.

### **4.2.3 Data collection in Studies III-IV**

Based on a cross-sectional design, the data collection procedure with the newly adapted questionnaire (Study II) was carried out between April and November 2008. Data were collected at ten of the 20 university general hospitals in Tehran affiliated to the Ministry of Health.

#### *4.2.3.1 Questionnaire*

The author (NA) delivered the questionnaires (in envelopes) and was available in person during a two-week data collection period in each hospital. Information on how



to fill in and return the questionnaire in an envelope was provided at the first page of questionnaire and also was explained to the participants. After one week the participants were reminded both in the form of a written notice that was put on the wall of the nursing offices and orally by the nurse managers at a staff meeting. The data collection process was similar in all hospitals and was based on a consensus meeting that was held before the data collection procedure in each hospital with the nursing manager and the nursing personnel representative (each hospital has a representative of the INO).

### **4.3 DATA ANALYSIS**

#### **4.3.1 Data analysis in Study I**

The study aimed to describe Iranian nurses' experience of managing work and family roles, and further to explore the antecedents and consequences of work–family role interference. To cover the aim we used grounded theory analysis, which is defined as a method for discovering the interaction process of a social phenomenon (Strauss & Corbin, 1998). A grounded theory approach can be used in research based on different expectations (Dahlgren, Emmelin, Winkvist, & Lindhgren, 2004). Accordingly, the purpose of this study was to obtain a broad picture of the potential impact factors in the process of work–family roles among Iranian nursing personnel. Data collection began with purposeful sampling, to get a variation of experiences among the participants, followed by adding theoretical sampling, when the sampling becomes deliberate in order to fill in any categories requiring further refinement.

In this study the theoretical sampling started after interviewing three ward nurses and analysing the data, which led to the emergence of codes and categories. As recommended by Strauss & Corbin (1998), data analysis began when the first interview had been transcribed and coded; thus, data collection and data analysis were conducted at the same time. The coding process was performed in three stages: open, axial and selective coding. In open coding, subcategories and categories emerged. Propositional statements then linked the categories and developed the main categories (axial coding), and the interrelations among main categories in the selective coding stage were determined. The aim of axial coding was to integrate and reduce the categories along the dimensional level to fill in any categories in need of further refinement.

During the analysis process, theoretical notes (memos) were written to capture emerging thoughts and questions. The key method for simultaneous data collection and data analysis was “constant comparison”, which was used to compare data with data, data with category, category with other categories, until the core category/concept emerged which connected all categories. When the core concept (striving for balance between work and family demands) emerged saturation was achieved, which meant that new data did not add new ideas, as described by Polit & Beck (2008).

#### **4.3.2 Data analysis in Study II**

Descriptive statistics were performed to present the socio-demographic characteristics of the participants. For content validity assessment, a score of 0.80 and higher on the CVI was considered to be acceptable (Polit & Beck, 2008). Reliability, including internal consistency, was assessed using Cronbach’s alpha for the scales and Kurder-Richardson-20 for the dichotomous items. In addition, test-retest was performed using the Intra-Class Correlation Coefficient (ICC) for scales and Kappa coefficient for dichotomous items (Switzer, Wisniewski, Belle, Dew, & Schultz, 1999). Cronbach’s alpha and ICC equal to or greater than 0.60 and 0.70 were considered acceptable, respectively (Polit & Beck, 2008).

In the construct validity assessment, hypotheses about the relation between constructs of the study were supported by the presence of an acceptable correlation of the working conditions scores (exposure) with general health scores (outcome). To assess construct validity in this study a Spearman’s correlation coefficient equal to or greater than 0.40 was considered acceptable (Switzer, et al., 1999).

#### **4.3.3 Data analysis in Studies III-IV**

Descriptive statistics were performed to produce distribution and average value of the exposure and outcome variables. The chi-square test with  $p < 0.05$  was used to analyse group differences. In the analysis process the variables, including general and mental health (outcome) and physical and psychosocial working conditions (exposure), were divided into two categories (below and above the median value) (Moncada et al., 2010). The self-reported health scores were labelled “poor” and “not poor”, and physical and psychosocial scores were labelled “adverse” and “non-adverse”, according to the direction of each scale (Kristensen, et al., 2005). Bivariate logistic regression

analyses and odds ratios (OR) with 95% Confidence Interval (CI) were performed to estimate the association between exposure and outcome. In the logistic regression analyses, each exposure variable was adjusted for age and sex (Model I); then other exposure variables were included in the analysis (Model II) to perform multiple logistic regression analyses. Data analyses were conducted using SPSS PASW statistics 18.

#### **4.4 ETHICAL CONSIDERATIONS**

Core principles of research ethics in Studies I-IV were adhered to, in terms of the individual's possibility to participate on a voluntary basis and to be assured of confidentiality, and the signing of the consent form. Participants were all given both oral and written information about the purpose and design of the study, and how to return the questionnaire. Furthermore, they were assured that they could withdraw from the actual session at any time. This also applied to the digital recordings of the interviews. Efforts were made to maintain accuracy in handling data during the whole process. Prior to adapting the questionnaire in this thesis, all developers of original questionnaires were informed about the aim and design of the study.

There are several ethical dilemmas that have to be considered when doing research, for example how to maintain confidentiality of data. This was performed by code numbering the qualitative data, and also by keeping all collected data in a safe place in the USWR. In Study I the informants were able to choose the time and place for the interview. However, they accepted the suggested place and all interviews took place in the hospital setting.

A further dilemma could be how to handle the projected emotions of the participants in Study I. The participants generously shared their experience with the interviewer. They were never left alone when expressing their feeling and they were supported emotionally by the interviewer.

During the data collection period, which lasted two weeks in each participating hospital in Tehran, the author (NA) was present to give information about the study, and reminder notices were sent to all participants after one week. The study was approved by the Ethics Committee at the Research Division of the Ministry of Health, issued no P/391, 31 July 2005.

## 5 FINDINGS

The findings in Studies I-IV are summarized and presented in the following order:

Striving for balance between work and family demands (Study I), adaptation of a questionnaire in Persian (Study II), self-reported general health and mental health and musculoskeletal disorders (the outcomes in Studies III-IV), and associated factors: family situation and working conditions (the exposures in Studies III-IV).

### 5.1 STRIVING FOR BALANCE BETWEEN WORK AND FAMILY DEMANDS (STUDY I)

The study aimed to describe Iranian registered nurses' experience of managing work and family roles. In this study, five categories emerged from the participants' experience (see Table 3) including "family roles", "working conditions", "seeking support", "perceiving dissatisfaction", and "perceiving threats to health". Based on grounded theory method, the findings reflected a social process that could be defined in terms of antecedent, active response and consequence.

The antecedent findings based on the participants' experience reflected a combination of demanding work–family roles. To be able to play their double roles, nurses sought support from three sources: workplace and society; family and close relatives; and finally their own capability and energy, which was considered an active response. They experienced their working conditions as difficult, due to understaffing, which resulted in mandatory overtime work and inflexible work schedules. In addition to this demanding work situation, where they perceived lack of support, they faced high expectations based on the traditional role of women in the family. Since they could not ignore their own family and work roles, they had to turn to the third source of support: their personal capability and energy. Thus, based on the participants' experience they generally ignored spare time and recovery time, relying more on their own capability. Consequently their job satisfaction and health were adversely affected. These adverse effects could be considered as the consequences of the family and work roles process. Therefore, the core concept of this study, which might explain and cover the whole process of managing work and family roles, was "striving for balance between family and work demands" (Study I).

Table 3. Overview of the findings in Study I.

<i>Work-family roles process</i>	<i>Antecedents</i>	<i>Response</i>	<i>Consequences</i>
Subcategories	Multiple family roles	Family support	Family
	Difficulties in family roles	Work support	dissatisfaction
	Quantitative work demands	Finding personal	Work dissatisfaction
	Qualitative work demands	support	Neglect of personal needs
Categories	Family roles	Seeking support	Perceiving
	Working conditions		dissatisfaction  Perceiving threats to health
Core category	Striving for balance between family and work demands		

## **5.2 ADAPTATION OF A QUESTIONNAIRE IN PERSIAN (STUDY II)**

To develop the questionnaire in Persian, first a number of scales from four well-established questionnaires were translated and culturally adapted. Then the questionnaire was evaluated in terms of validity and reliability assessments. The findings regarding the validity and reliability tests are presented below.

In the content validity evaluation, the second expert panel made some changes in the questionnaire to achieve similarity between the sources and the target versions. A summary of the modified items are illustrated in Table 4. Physical working items about lifting devices were omitted as they do not exist in the study hospitals, and items concerning availability of manual patient transfer devices (wheelchair and stretcher) were added instead. Some questions about regular work schedule were also omitted. Finally in the socio-demographic part of the questionnaire, items concerning accommodation, commuting time between home and workplace and spouse's job were added. The average percent and range of the CVI for the physical and psychosocial scales were 0.84 (0.80-0.87) and 0.87 (0.81-0.89), respectively. The results of the face validity assessment and interviews improved the language and fluency of the questionnaire.

Hypotheses about the relation between constructs of the study in terms of the correlation between general health scales with the physical and psychosocial exposure items ranged between 0.56 and 0.71 for physical  $r_s$  and between 0.51 and 0.66 for psychosocial  $r_s$ . The results of reliability assessment (see Table 4) in terms of alpha levels were equal to 0.61 or higher, and the levels of ICC were equal to 0.71 or higher for all scales, and thus considered acceptable (Switzer, et al., 1999).

Table 4. Results of reliability assessment and modified items by expert panel in Study II.

Scale/item	Alpha level (no of items)	Average and range of ICC	Modified items
Socio-demographic			Items on accommodation, commuting time between home and workplace and spouse's job added.  Items on regular work schedule omitted.
Physical	.88 (3)	.85 (.81-.92)	Items on availability of lifting devices omitted.  Items on available manual patient transfer devices (wheelchair and stretcher) added.
Psychosocial:			
Quantitative demands	.74 (4)	.85 (.82-.88)	
Emotional demands	.79 (3)	.88 (.79-.94)	
Influence at work	.75 (4)	.79 (.71-.85)	
Meaning of work	.67 (3)	.84 (.77-.92)	
Role clarity	.82 (4)	.87 (.87-.89)	
Quality of leadership	.81 (4)	.82 (.72-.88)	
Sense of community	.61 (3)	.75 (.70-.88)	
Insecurity at work	.70 (4)	.76 (.71-.88)	
Job satisfaction	.84 (4)	.84 (.73-.88)	
General health	.64 (3)	.86 (.81-.89)	
Mental health	.81 (4)	.94 (.82-.97)	
Musculoskeletal disorders	.71-.82(27)	.78 (.70-.92)	

### **5.3 GENERAL HEALTH AND MENTAL HEALTH AND MUSCULOSKELETAL DISORDERS (STUDIES III-IV)**

The focus of Studies III-IV was on investigating health outcomes and associated factors. First the health outcomes, including self-reported general health and mental health, and musculoskeletal disorders, are presented below.

Table 5 shows the distribution and mean values for general and mental health: 44.8 (SD 22.2) and 52.2 (SD 20.1) respectively. Musculoskeletal disorders in at least one body region were reported by 88% of the total population during the past 12 months. Among the nine body regions of musculoskeletal disorders, the three most prevalent during the past 12 months and the past week are shown in Table 5.



Table 5. Distribution and mean values (range 0-100, a higher value indicates better health), for self-reported general and mental health, and the prevalence of musculoskeletal disorders during the past 12 months and the past week among nursing personnel (n=520).

<i><b>Self-reported health</b></i>		
	<i>N (%)</i>	<i>Mean (SD)</i>
<i><b>General health</b></i>		44.8 (22.2)
Poor/ Fair	196 (37.8)	
Good	229 (44.2)	
Very good/ Excellent	93 (18.0)	
<i><b>Mental health</b></i>		52.2 (20.1)
Poor/ Fair	209 (40.9)	
Good	198 (38.7)	
Very good/ Excellent	104 (20.4)	

<i><b>Musculoskeletal disorders:</b></i>	<i><b>During the past 12 months</b></i>	<i><b>During the past week</b></i>
	<i>N (%)</i>	<i>N (%)</i>
<i><b>Neck</b></i>	258 (49.8)	140 (27.0)
<i><b>Low back</b></i>	339 (65.3)	207 (39.8)
<i><b>Knee</b></i>	292 (56.2)	183 (35.2)

#### **5.4 FACTORS ASSOCIATED WITH HEALTH OUTCOMES (STUDIES III-IV)**

Another main finding of Studies III-IV concerned the factors associated with health outcomes, including working conditions (organizational, physical and psychosocial factors) and family situation.

Most of the participants had overtime work (69%) (see Table 6), with a mean value of 57 (SD 17) working hours/week. The majority of the participants worked shifts (81%). Regarding associations, no significant relationship was seen between health outcomes and different type of wards and shifts. However, both job position and working hours were associated with mental health (nursing managers had better mental health.). Concerning the body regions in which musculoskeletal disorders were reported, only neck disorder was associated with working hours.

Most nursing personnel reported low operating efficiency of manual patient transferring devices and also lack of a training course in using these devices. Physical and psychosocial demands were rated high (see Table 6), while influences at work, leadership and job satisfaction were reported as poor. However, most participants rated their work as meaningful.

Table 6. Distribution of organizational and the mean values of physical and psychosocial factors (range 0-100, a higher value indicates better health), among nursing personnel (n= 520).

<i><b>Organizational</b></i>		<i><b>Physical and psychosocial</b></i>	
<i><b>Working hours/ week</b></i>	<i><b><u>N (%)</u></b></i>		<i><b><u>Mean (SD)</u></b></i>
44 hours	144 (31.0)	<i><b>Lifting &amp; transferring patients</b></i>	67.16 (22.11)
45-64	214 (46.0)	<i><b>Standing position</b></i>	83.08 (16.73)
65 and more	107 (23.0)	<i><b>Bending/uncomfortable posture</b></i>	72.34 (20.77)
<i><b>Working shift</b></i>		<i><b>Work demands</b></i>	60.93 (12.99)
Morning	100 (19.4)	<i><b>Job satisfaction</b></i>	29.66 (17.75)
Night/evening	360 (69.9)	<i><b>Influence at work</b></i>	37.00 (24.38)
Morning-evening	55 (10.7)	<i><b>Meaning of work</b></i>	66.22 (19.6)
<i><b>Job position</b></i>		<i><b>Leadership</b></i>	48.19 (12.49)
Staff	429 (83.6)		
Nursing manager	84 (16.4)		

Most of the family demands (shortage of time to take care of children, allocating spare time to household duties, and caring for sick dependent relatives) were associated with poor general health, but not with poor mental health.

The exposure variables (family situation, physical and psychosocial) which were significantly related to health outcomes in the chi-square analysis were considered for further evaluation in the logistic regression analyses to test OR (95% CI) in Model I (adjusted for sex and age; see Table 7). None of the family situation variables revealed an elevated OR for the health outcomes in Model I and were thus removed from further analysis.

Multiple logistic regression analysis was performed where the other physical or psychosocial exposures were included in the analyses (Model II) (see Table 7). In Study III, none of the physical exposure variables remained in Model II for general or mental health. However, the psychosocial variables, including high work demands and poor job satisfaction, remained in Model II for poor general health, while these variables, along with meaning of work and poor influence at work, remained for poor mental health.

In Study IV, most exposure variables in Model I gave an increased OR for neck and low back disorders; but only prolonged standing position gave an increased OR for knee disorder. According to Model II, bending/maintaining an uncomfortable posture and poor job satisfaction indicated an elevated OR for neck disorder, but for low back and knee disorders OR was elevated by poor job satisfaction and prolonged standing position.

Table 7. The OR (95 % CI) of physical and psychosocial work exposures for poor general health, mental health and musculoskeletal disorders, in Model I and Model II (Studies III-IV).

Exposure variables	Mod el	Self-reported poor health		Musculoskeletal disorders		
		General health	Mental health	Neck	Low back	Knee
Physical & ergonomics						
1-Lifting & transferring patients	I	1.49 .(1.01-2.19) *	1.69.(1.16-2.46) *	1.70(1.12-2.59) *	1.47(1.01-2.13) *	-----
	II	1.18.(0.75-1.87)	1.39 .(0.89-2.17)	1.12(0.66-1.91)	1.11(0.70-1.77)	-----
2-Prolonged standing position	I	----- a	2.16.(0.90-5.19)	-----	2.64(1.05-6.62) *	8.23(1.93-35.10) *
	II	-----	1.61 .(0.65-3.94)	-----	1.91(0.71-5.14)	7.38(1.68-32.40)*
3-Bending/uncomfortable posture	I	1.62.(1.10-2.39) *	1.66.(1.14-2.42) *	2.20(1.42-3.41) *	1.47(1.01-2.12 ) *	-----
	II	1.50 .(0.95-2.39)	1.34.(0.86-2.10)	1.86(1.07-3.23)*	1.18(0.73-1.88)	-----
Psychosocial:						
1-High work demands	I	1.93.(1.32-2.83) *	2.26.(1.55-3.29)*	-----	1.56(1.08-2.24) *	-----
	II	1.57.(1.03-2.39)*	2.04.(1.34-3.12)*	-----	1.15(0.76-1.73)	-----
2-Poor job satisfaction	I	3.13.(2.11-4.65) *	3.18.(2.18-4.64) *	2.67(1.77-4.08) *	2.60(1.79-3.76)*	1.41(0.97-2.05)
	II	2.49.(1.61-3.82)*	2.75.(1.43-3.32)*	2.34(1.48-3.71)*	2.53(1.68-3.81) *	1.34(0.89-2.02)
3-Poor influence at work	I	-----	2.04.(1.40-2.98) *	-----	1.29(0.89-1.87)	-----
	II	-----	1.61.(1.06-2.43)*	-----	1.11(0.74-1.66)	-----
4-Meaning of work	I	-----	1.87.(1.29-2.70) *			
	II	-----	1.97.(1.31-2.97)*			
5-Poor leadership	I	1.42.(0.97-2.10)	1.75.(1.21-2.54) *	1.50(0.99-2.24)	-----	-----
	II	1.07.(0.72-1.61)	1.33.(0.88-1.99)	1.16(0.74-1.80)	-----	-----

\*Significant odds ratio (95 % CI)

**a** No significant relationship in the chi-square test

## **6 DISCUSSION**

The findings of different aspects of work-related health reflected that Iranian nursing personnel perceived a total demand which were not only related to demanding working conditions but also to high family expectations. They reported a high workload in terms of long working hours and inflexible shift work schedule, adverse manual handling and patient transferring tasks, low control and low reward at work. Accordingly, they were striving for balance between work and family demands which could lead to threatened health and job dissatisfaction based on the experience of participants. However, the nursing personnel found their jobs meaningful, and also perceived family values to be an important source of support and inspiration.

Therefore, it is crucial how these issues have emerged and how they were perceived by the participants. Accordingly, the process of striving for balance between work and family roles, based on an explanation and interpretation of the antecedents, responses, and consequences, is discussed (Study I). This is followed by a presentation of work-related health outcomes and associated factors (exposures) (Studies III-IV). Finally, the cultural adaptation process and psychometric properties of the questionnaire, measuring working conditions and health problems in Persian, will be discussed (Study II).

### **6.1 STRIVING FOR BALANCE BETWEEN WORK AND FAMILY DEMANDS (STUDY I)**

This study aimed at describing Iranian nurses' experience of managing work and family roles in everyday life, and further to explore the antecedents, responses and consequences of this process. In this study five categories emerged, including "family roles" and "working conditions" as the antecedents factors; "seeking support" as the response; and "perceiving dissatisfaction" and "perceiving threats to health" as the consequences. The core concept that emerged from these categories was "striving for balance between family and work demands", which covers the whole process.

The antecedent findings are consistent with previous studies, which have reported work-family roles issues among nurses (Grzywacz, et al., 2006; Majomi, Brown, & Crawford, 2003). It is important to emphasize the meaning of family and family values

in order to understand family roles in the Iranian context. The family consists not only of parents and children, but refers to an extended family, and even friends and neighbours. Family members are regularly in contact with each other, and feel responsibilities and obligations towards all members. Family is an important source of relationship, and the individual's identity is mainly shaped based on the identity of the extended family (O'Shea, 2003). Thus, a possible reason for the major family roles of Iranian female workers is the broad family duties (Karimi, 2008). Women all over the world have family duties, but to our knowledge women's involvement in the care of extended family members, and further the responsibility and care of elderly parents by unmarried women, has not been mentioned previously in studies published in western countries. Thus, both married and unmarried Iranian female nurses experience interference between work and family roles. However, it is believed that these traditional female roles and rights are changing in Iran due to the intrusion of the modern world and Internet into the lives of people; thus, the situation varies from family to family, depending on socio-economic class (Aghajanian, Tashakkori, Thompson, Mehryar, & Kazemipour, 2007).

Another antecedent category that emerged was "working conditions", which revealed a high number of weekly working hours and overtime work. Most Iranian nurses not only face mandatory overtime work but also experience a high number of weekly working hours due to the limited number of working nurses. The shortage of nurses has become the most problematic challenge around the world, mainly due to high job turnover, but in Iran the reasons are different (Li, et al., 2010; van der Heijden, et al., 2009). A possible explanation for the nursing shortage in Iran is that there are few employment opportunities, despite the fact that many graduated nurses are unemployed due to economic cutbacks (Zarea, et al., 2009).

The findings of a study to assess intention to leave the job among nurses in several European countries revealed that overtime work was considered occasionally, but mostly compensated by time off. However, in this study, intention to leave the job was associated with work-family conflict (Simon, et al., 2004). Based on the demanding nature of nursing work, most nurses around the world are confronted with shift work during night time and holidays, as well as physical workload and also emotional burdens such as human suffering, all of which might lead to intentions to leave their

jobs. However, Iranian nurses have the extra load of an inflexible work schedule added to these demands.

In addition, a negative public attitude to women working as nurses was another theme that contributed to their experience of difficult working conditions. Further, in spite of the nurses' advanced education, they are still seen as doctors' assistants in the view of the public and also in their professional context (Emami & Nasrabadi, 2007; Hagbaghery, et al., 2004). Thus, nurses do not receive the professional respect that they deserve at workplaces and in society.

In the response phase, the participants sought sources of support, including work and social facilities, family and close relatives, and personal capabilities, in order to be able to play their double work–family roles; this was in line with previous studies (Burke & Greenglass, 1999). Lack of support from the workplace and society, such as shortage of child care and elderly care, is also perceived. Thus, to be able to manage double roles in the context of traditional women's role pressure, they generally ignored their spare time and recovery time, relying more on their own capabilities. Consequently their job satisfaction and health were adversely affected. "Perceiving dissatisfaction" and "perceiving threats to health" were considered as the consequences of managing work–family roles, as expressed by the participants. It has been shown that long-lasting stress might lead to health problems, while having time for recovery in the form of exercise or social activities can promote health (McEwen, 2008). In the case of role pressure and no time for recovery, one important source of support is close relatives and parents (Burke & Greenglass, 1999, 2001), but access to these persons with the heavy traffic in Tehran might be problematic.

Based on the Effort-Reward-Imbalance model, Deryke et al. (2010) have discussed the coping strategies which may emerge in the context of work-related stress. They consider intention to leave the job to be a coping strategy used by nurses to deal with their demanding work situation. Accordingly, Iranian nurses in our study have used their own coping strategies; they were "striving for balance between family and work demands", which was the core category.



Greenhaus, Collins, and Shaw (2003) argued that being balanced means approaching each role, work and family with an approximately equal level of attention, time, involvement, and commitment. Considering the definition of being balanced, the process reviewed in this study could be regarded as striving to achieve, not real balancing. Therefore further studies are required to clarify whether these demanding roles can be truly balanced.

## **6.2 GENERAL AND MENTAL HEALTH AND MUSCULOSKELETAL DISORDERS (STUDIES III-IV)**

In this thesis, nursing staff reported poor general and mental health that was associated with adverse working conditions. The mean values for self-reported general and mental health among participants were 45 and 52 (score range 0-100), which was lower than the rating for the general population in Iran: 68 and 67, respectively (Montazeri, et al., 2005). It is important to note that results of studies from different countries have indicated that self-rated health of nurses is mostly lower than that of the general population and also compared with other job groups (Bergstrom, Bodin, Hagberg, Aronsson, & Josephson, 2009; Clausen, et al., 2010).

Nursing personnel reported musculoskeletal disorders in nine body regions during two time periods: the past 12 months and the past week. We found a high prevalence of musculoskeletal disorders in at least one body region (88%) during the past 12 months, which is in line with similar studies among Asian nurses in China and Turkey (Smith, et al., 2004; Tezel, 2005), and studies conducted in developed countries, e.g. America (Trinkoff, et al., 2002) and Australia (Schluter, et al., 2011). Similar results have also been reported in two recent Iranian studies (Choobineh, et al., 2010; Mehrdad, et al., 2010). The three most prevalent body regions during the past 12 months were low back, knee and neck. The prevalence rate of musculoskeletal disorders among the study participants was considerably higher than the statistics of the general population (Choobineh, Rajaeefard, & Neghab, 2006), and also higher than the prevalence for automobile manufacturing workers in Iran (Ghaffari, Alipour, Jensen, et al., 2006).

### **6.3 FACTORS ASSOCIATED WITH HEALTH OUTCOMES (STUDIES III-IV)**

Concerning physical and ergonomic work exposures, most nursing personnel reported deficiency and low quality of manual patient transferring devices (stretchers and wheelchairs) and also a lack of training in this matter. Over-exertion in manual handling and patient transfer, standing for a long time and maintaining uncomfortable positions, were other factors that were reported. High physical workload has been reported in most occupational health studies among nurses (Kim, Geiger-Brown, Trinkoff, & Muntaner, 2010; S. Kim, Barker, Jia, Agnew, & Nussbaum, 2009) as the exposure of musculoskeletal disorders. Nursing is a physically demanding job in terms of lifting and transferring tasks, and uncomfortable postures. Thus it is highly related to musculoskeletal disabilities (Engkvist, 2006; Waters, et al., 2006).

Accordingly, many preventive programmes have been implemented around the world to decrease problems with lifting and transferring patients, using manual and mechanical patient lifting and transferring devices (Engkvist, 2006). There are several approaches to training healthcare workers in using related devices for patient lifting and transferring. One important issue is how to evaluate the results of training courses. Traditionally, this has been measured in terms of decrease in musculoskeletal disorders. However, a more relevant evaluation of the effect of training is to assess the skills in patient transfer technique of nurses who have participated in training courses. In order to evaluate training sessions, an observational instrument was developed based on nurses' skills and patients' evaluation of safety and comfort during transfers, for example from bed to chair (Johnsson, Kjellberg, Kjellberg, & Lagerstrom, 2004). One Swedish study reported that there was a relation between nurses' skills in patient transfers and quality of patient care (Kjellberg, Lagerstrom, Hagberg 2004). Subsequently, there is a need to conduct "on the job training" courses to decrease the risks of manual lifting and transfer technique among healthcare workers in Iran.

In line with other studies discussing the psychosocially demanding work of nurses in Iran (Mehrdad, et al., 2010; Nikbakht Nasrabadi & Emami, 2006) and other countries (Aust, et al., 2007; Gunnarsdottir, et al., 2003), this thesis also found demanding psychosocial work and low influence at work. These results could be explained based on the organizational situation that the participants reported in this study, in terms of the high number of ordinary working hours (44 hours/week), mandatory overtime

work, and inflexible and irregular shift work. A study of nurses in seven European countries conducted by the NEXT research group discussed nurses' satisfaction with working hours, as they were neither allowed to choose the type of shift schedule nor given adequate incentives for their night duties (Camerino, et al., 2008). These high work demands, along with low influence at work, might be related to a perceived stressful work situation, which consequently had an adverse effect on the health of employees, based on the perspective of the DCS model (Ala-Mursula, Vahtera, Kivimaki, Kevin, & Pentti, 2002; Hasselhorn et al., 2008). Accordingly, the findings of this thesis in terms of adverse organizational, physical and psychosocial working conditions could be explained based on this model.

In line with previous studies (Nasrabadi, et al., 2004; Zarea, et al., 2009), the participants also reported low satisfaction with their job in terms of the salary, workload and also considering their job as a whole. One prominent imbalanced factor relating to effort and reward is the employees' low salary, which has been reported as one common reason for leaving nursing. Low salary contributes to job dissatisfaction in different ways. Nurses do not think that their salary is in proportion to their responsibility (Sjogren, Fochsen, Josephson, & Lagerstrom, 2005), the pay is too low in relation to comparable education (Fochsen, Sjogren, Josephson, & Lagerstrom, 2005; Kalliath & Morris, 2002), and the way in which salaries are set is also unclear (Gardulf et al., 2005). An imbalance in terms of high efforts at work and low occupational rewards in return, might explain this situation based on the ERI model (Derycke et al., 2010). Most of these explanations involving low salary could probably be considered as the reasoning behind job dissatisfaction also for Iranian nurses. In addition, almost three in four of the participants reported an adverse financial status, which might confirm these findings.

The mental health of manager nurses was higher than that of the staff; this might mean that they are more involved in their workplace goal planning than staff nurses. Results of a study among Swedish hospital nurses to assess the intention of nurses to quit their jobs showed that nurses who had no intention of quitting reported better mental energy and well-being than those who intended to quit, because the former reported involvement in their unit goal planning. This group also rated greater job satisfaction and higher quality of work competence (Gardulf, et al., 2005). Thus, one possible

explanation related to this thesis is that staff nurses did not perceive participatory leadership, which was also confirmed by the low rating of leadership. The low quality of leadership found in our study, in terms of lack of role clarity and unclear job descriptions, has also been reported previously in other nursing studies (Feng, Chen, & Mao, 2007; Lu, While, & Louise Barriball, 2005).

An interview study among hospital nursing staff and managers in Iran remarked that lack of support and ignoring the value of nursing services, and also lack of control over the practice setting, were the main issues related to professional power in nursing (Hagbaghery, et al., 2004). This might be due to the fact that nursing managers are not supported by top management, and thus, in turn, cannot be supportive to staff nurses. The nursing managers in our study had to organize the work at the ward that they were in charge of, and could not consider the personal preferences of staff nurses when too few nurses were employed, as stated in Study I. This has established the inflexible work schedule for staff nurses.

In spite of these findings, most nurses found their job meaningful. Often nurses stated that their contact with patients was rewarding (Emami & Nasrabadi, 2007; Fakhr-Movahedi, et al., 2011). Optimistically, there is still a core motive in Iranian nursing work that can provide a positive background for improving working conditions and increasing nurses' satisfaction, along with job-promoting interventions, which might finally lead to improvements in the quality of patient care.

In summary, taking all findings into consideration, it could be concluded that nursing personnel perceived a demanding socio-cultural situation in their personal life that was related to the negative public view of nursing and their family role pressures (Study I). Further, in their working life they also experienced different demands related to organizational, physical and psychosocial conditions. In the context of demanding working conditions and socio-cultural pressure it is not surprising that nurses' health was adversely affected, as they relied on their own capabilities without considering time for recovery. Based on this background, possible strategies to improve occupational health among Iranian nursing personnel could be considered at two levels: the organization as a whole and the workplace.

At the organizational level, it is the “healthcare system” which provides healthcare services, mainly in the form of medical centres and hospitals (hospital-based healthcare service). There is a lack of systematic structure for continuity of care between hospital and community. A transition in this perspective to a community-based service might establish a multi-disciplinary approach. This approach could lead to improvements in the roles of different professions in the healthcare team, and provide opportunities for nurses to use the full range of their nursing skills (Hajbaghery & Salsali, 2005). In integrated community-based care services, nursing competence could be recruited and extended to the different levels of the community, and thus make nursing more visible, which in turn might positively affect the public view of nursing. This is the most important improvement for Iranian nurses, based on their crucial role in providing healthcare services and also their educational level; they deserve respect both in the view of the public and the healthcare sector.

Another important strategy to alter public opinion is related to the workplace and refers to improving the work situation. Job redesign interventions in terms of revising hard physical and ergonomic factors, high psychosocial work demands and leadership styles, and low job payment are examples of these interventions. There is scientific evidence which indicates a positive relation between job payment and social status of the employees (Zarea, et al., 2009); therefore paying salaries to nurses that are based on their efforts and education would raise their social status, and positively affect the public view as well. By recruiting more nurses, and thus decreasing the current shortage, a flexible work schedule could be provided.

Based on the traditional female role expectations, these improvements could be regarded as the most important factors to create a positive public view of nursing. One interesting finding of this thesis was that family demands were not related to mental health. Taking into consideration the meaning and values of family life, it is important to plan and implement strategies at both levels; for example, policy makers should provide state and social facilities such as child care and elderly care, which, along with the other interventions, could lead to improved occupational health among Iranian nursing personnel. This would provide a contextually based improvement of working conditions, increase nurses’ job satisfaction and improve the quality of healthcare.

#### **6.4 ADAPTATION OF A QUESTIONNAIRE IN PERSIAN (STUDY II)**

The aim of this study was to adapt a questionnaire in Persian, measuring health problems, personal factors and working conditions. Prior to the study, based on the multi-dimensional characteristics of work-related health, it was agreed to use the method of an expert panel combined from relevant professions (Beaton, Bombardier, Guillemin, & Ferraz, 2000a). Accordingly, two expert panels were formed – one in Sweden and another in Iran – and they collaborated in leading this study. The main decision of the former group was to select the primary questionnaires and develop a new questionnaire that was as short as possible while maintaining good measurement properties (Kompier & Taris, 2004; Nubling, Stobel, Hasselhorn, Michaelis, & Hofmann, 2006). The latter expert group first made an action plan which contained the different steps of the adaptation process, including translation and back-translation, validity and reliability assessments. All adaptation steps were supervised by the expert panel until the process was completed (Beaton, Bombardier, Guillemin, & Ferraz, 2000a).

The results showed that the adapted questionnaire had an acceptable conceptual structure for measuring working conditions, health problems and personal factors among Iranian nursing personnel.

It is important to note that the findings of Study I were included in the selection and adaptation process of the questionnaire, which improved the structure and the content. Dahlgren, Emmelin, Winkvist, & Lindhgren (2004) discussed the different applications of grounded theory findings and remarked that one important use is when this method can discover and describe different aspects of a phenomenon and also formulate associations. Thus, by using the findings of the grounded theory study, we were able to create a picture of the total demands, as well as the possible exposures and outcomes in this thesis.

## 6.5 METHODOLOGICAL CONSIDERATIONS

The research methods have been described in detail in Studies I-IV. The strengths and limitations of these four studies are discussed below.

**Design:** Different aspects of a phenomenon can be assessed by including a mixed method in the research design (Dahlgren, et al., 2004). The focus in this thesis was on gaining a better understanding of work-related health and associated factors, in the context of work, family and society, based on the perception and experience of nursing personnel. By using both qualitative and quantitative methods we have tried to achieve this. In Study I, by using grounded theory analysis, a general picture of the dynamic of the work–family roles process emerged (Strauss & Corbin, 1998).

Concerning the multi-dimensional aspects of occupational health, it was suggested that a comprehensive questionnaire should be developed (Kompier, 2005). To quantify the health outcomes and exposure variables, a multi-scale questionnaire from relevant, well-established instruments was selected and then culturally adapted and psychometrically tested in Study II, based on the guidance literature (Beaton, Bombardier, Guillemin, & Ferraz, 2000a; Beaton, Bombardier, Guillemin, & MB Ferraz, 2000b). Additionally, during the adaptation process the findings of Study I improved the structure and usability of the questionnaire. Finally, the adapted questionnaire showed an acceptable conceptual structure and provided reliable information on health and related factors, among Iranian nursing personnel.

The newly adapted questionnaire was then used in the cross-sectional research in ten university hospitals in Tehran (Studies III-IV). Thus, these results might be generalized in similar settings. Cross-sectional studies using self-reported questionnaire are often a first step in identifying risk exposures in large samples and are, thus, the most usable and cost-effective method, but with some limitations, the most important being that there is no cause-and-effect relationship between the exposures and outcomes (Kompier, 2005; Theorell & Hasselhorn, 2005).

**Sampling:** The ten university general hospitals affiliated to Ministry of Health in Tehran were included in Studies III-IV. There is no system of recruiting in any of these hospitals, since the Ministry of Health employs staff and nursing personnel and then allocates them to the hospitals (Hagbaghery, et al., 2004). Due to this centralized approach there is no systematic difference between the nursing personnel of different hospitals. However, concerning the possible effects of hospital locations, these hospitals were randomly selected from three different regions of the city – north, central and south – to achieve the greatest similarity between participants.

The participants were those who were currently working. Personnel who had left their jobs, perhaps due to health problems, were excluded, and thus a healthy worker effect might have occurred (Checkoway, Pearce, & Kriebel, 2007). Based on the recommendations of the nursing managers, who claimed that they could not allow more nurses to participate in the study due to the need to maintain quality of care, we agreed to limit the study group at each hospital to one in three of all nursing personnel. This might have led to selection bias (Polit & Beck, 2008). However, we tried to achieve the greatest possible variation in the sampling, concerning type of ward, shift work and level of education.

There is also a possibility that results were affected by the exclusion of dropout participants, but as they only accounted for eight percent of all participants, the effect is probably not considerable. The thesis addressed the work situation of nurses in public hospitals and no other setting; however, at most of these workplaces the current hospital-based approach to provide healthcare services is used. The acceptable response rate (92%) in Studies III-IV might be explained based on Polit and Beck (2008), who stated that when questionnaires are handled personally in research, as was the case in this thesis, the response rate is higher than when they are sent by post.

**Data collection:** In Study I, efforts were made to provide a comfortable situation for the interviews. All interviews were performed by the author (NA) and based on an interview guide; furthermore, since the interviewer was a female nurse this might have had some impact on the interviewees. We included both the staff and manager nurses in the individual interviews, but the manager nurses were not involved in the two FGDs due to the possibility of group dynamic effect and reporting bias.



There may have been an under-reporting bias related to the possibility that nursing managers influenced the staff to report an ideal working condition. To prevent this potential impact, information was given on aim, design and data collection of the study; furthermore, the participants were given oral and written assurance that participation was anonymous. Another preventive decision about under-reporting bias was made based on an initial agreement with the INO, where the representatives of the nursing personnel acted in collaboration with the author (NA). Thus the representatives were involved in the process of data collection in terms of distributing and collecting the questionnaire in each hospital. This might also have led to the good response rate (92%) in Studies III-IV. The findings of this study gave a variety of answers and were consistent with other relevant studies (Aust, et al., 2007; Choobineh, et al., 2010; Zarea, et al., 2009).

It is worth noting that perception of health and illness varies among people, depending on age, sex, context and culture. Based on the findings of Study I, reflecting that when nurses face the pressure of work–family roles they usually neglect their own health needs, we believe that an under-reporting of poor health might have occurred. Another possible explanation related to under-reported poor health, is the high patient-to-nurse ratio. Accordingly, nurses claimed that they could not express their requests and desires because they were uncertain whether they would get a relevant response from their nursing manager, who frequently repeated the same answer: “We don’t have enough staff.” (Study I). This uncertainty, as well as low insurance coverage, might have meant that the nurses worked when they felt ill. The effect of insurance systems on sick-leave days has been discussed as an important factor in assessing health outcome and performance at work (Dellve, Hadzibajramovic, & Ahlborg Jr, 2011). This was one feedback from Study I, and accordingly we agreed not to include the questions related to sick-leave days in the questionnaire.

In Tehran there are many risks factors in terms of overcrowding, air pollution, noise and time pressure due to the heavy traffic, which may also lead to over-reported adverse health. In addition, one form of over-reporting of adverse working conditions might have occurred among nurses with poor health outcomes, in that they might have

assessed the work situation as more negative compared with those who were in good health (Polit & Beck, 2008) (Studies III-IV).

It is worth noting that the questionnaires that are used in the studies of client-service professions are expected to cover all psychosocial aspects of these professions, e.g. quantitative demands and emotional demands (Gillen et al., 2007; Rugulies, Aust, & Pejtersen, 2010; Rugulies et al., 2004). In this thesis, the psychosocial aspects of nursing work were measured using the COPSQ (Kristensen, et al., 2005), which is theory-based and related to the most prominent theories in occupational health psychology, including the Demand-Control-Support model, the Effort-Reward-Imbalance model, and the Michigan leadership model (Kompier, 2005).

**Data analysis:** In order to develop the core category in grounded theory studies, Strauss and Corbin (1988) discussed that it may develop out of the list of existing categories. Each category tells part of the story, but none captures it completely, which was the case in Study I, and the core category emerged in the same way. Further regarding trustworthiness, credibility was established through member checks, the participants were given feedback about their emerging experience. Confidence about no possible effect of previous experience in the field was controlled by using peer checks, a form of triangulation by involving the research group in the whole research process and also by using bracketing technique as recommended by Strauss & Corbin (1998).

Maximum variation of sampling and confirmation of the data saturation also improved the confirmability and credibility of the data in Study I (peer debriefing, supervision). Data collection continued until saturation occurred, when no more new codes were emerged from the nurses' experience (Polit & Beck, 2008). To make the research easier to follow for others, precise documentation of dependability was made after providing a proper documentation of this data. It is up to the reader to judge the transferability of the findings of Study I to the context, as stated by Strauss and Corbin (1998).

In Study II, based on applying a comprehensive view, a number of variables were considered in the new questionnaire. However, it was culturally adapted and psychometrically tested based on the guidelines in the literature. In Studies III-IV, the statistical consideration concerning these different variables was testing the outcomes

and exposures in a univariate logistic regression analysis based on the two adjusted and multiple models (Checkoway, Pearce, & Kriebel, 2007).

As expected, no considerable gender differences have been seen concerning a female-dominant sample in Studies III-IV. To reduce recall bias in Study IV, the frequency of musculoskeletal disorders was analysed using the time period of the past week.

## **6.6 CONCLUSION**

Different aspects of work-related health in Iranian nursing personnel have been studied in this thesis. With regard to physical work demands, inadequate and low quality manual patient transferring devices and lack of training in their use, as well as perceived over-exertion, were common. Psychosocial work demands were high, with reports of low influence at work, poor leadership and job dissatisfaction. Other demanding work factors were long working hours and inflexible work schedules. These organizational, physical and psychosocial work demands were associated with self-reported general and mental health, and musculoskeletal disorders. Nurses were striving for balance between their demanding work role and high traditional family expectations, which resulted in threatened health and life dissatisfaction.

Nevertheless, the nursing personnel found their jobs meaningful, which might be related to their high job commitment to provide patients with good quality of care, as well as their motivation to participate in social activities, and help their children and extended family financially and practically. They also perceived family values to be an important source of support and inspiration.

The adapted questionnaire had an acceptable conceptual structure to measure personal factors, working conditions and health problems among Iranian nursing personnel.

## **6.7 IMPLICATIONS FOR NURSING PRACTICE**

This thesis contributes new knowledge in that it explains how interference between work and family roles is experienced among nursing personnel in Iran – a society with traditional women's roles, where family role expectations and working conditions are different from those in western countries. The empirical findings can be implemented in a similar setting or in other settings with similar work and family background. The adapted questionnaire could also be used to measure occupational health among nursing personnel or among other shift-work professions in similar settings.

The most important implications recommended in this thesis are based on two principles. The first principle is that there should be a comprehensive perspective, taking into consideration the total demands in both work and non-work contexts in research, and then testing in a pilot study prior to implementing work promotion

interventions. The second principle concerns feasibility aspects of the implications. According to these principles, the implications of this thesis are presented below in four different levels:

***Individual level:*** Nursing as an emotionally demanding job and human caring profession requires interrelationship qualifications and up-to-date knowledge that should be focused on by nursing managers in order to improve the capability of the individual nurse, e.g. coping and stress management courses for nurses' health protection and also continuous job education on caring. All together this could promote self-efficacy and work-efficiency.

***Workplace and organization level:*** Participatory leadership and interrelationship improvements should be provided, by involving nursing staff in goal planning and workplace improvement interventions; improvements in organizational, physical and psychosocial working conditions should also be made. Merely focusing on higher job commitment might lead to adverse health and burnout.

The immediate short-term implication of this thesis is that physical working conditions should be enhanced by training courses on using manual patient transferring devices, and adequate devices should be provided in hospitals. In terms of the organizational implications, it is recommended that sufficient nursing personnel should be recruited to decrease staff shortages and provide a flexible working schedule.

The current hospital-based approach to providing healthcare services does not give nurses the opportunity to use the various nursing skills for which they have been trained. Health policy makers should take a community-based approach, and develop a structure for continuity of care between community and hospitals. These interventions, as well as the development of a logical structure for paying salary to nursing personnel, could increase job satisfaction and promote occupational health, which would consequently lead to improvements in the quality of healthcare.

***Academic and educational level:*** To achieve evidence-based intervention, the results of related research should be implemented in education and in practice, with a view to

decreasing the research/education—practice gap in nursing care in Iran. The nursing curriculum should be revised and should be flexible, based on the care needs of society.

***Socio-cultural level:*** Implementation of these three levels of implications, and provision of social facilities such as child care and elderly care for all work shifts, as well as supportive policies for empowering professional foundations of nurses (e.g. INO and other practical or scientific councils in nursing), might make nursing more attractive and would undoubtedly lead to a positive public view of the nursing profession.

Finally, one more implication is the need to establish a systematic multi-disciplinary occupational health service in all work sectors including the healthcare sector and hospitals.

## 7 SAMMANFATTNING – SUMMARY IN SWEDISH

Sjuksköterskor utgör den största gruppen vårdanställda och har en avgörande roll inom omvårdnadsarbetet. Internationella studier visar att dagens arbetsmiljö inom vården kan öka risken för nedsatt hälsa hos vårdpersonalen, vilket i sin tur kan leda till bristande omvårdnadskvalitet. Det övergripande syftet med denna avhandling var att studera iranska vårdanställdas arbetsrelaterade hälsa och samvarierande faktorer. Ett ytterligare syfte var att beskriva iranska sjuksköterskors upplevelse av att hantera arbets- och familjeroller.

Avhandlingen baseras på fyra studier varav den första utfördes med kvalitativ och de övriga med kvantitativ metod. **Studie I** fokuserade på processen att hantera både arbets- och familjeroller för 22 iranska kvinnliga sjuksköterskor. I **studie II** anpassades ett frågeformulär, som baserades på väl beprövade internationella instrument till att användas inom vårdsektorn i Iran. Avsikten med frågeformuläret var att studera personfaktorer, arbetsförhållanden och hälsa. Psykometrisk utvärdering på iransk vårdpersonal genomfördes och det anpassade frågeformulär användes därefter i en tvärsnittsundersökning (**studierna III-IV**). Självskattad generell hälsa, mental hälsa och besvär i rörelseorganen samt organisatoriska, fysiska och psykosociala faktorer i arbetet och familjesituation studerades hos 520 anställda vid 10 universitetssjukhus i Tehran.

Resultaten från **studie I** visade på sjuksköterskornas strävan efter balans mellan arbets- och familjeroller. Resultatet av den psykometriska utvärderingen visade att det anpassade frågeformuläret hade acceptabel validitet och reliabilitet (**studie II**). I **studierna III-IV** rapporterade vårdpersonalen bristande tillgång och dålig kvalitet på befintliga hjälpmedel för användning vid förflyttning av patienter och även upplevelse av fysisk ansträngning. Dessutom angav deltagarna ett lågt inflytande över arbetet, svagt ledarskap, brist på flexibla arbetsscheman samt otillfredsställelse med arbetssituationen. Dessa faktorer hade samband med generell och mental hälsa, med besvär i rörelseorganen samt med familjesituation. Däremot uppfattade vårdpersonalen omvårdnadsarbetet som meningsfullt och det förelåg inget samband mellan mental hälsa och familjesituation.

Slutsatsen är att sjuksköterskornas strävan efter balans mellan höga krav i arbetet och högt ställda traditionella familjeförväntningar kan utgöra en risk för nedsatt hälsa och även leda till otillfredsställelse med livssituationen. Trots detta förelåg inget samband mellan mental hälsa och familjesituation. Familjen uppfattades som en viktig källa till stöd och inspiration. Nedsatt generell hälsa samt besvär i rörelseorganen var relaterat till flera faktorer i arbetet samt till familjesituationen. Följaktligen skulle förbättrade fysiska och psykosociala arbetsförhållanden med möjlighet till flexibelt arbetsschema och med barnomsorg och äldreomsorg anpassade för skiftarbetande kunna stödja sjuksköterskorna i att hantera sina arbets- och familjeroller. Dessa åtgärder skulle förhoppningsvis kunna leda till en förbättrad hälsa hos vårdpersonalen högre kvalitet på omvårdnadsarbetet.



## 8 ACKNOWLEDGEMENTS

During the challenging, demanding and finally rewarding years of doctoral study I experienced a really constructive journey. The most rewarding part was to develop the insight and understanding needed to continue my journey in finding the countless future mysteries in this area. Another reward is the opportunity to mention the many individuals who, without their support this thesis would not have been produced.

First I would like express my thanks to all those who have supported me in different ways especially who may not be mentioned here but who I have in my heart.

I would like also to express by deep appreciation to the following:

All the nursing personnel and nursing managers who participated in the interview and questionnaire studies for the generous sharing of their ideas; I hope I have succeeded in incorporating these in the results. In addition I would like to thank the members and representatives of the Iranian Nursing Organization (INO) for their support during data collection in the hospitals and to thank also the administration and staff of the involved universities.

My sincere appreciation for the academic climate in the Karolinska Institutet (KI) which through an appropriate system and facilities provided a background for developing doctoral students. I really appreciate having the opportunity to stud at the Department of Neurobiology, Caring Sciences and Society (NVS), Division of Nursing, and thank all for sharing their knowledge and constructive comments.

I would like also the thank associate professor Monica Lagerström at the Department of NVS, Division of nursing, KI, my main supervisor, for believing in me and guiding me through all passages. Thank you for being supportive during my moments of doubt, your patience in my hard moments, and for your all understanding. Thank you also for your commitment with arranging regular meetings and your effort during many long hours of reading and discussing.

Associate professor Malin Josephson at the Department of Occupational and Environmental Medicine, Uppsala University, my co-supervisor, thank you for your

constructive criticisms. Thank you for your support and sharing your knowledge and also your guidance through the statistics tests.

Associated Professor Masoud Fallahi Khoshknab at the University of Social Welfare and Rehabilitation Sciences (USWR), Division of nursing in Tehran, my co-supervisor thank you for sharing your knowledge and being supportive through long period of planning and implementing data collecting. Thank you also for your supervision during the design and data analysis of the qualitative study.

Associated Professor Mostafa Ghaffari at the Occupational Medicine Research Center of Tehran University of Medical Sciences, Researcher at Department of Occupational and Environmental Medicine, Uppsala University. Thank you for generously sharing your knowledge in the area of occupational health and also thank you for your contribution in adapting the questionnaire and being authorship of its article.

I would also like to thank many other senior researchers who have generously contributed to develop my knowledge during this journey through their constructive discussions and valued comments: Professor Hoshang Shahnava, in adapting the research questionnaire, Ann Langvis-Eklöf, Inga-Lill Pettersson and Agneta Cronqvist, the evaluation board of my half time seminar, Yvonne Wengström, and Per-Olof Sandman during my Kappa seminar, finally Lars E. Eriksson and Anne-Marie Boström accepting to give comments in my pre-defence seminar.

Thank you everybody at Department of NVS, Sektionen för omvårdand, Alpha and Gama units for the warm workplace; thank you my dear friends, first of all Agneta Wennman-Larsen and her family for the kind support of me and my children during our first stay in Stockholm, Elisabet Welin Henriksson for her kind support and understanding, many thanks also to Johanna Ulfvarson and her family for the hospitality and her kind support of me and my children.

Thank you Carina Dahlin, for your kind administrator helps during all years of my doctoral study.

To all the people in my country mentioned below, and also those I have left out, thank you for sharing your knowledge and the kind support. First of all Dr. Monir Sadat.

Maddah, my role model in caring science, thank you for your support, your kind concerns and advice and for your helpful recommendations on the qualitative research in my thesis proposal. Thanks also to all my colleagues in the USWR, department of nursing for your support and understanding. Thanks also to all authorities and staff, my colleagues in the different units of the USWR that supported me during my doctoral study including: The Psychiatric Center of Razi, The Rofayde Hospital, deputies of Education, Research and Administration. Thank you also for all experts in the departments of Ergonomics and psychology (USWR) and also department of Work environment health, Faculty of Health in the Iran University of Medical Science who were so generous in sharing their knowledge in adapting the research questionnaire.

All of my Iranian fellow students: Zahra Mosalanezhad, Mandana Fallahpour, Tahereh Najafi, Sedigheh Khanjari, Ahmad Delbari, Asghar Dalvandi, and especially Jalal Safipour thank you all for sharing your concerns, experience and knowledge during our long course of doctoral study. Thank you my dear friends, who will defended their thesis soon, Camelia Rohani for sharing your knowledge and your support and Monir Mazaheri thank you for sharing your knowledge, and your kind advice about social and practical life in Stockholm and also thank you for being always helpful. My dear friend Hamideh Mohammad Zadeh, thank you for sharing your knowledge during writing my thesis. Thank you also for your encouragement and kind support.

My special thanks to my beloved family:

Mousa Parvizi, my dear husband thank you for your kind support and encouragement during this hard and long journey. Thank you for your understanding. Mahsa and Niloufar my darling daughters, countless thanks for your endless patience, understanding and kind support.

Shamsi Khaledian and Mohammad Hassan Aarsalani my dear parents, Nasrin and Shabbo my beloved sisters and their families thank you for your caring support I have you all in my heart and spirit, and thank you the other member of my family and relatives here and there when I had to trip with lots of concerns in behind, I was alone here but you all made me sure that I felt never lonely. My dear family, hopefully now it is the time to enjoy life together.

## 9 REFERENCES:

- Ahmad-Nia, S. (2002). Women's work and health in Iran: A comparison of working and non-working mothers. *Social science & medicine*, 54(5), 753-765.
- Aghajanian, A., Tashakkori, A., Thompson, V., Mehryar, A. H., & Kazemipour, S. (2007). Attitudes of Iranian Female Adolescents Toward Education and Nonfamilial Roles. *Marriage & Family Review*, 42(1), 49-64.
- Agius, R. (2011). Health, Environment and Work. Available at: <http://www.agius.com/hew/resource/ohsilo.htm> (Accessed 10 Jan 2012).
- Aittomäki, A., Lahelma, E., Rahkonen, O., Leino-Arjas, P., & Martikainen, P. (2007). The contribution of musculoskeletal disorders and physical workload to socioeconomic inequalities in health. *The European Journal of Public Health*, 17(2), 145-150.
- Ala-Mursula, L., Vahtera, J., Kivimäki, M., Kivimäki, M. V., & Pentti, J. (2002). Employee control over working times: associations with subjective health and sickness absences. *Journal of Epidemiology and Community Health*, 56(4), 272.
- Alipour, A., Ghaffari, M., Jensen, I., Shariati, B., & Vingard, E. (2007). Reliability and validity study of Persian modified version of MUSIC(musculoskeletal intervention center) – Norrtälje questionnaire. *BMC Musculoskeletal Disorders*, 8(1), 88.
- Alipour, A., Ghaffari, M., Shariati, B., Jensen, I., & Vingard, E. (2008). Occupational neck and shoulder pain among automobile manufacturing workers in Iran. *American journal of industrial medicine*, 51(5), 372-379.
- Antonovsky, A. (1979). Health, stress, and coping: New perspectives on mental and physical well-being: San Francisco: Jossey-Bass.
- Antonovsky, A. (1987). *Unraveling the mystery of health: How people manage stress and stay well*: Jossey-Bass.
- Antonovsky, A. (1996). The salutogenic model as a theory to guide health promotion. *Health promotion international*, 11(1), 11.
- Aust, B., Rugulies, R., Skakon, J., Scherzer, T., & Jensen, C. (2007). Psychosocial work environment of hospital workers: Validation of a comprehensive assessment scale. *International journal of nursing studies*, 44(5), 814-825.
- Bambra, C., Egan, M., Thomas, S., Petticrew, M., & Whitehead, M. (2007). The psychosocial and health effects of workplace reorganisation. 2. A systematic review of task restructuring interventions. *Journal of Epidemiology and Community Health*, 61(12), 1028-1036.
- Beaton, D., Bombardier, C., Guillemin, F., & Ferraz, M. (2000). Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*, 25(24), 3186.
- Beaton, D., Bombardier, C., Guillemin, F., & Ferraz, M. (2000). Recommendations for the cross-cultural adaptation of health status measures. *Spine*, 25, 3186-3191.
- Bergstrom, G., Bodin, L., Hagberg, J., Aronsson, G., & Josephson, M. (2009). Sickness presenteeism today, sickness absenteeism tomorrow? A prospective study on sickness presenteeism and future sickness absenteeism. *Journal of Occupational and Environmental Medicine*, 51(6), 629.
- Borg, V., & Kristensen, T. S. (2000). Social class and self-rated health: can the gradient be explained by differences in life style or work environment? *Social Science and Medicine*, 51(7), 1019-1030.
- Bowling, A. (1997). *Measuring health. A review of quality of life measurement scales*: Open University Press.

- Bowling, A. (2005). Just one question: If one question works, why ask several? *Journal of Epidemiology and Community Health*, 59(5), 342-345.
- Burke, R. J., & Greenglass, E. R. (1999). Work–family conflict, spouse support, and nursing staff well-being during organizational restructuring. *Journal of Occupational Health Psychology*, 4(4), 327.
- Burke, R. J., & Greenglass, E. R. (2001). Hospital restructuring, work-family conflict and psychological burnout among nursing staff. *Psychology and Health*, 16(5), 583-594.
- Camerino, D., Conway, P. M., Sartori, S., Campanini, P., Estry-Behar, M., Van Der Heijden, B. I. J. M., et al. (2008). Factors affecting work ability in day and shift-working nurses. *Chronobiology international*, 25(2-3), 425-442.
- Camerino, D., Estry-Behar, M., Conway, P. M., & Van Der Heijden, B. I. J. (2008). Work-related factors and violence among nursing staff in the European NEXT study: A longitudinal cohort study. *International journal of nursing studies*, 45(1), 35-50.
- The U.S. Equal Employment Opportunity Commission. (2007). Questions and Answers about Health Care Workers and the Americans with Disabilities Act. Available at: [http://www.eeoc.gov/facts/health\\_care\\_workers.html](http://www.eeoc.gov/facts/health_care_workers.html) (Accessed 10 Jan 2012).
- Checkoway, H., Pearce, N., & Kriebel, D. (2007). Selecting appropriate study designs to address specific research questions in occupational epidemiology. *Occupational and environmental medicine*, 64(9), 633-638.
- Choobineh, A., Movahed, M., Tabatabaie, S., & Kumashiro, M. (2010). Perceived Demands and Musculoskeletal Disorders in Operating Room Nurses of Shiraz City Hospitals. *Industrial Health*, 48(1), 74-84.
- Choobineh, A., Rajaeefard, A., & Neghab, M. (2006). Association between perceived demands and musculoskeletal disorders among hospital nurses of Shiraz University of Medical Sciences: a questionnaire survey. *International journal of occupational safety and ergonomics: JOSE*, 12(4), 409-416.
- Choobineh, A., Shahnavaz, H., & Lahmi, M. (2004). Major health risk factors in Iranian hand-woven carpet industry. *International journal of occupational safety and ergonomics*, 10(1), 65-78.
- Clausen, T., Christensen, K. B., & Borg, V. (2010). Positive work-related states and long-term sickness absence: A study of register-based outcomes. *Scandinavian Journal of Public Health*, 38(3 suppl), 51-58.
- Dahlgren, L., Emmelin, M., Winkvist, A., & Lindhgren, M. (2004). *Qualitative methodology for international public health*: Epidemiology and Public Health Sciences, Department of Public Health and Clinical Medicine, Umea University.
- Danna, K., & Griffin, R. (1999). Health and well-being in the workplace: A review and synthesis of the literature. *Journal of Management*, 25(3), 357-384.
- Dellve, L., Hadzibajramovic, E., & Ahlborg Jr, G. (2011). Work attendance among healthcare workers: prevalence, incentives, and long-term consequences for health and performance. *Journal of Advanced Nursing*.
- Dellve, L., Lagerstrom, M., & Hagberg, M. (2003). Work-system risk factors for permanent work disability among home-care workers: a case-control study. *International archives of occupational and environmental health*, 76(3), 216-224.
- Deputy of the Iranian Nursing Organization (INO) (2011). Available at: <http://www.ghatreh.com/news/6703682.html> (Accessed 11 January 2011).
- Derycke, H., Vlerick, P., Burnay, N., Declaire, C., D'Hoore, W., Hasselhorn, H. M., et al. (2010). Impact of the effort–reward imbalance model on intent to leave among Belgian health care workers: A prospective study. *Journal of Occupational and Organizational Psychology*, 83(4), 879-893.

- Ekvall, G. (1993). *Creativity in project work; A longitudinal study of a product development project*.
- Ekvall, G., & Arvonen, J. (1991). Change-centered leadership: An extension of the two-dimensional model. *Scandinavian Journal of Management*, 7(1), 17-26.
- Emami, A., & Nasrabadi, A. (2007). Two approaches to nursing: a study of Iranian nurses. *International Nursing Review*, 54(2), 137-143.
- Engkvist, I. L. (2006). Evaluation of an intervention comprising a No Lifting Policy in Australian hospitals. *Applied Ergonomics*, 37(2), 141-148.
- Eriksson, I., Unden, A. L., & Elofsson, S. (2001). Self-rated health. Comparisons between three different measures. Results from a population study. *International Journal of Epidemiology*, 30(2), 326.
- Fakhr-Movahedi, A., Salsali, M., Negharandeh, R., & Rahnavard, Z. (2011). A qualitative content analysis of nurse-patient communication in Iranian nursing. *International Nursing Review*.
- Fallahi-Khosknab (2012). Iranian Scientific Nursing Association. Available at: <http://ina.ir/> (Accessed 20 Jan 2012).
- Feng, C., Chen, M., & Mao, I. (2007). Prevalence of and risk factors for different measures of low back pain among female nursing aides in Taiwanese nursing homes. *BMC musculoskeletal disorders*, 8(1), 52.
- Fochsen, G., Josephson, M., Hagberg, M., Toomingas, A., & Lagerstrom, M. (2006). Predictors of leaving nursing care: a longitudinal study among Swedish nursing personnel. *Occupational and environmental medicine*, 63(3), 198.
- Fochsen, G., Sjogren, K., Josephson, M., & Lagerstrom, M. (2005). Factors contributing to the decision to leave nursing care: a study among Swedish nursing personnel. *Journal of Nursing Management*, 13(4), 338-344.
- Gardulf, A., Soderstrom, I. L., Orton, M. L., Eriksson, L. E., Arnetz, B., & Nordstrom, G. (2005). Why do nurses at a university hospital want to quit their jobs? *Journal of Nursing Management*, 13(4), 329-337.
- Ghaffari, M. (2007). *Low back pain among industrial workers [Thesis for doctoral degree(PhD)]*. Karolinska Institutet, Stockholm.
- Ghaffari, M., Alipour, A., Farshad, A., Yensen, I., & Vingard, E. (2006). Incidence and recurrence of disabling low back pain and neck-shoulder pain. *Spine*, 31(21), 2500.
- Ghaffari, M., Alipour, A., Jensen, I., Farshad, A., & Vingard, E. (2006). Low back pain among Iranian industrial workers. *Occupational Medicine*, 56(7), 455-460.
- Gillen, M., Yen, I., Trupin, L., Swig, L., Rugulies, R., Mullen, K., et al. (2007). The association of socioeconomic status and psychosocial and physical workplace factors with musculoskeletal injury in hospital workers. *American journal of industrial medicine*, 50(4), 245-260.
- Greenhaus, J. H., & Beutell, N. J. (1985). Sources of conflict between work and family roles. *Academy of management review*, 76-88.
- Greenhaus, J. H., Collins, K. M., & Shaw, J. D. (2003). The relation between work-family balance and quality of life. *Journal of Vocational Behavior*, 63(3), 510-531.
- Greenhaus, J. H., Parasuraman, S., & Collins, K. M. (2001). Career involvement and family involvement as moderators of relationships between work-family conflict and withdrawal from a profession. *Journal of Occupational Health Psychology*, 6(2), 91.
- Greenspan, J. D., Craft, R. M., LeResche, L., Arendt-Nielsen, L., Berkley, K. J., Fillingim, R. B., et al. (2007). Studying sex and gender differences in pain and analgesia: a consensus report. *Pain*, 132, S26-S45.

- Grzywacz, J. G., Frone, M. R., Brewer, C. S., & Kovner, C. T. (2006). Quantifying work–family conflict among registered nurses. *Research in nursing & health*, 29(5), 414-426.
- Grzywacz, J. G., & Marks, N. F. (2000). Reconceptualizing the work–family interface: An ecological perspective on the correlates of positive and negative spillover between work and family. *Journal of Occupational Health Psychology*, 5(1), 111.
- Gunnarsdottir, H., Rafnsdottir, G., Helgadóttir, B., & Tomasson, K. (2003). Psychosocial risk factors for musculoskeletal symptoms among women working in geriatric care. *American journal of industrial medicine*, 44(6), 679-684.
- Hagbaghery, A., Salsali, M., & Ahmadi, F. (2004). A qualitative study of Iranian nurses' understanding and experiences of professional power. *Human Resources for Health*, 2(1), 9.
- Hagberg, M., Punnett, L., Bergqvist, U., Burdorf, A., Härenstam, A., Kristensen, T. S., et al. (2001). Broadening the view of exposure assessment. *Scandinavian Journal of Work Environment and Health*, 27(5), 354-357.
- Hajbaghery, M. A., & Salsali, M. (2005). A model for empowerment of nursing in Iran. *BMC health services research*, 5(1), 24.
- Hasselhorn, H., Mueller, B., & Tackenberg, P. (2003). 1 Investigating premature departure from the nursing professions in Europe—the European NEXT-Study. *Working conditions and intent to leave the profession among nursing staff in Europe*, 9.
- Hasselhorn, H., Muller, B., & Tackenberg, P. (2005). NEXT Scientific Report, July 2005. *Wuppertal The European NEXT-Study (Nurses' Early Exit Study, University of Wuppertal, NEXT-Study Coordination)*.
- Hasselhorn, H. M., Conway, P. M., Widerszal-Bazyl, M., Simon, M., Tackenberg, P., Schmidt, S., et al. (2008). Contribution of job strain to nurses' consideration of leaving the profession - results from the longitudinal European nurses' early exit study. *Scandinavian Journal of Work Environment & Health*, 75-82.
- Hestbaek, L., Leboeuf-Yde, C., & Manniche, C. (2003). Low back pain: what is the long-term course? A review of studies of general patient populations. *European Spine Journal*, 12(2), 149-165.
- Howard, R. (1990). Healthy work, stress, productivity, and the reconstruction of working life - Kaeasek, R., Theorell, T. *New York Times Book Review*, 18-18.
- Johnsson, C., Kjellberg, K., Kjellberg, A., & Lagerstrom, M. (2004). A direct observation instrument for assessment of nurses' patient transfer technique (DINO). *Applied Ergonomics*, 35(6), 591-601.
- Joolae, S., Nikbakht-Nasrabadi, A., Parsa-Yekta, Z., Tschudin, V., & Mansouri, I. (2006). An Iranian perspective on patients' rights. *Nursing Ethics*, 13(5), 488.
- Josephson, M., Lindberg, P., Voss, M., Alfredsson, L., & Vingard, E. (2008). The same factors influence job turnover and long spells of sick leave--a 3-year follow-up of Swedish nurses. *The European Journal of Public Health*, 18 (4), 380-385.
- Kalliath, T., & Morris, R. (2002). Job satisfaction among nurses: a predictor of burnout levels. *Journal of nursing administration*, 32(12), 648.
- Karahan, A., Kav, S., Abbasoglu, A., & Dogan, N. (2009). Low back pain: prevalence and associated risk factors among hospital staff. *Journal of Advanced Nursing*, 65(3), 516-524.
- Karasek Jr, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative science quarterly*, 285-308.
- Karimi, L. (2008). A study of a multidimensional model of work–family conflict among Iranian employees. *Community, Work & Family*, 11(3), 283-295.

- Keyes, C. L. M., & Lopez, S. J. (2002). Toward a science of mental health. *Handbook of positive psychology*, 45-59.
- Kim, I. H., Geiger-Brown, J., Trinkoff, A., & Muntaner, C. (2010). Physically demanding workloads and the risks of musculoskeletal disorders in homecare workers in the USA. *Health & Social Care in the Community*, 18(5), 445-455.
- Kim, S., Barker, L. M., Jia, B., Agnew, M. J., & Nussbaum, M. A. (2009). Effects of two hospital bed design features on physical demands and usability during brake engagement and patient transportation: A repeated measures experimental study. *International journal of nursing studies*, 46(3), 317-325.
- Kjellberg, K., Lagerstrom, M., & Hagberg, M. (2003). Work technique of nurses in patient transfer tasks and associations with personal factors. *Scandinavian journal of work, environment & health*, 29(6), 468-477.
- Kompier, M. (2002). The psychosocial work environment and health-what do we know and where should we go? *Scandinavian Journal of Work Environment and Health*, 28(1), 1-4.
- Kompier, M. (2005). Assessing the psychosocial work environment-" subjective" versus" objective" measurement. *Scandinavian Journal of Work Environment and Health*, 31(6), 405-408.
- Kompier, M., & Taris, T. W. (2004). Assessing methodological quality and biological plausibility in occupational health psychology. *Scandinavian Journal of Work Environment and Health*, 30(2), 81-84.
- Kristensen, T. S., Hannerz, H., Hogh, A., & Borg, V. (2005). The Copenhagen Psychosocial Questionnaire - a tool for the assessment and improvement of the psychosocial work environment. *Scandinavian Journal of Work Environment & Health*, 31(6), 438-449.
- Kuorinka, I., Jonsson, B., Kilbom, A., Vinterberg, H., Biering-Sørensen, F., Andersson, G., et al. (1987). Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms. *Applied Ergonomics*, 18(3), 233-237.
- Lamberton, M. M. (1983). Health and Illness: A Co-Existence Hypothesis. *The Nurse Practitioner*, 8(2), 47&hyphen; 52.
- Leijon, O., Lindberg, P., Josephson, M., & Wiktorin, C. (2007). Different working and living conditions and their associations with persistent neck/shoulder and/or low back disorders. *Occupational and environmental medicine*, 64(2), 115.
- Li, J., Fu, H., Hu, Y., Shang, L., Wu, Y. H., Kristensen, T. S., et al. (2010). Psychosocial work environment and intention to leave the nursing profession: Results from the longitudinal Chinese NEXT study. *Scandinavian Journal of Public Health*, 38, 69-80.
- Lindell, O., Johansson, S. E., & Streder, L. E. (2010). Living conditions, including life style, in primary-care patients with nonacute, nonspecific spinal pain compared with a population-based sample: a cross-sectional study. *Clinical epidemiology*, 2, 261.
- Lu, H., While, A. E., & Louise Barriball, K. (2005). Job satisfaction among nurses: a literature review. *International journal of nursing studies*, 42(2), 211-227.
- Majomi, P., Brown, B., & Crawford, P. (2003). Sacrificing the personal to the professional: community mental health nurses. *Journal of Advanced Nursing*, 42(5), 527-538.
- McBeth, J., & Jones, K. (2007). Epidemiology of chronic musculoskeletal pain. *Best Practice & Research Clinical Rheumatology*, 21(3), 403-425.
- McEwen, B. S. (2008). Central effects of stress hormones in health and disease: Understanding the protective and damaging effects of stress and stress mediators. *European Journal of Pharmacology*, 583(2-3), 174-185.
- McNeely, E. (2005). The consequences of job stress for nurses' health: time for a check-up. *Nursing outlook*, 53(6), 291-299.



- Mehrdad, R. (2009). Health system in Iran. *JMAJ*, 52(1), 69-73.
- Mehrdad, R., Dennerlein, J., Haghighat, M., & Aminian, O. (2010). Association between psychosocial factors and musculoskeletal symptoms among Iranian nurses. *American Journal of Industrial Medicine*, 53, 1032-1039.
- Mehryar, A. H., & Ahmad-Nia, S. (2004). Age-structural transition in Iran: Short and long-term consequences of drastic fertility swings during the final decades of twentieth century. *Age-Structural Transitions: Population Waves, Disordered Cohort Flows and the Demographic Bonus*, Paris, 23–26 February 2004.
- Moncada, S., Pejtersen, J. H., Navarro, A., Llorens, C., Burr, H., Hasle, P., et al. (2010). Psychosocial work environment and its association with socioeconomic status. A comparison of Spain and Denmark. *Scandinavian Journal of Public Health*, 38(3 suppl), 137-148.
- Montazeri, A., Goshtasebi, A., Vahdaninia, M., & Gandek, B. (2005). The Short Form Health Survey (SF-36): translation and validation study of the Iranian version. *Quality of life research*, 14(3), 875-882.
- Nabe-Nielsen, K., Tüchsen, F., Christensen, K. B., Garde, A. H., & Diderichsen, F. (2009). Differences between day and nonday workers in exposure to physical and psychosocial work factors in the Danish eldercare sector. *Scandinavian journal of work, environment & health*, 35(1), 48-55.
- Nasrabadi, A. N., Lipson, J. G., & Emami, A. (2004). Professional nursing in Iran: an overview of its historical and sociocultural framework. *Journal of Professional Nursing*, 20(6), 396-402.
- NationalMaster (2011). Middle East, Iran, Age distribution. Available at: [http://www.nationalmaster.com/country/ir/Age\\_distribution](http://www.nationalmaster.com/country/ir/Age_distribution) (Accessed 10 Nov 2011).
- Nikbakht Nasrabadi, A., Emami, A., & Parsa Yekta, Z. (2003). Nursing experience in Iran. *International Journal of Nursing Practice*, 9(2), 78-85.
- Nikbakht Nasrabadi, A., & Emami, A. (2006). Perceptions of nursing practice in Iran. *Nursing outlook*, 54(6), 320-327.
- Nubling, M., Stobel, U., Hasselhorn, H., Michaelis, M., & Hofmann, F. (2006). Measuring psychological stress and strain at work-Evaluation of the COPSOQ Questionnaire in Germany. *GMS Psycho-Social Medicine*, 3, 3-14.
- O'Donnell, M. P. (1986). Definition of health promotion. *American journal of health promotion: AJHP*, 1(1), 4-5.
- O'Shea, M. (2003). *Culture shock! Iran*. Portland, Oregon: Graphic Arts Center Publishing.
- Parast, M. S. (2009). Iran Pension system, current and future situation. *Presented in the international workshop of insurance industry 8-9 October 2009*.
- Polit, D. F., & Beck, C. T. (2008). *Nursing research: Generating and assessing evidence for nursing practice*: Lippincott Williams & Wilkins.
- Punnett, L., & Herbert, R. (2000). Tuesday, November 14, 2000-9: 22 AM Abstract# 5821 *Work-related musculoskeletal disorders: Is there a gender differential, and if so, what does it mean?*
- Punnett, L., & Wegman, D. H. (2004). Work-related musculoskeletal disorders: the epidemiologic evidence and the debate. *Journal of Electromyography and Kinesiology*, 14(1), 13-23.
- Roh, Y. (2003). The current situation of musculoskeletal disorder in South Korea. *Global Occup Health Network*, 4, 1-3.
- Rugulies, R., Aust, B., & Pejtersen, J. (2010). Do psychosocial work environment factors measured with scales from the Copenhagen Psychosocial Questionnaire predict

- register-based sickness absence of 3 weeks or more in Denmark? *Scandinavian Journal of Public Health*, 38(3 suppl), 42-50.
- Rugulies, R., Braff, J., Frank, J., Aust, B., Gillen, M., Yen, I., et al. (2004). The psychosocial work environment and musculoskeletal disorders: Design of a comprehensive interviewer-administered questionnaire. *American journal of industrial medicine*, 45(5), 428-439.
- Saylor, C. (2004). The Circle of Health. *Journal of Holistic Nursing*, 22(2), 97-115.
- Schluter, P. J., Turner, C., Huntington, A. D., Bain, C. J., & McClure, R. J. (2011). Work/life balance and health: the Nurses and Midwives e-cohort study. *International Nursing Review*, 58(1), 28-36.
- Sellgren, S., Ekvall, G., & Tomson, G. (2006). Leadership styles in nursing management: preferred and perceived. *Journal of Nursing Management*, 14(5), 348-355.
- Siegrist, J. (1996). Adverse health effects of high-effort/low-reward conditions. *Journal of Occupational Health Psychology*, 1(1), 27.
- Simon, M., Kummerling, A., & Hasselhorn, H. (2004). Work-home conflict in the European nursing profession. *International journal of occupational and environmental health*, 10(4), 384-391.
- Simon, M., Tackenberg, P., Nienhaus, A., Estryn-Behar, M., Maurice Conway, P., & Hasselhorn, H. (2008). Back or neck-pain-related disability of nursing staff in hospitals, nursing homes and home care in seven countries--results from the European NEXT-Study. *International journal of nursing studies*, 45(1), 24-34.
- Sjogren, K., Fochsen, G., Josephson, M., & Lagerstrom, M. (2005). Reasons for leaving nursing care and improvements needed for considering a return: a study among Swedish nursing personnel. *International journal of nursing studies*, 42(7), 751-758.
- Smith, D., Choe, M., Jeon, M., Chae, Y., An, G., & Jeong, J. (2005). Epidemiology of musculoskeletal symptoms among Korean hospital nurses. *International Journal of Occupational Safety and Ergonomics (JOSE)*, 11(4), 431-440.
- Smith, D., Wei, N., Zhao, L., & Wang, R. (2004). Musculoskeletal complaints and psychosocial risk factors among Chinese hospital nurses. *Occupational Medicine*, 54(8), 579-582.
- Smith, D. R., Ohmura, K., Yamagata, Z., & Minai, J. (2003). Musculoskeletal disorders among female nurses in a rural Japanese hospital. *Nursing & Health Sciences*, 5(3), 185-188.
- Strauss, A., & Corbin, J. (1998). Basics of qualitative research: Techniques and procedures for developing grounded theory. *SAGE Publications, Thousand Oaks, USA*.
- Switzer, G., Wisniewski, S., Belle, S., Dew, M., & Schultz, R. (1999). Selecting, developing, and evaluating research instruments. *Social psychiatry and psychiatric epidemiology*, 34(8), 399-409.
- Tehran's Municipality Web-page (2011). Available at: <http://en.tehran.ir/> (Accessed 10 Jan 2012).
- Tezel, A. (2005). Musculoskeletal complaints among a group of Turkish nurses. *International Journal of Neuroscience*, 115(6), 871-880.
- Theorell, T., & Hasselhorn, H. M. (2005). On cross-sectional questionnaire studies of relationships between psychosocial conditions at work and health—are they reliable? *International archives of occupational and environmental health*, 78(7), 517-522.
- The U.S. Equal Employment Opportunity Commission. (2007). Questions and Answers about Health Care Workers and the Americans with Disabilities Act. Available at: [http://www.eeoc.gov/facts/health\\_care\\_workers.html](http://www.eeoc.gov/facts/health_care_workers.html) (Accessed 10 Jan 2012).

- Trinkoff, A., Lipscomb, J., Geiger-Brown, J., & Brady, B. (2002). Musculoskeletal problems of the neck, shoulder, and back and functional consequences in nurses. *American journal of industrial medicine*, 41(3), 170-178.
- Trinkoff, A., Lipscomb, J., Geiger-Brown, J., Storr, C., & Brady, B. (2003). Perceived physical demands and reported musculoskeletal problems in registered nurses. *American Journal of Preventive Medicine*, 24(3), 270-275.
- Tripp-Reimer, T. (1984). Reconceptualizing the construct of health: Integrating emic and etic perspectives. *Research in nursing & health*, 7(2), 101-109.
- Van Der Heijden, B., Demerouti, E., Bakker, A. B., & Hasselhorn, H. (2008). Work-home interference among nurses: reciprocal relationships with job demands and health. *Journal of Advanced Nursing*, 62(5), 572-584.
- Van Der Heijden, B., Van Dam, K., & Hasselhorn, H. M. (2009). Intention to leave nursing The importance of interpersonal work context, work-home interference, and job satisfaction beyond the effect of occupational commitment. *Career Development International*, 14(6-7), 616-635.
- Ware, J., Snow, K., Kosinski, M., & Gandek, B. (1993). SF-36 health survey: manual and interpretation guide. 1993. *Boston: The Health Institute, New England Medical Center*.
- Waters, T., Collins, J., Galinsky, T., & Caruso, C. (2006). NIOSH research efforts to prevent musculoskeletal disorders in the healthcare industry. *Orthopaedic Nursing*, 25(6), 380-386.
- Weyers, S., Peter, R., Boggild, H., Jeppesen, H. J., & Siegrist, J. (2006). Psychosocial work stress is associated with poor self rated health in Danish nurses: a test of the effort–reward imbalance model. *Scandinavian journal of caring sciences*, 20(1), 26-34.
- Vigeh, M., & Mazaheri, M. (2009). Occupational medicine in Iran. *Occupational Medicine*, 59(1), 66-66.
- Vingard, E., Alfredsson, L., Hagberg, M., Kilbom, A., Theorell, T., Waldenstrom, M., et al. (2000). To What Extent Do Current and Past Physical and Psychosocial Occupational Factors Explain Care-Seeking for Low Back Pain in a Working Population?: Results from the Musculoskeletal Intervention Center-Norrtalje Study. *Spine*, 25(4), 493-500.
- WHO (1948). Official record of the World Health Organization No 2, June, 1946 ,New York.
- WHO (1986). The Ottawa Charter for Health Promotion, 1986. World Health Organization.
- WHO (2006). The role of contractual arrangement in providing health care sector performance. Available at: <http://gis.emro.who.int/HealthSystemObservatory/PDF/Contracting/Iran.pdf> (Accessed 10 Nov 2011).
- WHO (2007). Workers' health: global plan of action, Sixtieth World Health Assembly. World Health Organization, 23 May 2007.
- WHO (2009). Country profile of Iran. Available at: <http://www.emro.who.int/iran/countryprofile.htm> (Accessed 8 Nov 2011).
- WHO (2012). Health worker occupational health. Available at: [http://www.who.int/occupational\\_health/topics/hcworkers/en/index.html](http://www.who.int/occupational_health/topics/hcworkers/en/index.html) (Accessed 10 Jan 2012).
- Zarea, K., Negarandeh, R., Dehghan-Nayeri, N., & Rezaei-Adaryani, M. (2009). Nursing staff shortages and job satisfaction in Iran: Issues and challenges. *Nursing & Health Sciences*, 11(3), 326-331.