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The Experience of Angina Pectoris characteristics and coping with
Coronary Heart Disease illustrated by Iranian patients from a gender-
related perspective

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ABSTRACT

Coronary Heart Disease (CHD) is a major cause of death for both men and women around the world. Therefore, it is of great importance to identify effective ways and plans to prevent CHD and to ensure patients with Angina Pectoris (AP) seek medical care. A critical issue for developing these plans is to consider the symptom experiences of patients with CHD. Patients with CHD have to live and deal with this life-long disease. Nurses as health-care providers need to be aware of this process for helping patients to cope with the illness and its symptoms. Moreover, gender as a socio-cultural concept might influence how patients experience AP characteristics and cope with CHD. Thus, it needs to be investigated particularly in Iran where there is a lack of information about this issue. This doctoral thesis aims at exploring and describing experiences of AP characteristics and coping with CHD from a gender-related perspective. The doctoral thesis includes four sub-studies. The first two sub-studies regarded instrumentation. The AP characteristics questionnaire, which includes the Modified Rose Questionnaire (MRQ), the Short Form-McGill pain Questionnaire (SF-MPQ) and the accompanying symptom checklist, was utilized. The aims of sub-study I were to describe the process of translating the SF-MPQ, MRQ and accompanying symptom checklist from English to Persian and to evaluate substantial psychometric works (content and construct validity) for the entire instrument and each part of it (SF-MPQ, MRQ and accompanying symptom checklist). The aim of sub-study II was to evaluate internal consistency and test–retest reliability of the Iranian version of the AP characteristics questionnaire. The instrument was translated through a combined approach. Then, one hundred and ten patients with CHD (diagnosis on the basis of angiography) who experienced AP were selected for evaluating the reliability and validity of the instrument. According to the results, the Iranian version of AP characteristics questionnaire was a valid, consistent and reliable tool for evaluating AP in Iranian patients with CHD. The aim of sub-study III was to examine gender differences in the description, intensity and location of AP in patients with CHD to determine gender-specific variations in the characteristics of AP symptoms. In this cross-sectional study, five hundred patients with AP were chosen and filled out the Iranian version of AP characteristics questionnaire. The results indicated that, in comparison with men, women felt a greater intensity of pain, chose more pain descriptors, and were more likely to report pain in the neck and left arm, hand, and scapula. Sub-study IV which was a grounded theory study aimed at exploring and describing the experiences of and coping with CHD and how gender influences on

experiences reported by the participants. Twenty four patients were chosen through purposive sampling. The sampling was continued with theoretical sampling. The findings indicated that patients with CHD who experienced AP tried to cope with the illness and its consequences. The findings are presented as the process of “transitioning to normalize life” with the following categories: 1) losing normal life: experiencing emotions and consequences of illness, 2) coming to terms and using coping strategies and 3) recreating normal life. Men and women showed differences in some of the issues such as interpersonal relationships, responding to illness, searching for information and receiving the family support.

In conclusion, men and women with CHD experience a variety of symptoms which can be related to various psycho-physiological, clinical, and anatomical factors, anxiety sensitivity, depression and communication abilities. During the coping process, the participants transitioned to living normally again. However, there were gender-related differences in some aspects of coping such as using coping strategies and receiving support. The findings can be useful for considering gender perspectives in health-care services, training health professionals, and also educating society to become aware of gender differences in experiencing AP characteristics and coping with CHD.

Key words: Chest pain, Coping, Coronary artery disease, Gender, Normalization, Sex, Symptom, Transition

LIST OF PUBLICATIONS

This thesis is based on four sub-studies referred to by their Roman numerals I-IV. In sub-study I, an instrument was translated, adapted, and tested for validity. In the sub-study II, the instrument was tested for reliability. Sub-study III focused on determining and comparing symptom characteristics in men and women. In sub-study IV, the process of coping with illness was explored.

- I. **Najafi Ghezeljeh, T.**, Ekman, I., Nikraves, MY., Emami, A. (2008). Adaptation and validation of the Iranian version of Angina Pectoris characteristics questionnaire. *International Journal of Nursing Practice*, 14, 470–476.
- II. **Najafi Ghezeljeh, T.**, Tessama, MK., Nikraves, MY., Ekman, I., Emami, A. (2009). The Iranian version of Angina Pectoris characteristics questionnaire: reliability assessment. *Journal of clinical Nursing*, 18, 694 – 699.
- III. **Najafi Ghezeljeh, T.**, Momtahn, M., Tessama, MK., Nikraves, MY., Ekman, I., Emami, A. (2010). Gender specific variations in the description, intensity and location of Angina Pectoris: a cross-sectional study. *International Journal of Nursing studies*, 47, 965-974.
- IV. **Najafi Ghezeljeh, T.**, Nikraves, MY., Emami, A. (2011). Transitioning to normalize life with coronary heart disease for men and women: perspectives identified through a grounded theory approach, *Submitted*.

CONTENTS

1	INTRODUCTION.....	8
2	BACKGROUND.....	10
	2.1 Health, disease, and illness.....	10
	2.2 Symptom experience.....	11
	2.3 Coping	12
	2.4 Gender perspective in health care.....	13
	2.5 Coronary heart disease.....	14
	2.6 Experiencing angina pectoris characteristics.....	16
3	SYNTHETIZING THEORETICAL FRAME WORK: TRANSITION.....	18
4	RATIONAL FOR THE THESIS.....	21
5	MAIN AIMS	23
6	METHODS.....	24
	6.1 Design.....	24
	6.2 Participants.....	27
	6.3 Study site.....	28
	6.4 Ethical consideration.....	28
	6.5 Data collection methods.....	29
	6.6 Data analysis.....	31
7	RESULTS FROM SUB-STUDIES.....	35
	7.1 Demographic results.....	35
	7.2 Results from sub-studies I and II.....	35
	7.3 Results from sub-study III.....	37
	7.4 Results from sub-study IV.....	38
8	DISCUSSION.....	41
	8.1 Cross-cultural adaptation and psychometric evaluation.....	41
	8.2 Symptom characteristics.....	43
	8.3 Transitioning to normalize life.....	44
	Gender aspect in the coping process.....	49
9	IMPLICATIONS FOR NURSING SCIENCE	52
10	FUTURE RESEARCH.....	54
11	METHODOLOGICAL CONSIDERATION.....	56
	11.1 Methodological consideration related to sub-studies I-III.....	56
	11.2 Methodological consideration related to sub-study IV.....	59
12	CONCLUSION	62
13	POPULÄRVETENSKAPLIG SAMMANFATTNING.....	63
14	ACKNOWLEDGMENTS.....	65
15	REFERENCES.....	67

List of abbreviations

MI	Myocardial Infarction
AP	Angina Pectoris
BMI	Body Mass Index
CHD	Coronary Heart Disease
CI	Confidence Interval
CVI	Content Validity Index
DALYs	Disability Adjusted Life Years
ICC	Intraclass Correlation Coefficient
KR-20	Kuder-Richardson Formula 20
MRQ	Modified Rose Questionnaire
NRS	Numeric Rating Scale
PPI	Present Pain Intensity
PTCA	Percutaneous Transluminal Coronary Angioplasty
QOL	Quality Of Life
SD	Standard Deviation
SEM	Standard Error of Measurements
SF-MPQ	Short Form McGill pain Questionnaire
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization

LIST OF TABLES

Figure 1 The research process

Table 1 Sampling method and sample size for each sub-study

Table 2 Examples of codes and categories (interpretation process)

Table 3 Demographic and clinical characteristics of men and women in sub-studies I-III

Table 4 Mean (SD) of pain scores in sub-studies I-III

Table 5 Intra-class correlation coefficient (ICC) and standard error of measurement (SEM) in men and women

1 INTRODUCTION

My research originated from my personal and professional interest in expanding my knowledge and understanding of the Angina Pectoris (AP) characteristics in patients with Coronary Heart Disease (CHD). I was further interested in how these patients cope with their illness in their daily lives and whether their gender had any impact on their experience and coping process. Moreover, I considered expanding my knowledge in research methodology. Therefore, I chose multifarious methods for gaining knowledge and experience from each one of them. In this thesis, I used quantitative methods to evaluate the instrument that I utilized in the sub-studies included in this doctoral thesis and applied the grounded theory for reaching an understanding of the participants' experience of CHD illness and coping with it.

CHD is the leading cause of death worldwide. It is one of the major causes of disease burden in developing countries. Three-fourths of CHD mortalities happen in low-income and middle-income countries (Gaziano et al., 2010). Worldwide, the prevalence of AP is 8.20 million people and the number of Disability Adjusted Life Years (DALYs) is 11.80 million for CHD (World Health Organization, 2008). About 16.90% of mortalities were related to CHD in the Middle East (including Iran) and North Africa in 2001 (333000 deaths) (Gaziano et al., 2010).

The number of deaths from cardiovascular diseases in 2002 in Iran was 81983 (Mackay & Mensah, 2004). It is estimated that there were 21572 DALYs caused by all types of illnesses and injuries for each 100,000 Iranian in 2003 (14.349 million DALYs in total). From this estimation, 58% were caused by cardiovascular diseases that were the major cause of DALYs for women. The major cause of DALYs for men was road traffic injuries (Jafari et al., 2009). A study on 3723 Iranian people indicated that 11.30% of the participants had coronary symptoms and 1.40% had MI. The age-adjusted prevalence was 12.70% (Nabipour et al., 2007). The prevalence of risk factors of cardiovascular disease are high in Iranian people, which probably causes the increased mortality and morbidity (Azizi et al., 2002; Hatmi et al., 2007).

Mortality rates from CHD have declined in many developed countries since the 60s and 70s, including North America, Australia and Europe. In the United Kingdom, for example, for men between 35 and 74, the CHD mortality rate declined 39% during 1988-1998. In Denmark, Australia, and Norway, the death rate declined by 49%, 45%, and 45%, respectively (Frayn & Stanner, 2005). This decrease in death rate results from improved prevention, early diagnosis, proper treatment, life style

modification related to stopping smoking, and decrease of blood pressure and cholesterol levels. This decrease in mortality rate can increase CHD prevalence and lead to a higher morbidity, burden of disease and needs for treatment (Frayn & Stanner, 2005). It is predicted that, in the future, 82% of the CHD mortality will be related to developing countries because of the increase of lifelong, living in urban areas, and alterations in lifestyle. CHD mortality will increase in developing countries from 9 million in 1990 to 19 million in 2020 (Okraïneć et al., 2004; Reddy, 2004). This increase can be related to socioeconomic changes, increase in life expectancy, changes in nutrition, sedentary living and an increase in smoking (Critchley et al., 2004). Critchley et al. (2004) determined CHD mortality in Beijing, China, from 1984 to 1999. They investigated how CHD mortality can be related to changes in the main cardiovascular risk factors. They indicated that age-adjusted CHD deaths increased by 50% for men and 27% for women during that period. Most of the increase (77%) in CHD mortality was related to an increase in total cholesterol levels, diabetes and obesity. Maddox et al. (2007) found that patients with unstable AP compared with MI have a similar undesirable health condition, physical status, and quality of life one year after diagnosis. They recommend that patients with unstable AP need to receive a close follow-up and monitoring like patients with MI. Therefore, it is of great importance to realize effective ways to prevent CHD and conservative plans to ensure that AP patients seek and receive proper care for their conditions (Moser et al., 2006). Through results from studies that describe the patients' experience and coping process, effective interventions can be developed.

2 BACKGROUND

2.1 HEALTH, DISEASE, AND ILLNESS

Health and illness are both socially and culturally constructed concepts which change in different social and cultural situations (Greiner & Edelman, 2010). Health as one of the basic concepts of nursing science can be considered from different perspectives. Different societies and different cultures embody various meanings of health. From Gadamer's (1996) point of view, people become aware of health when it disappears and when disease occurs. The World Health Organization (WHO) has specified the definition of health: *"Health is a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity"* (World Health Organization, 1948). In 1986, WHO revised the definition: *"Good health is a major resource for social, economic and personal development and an important dimension of quality of life"* (Ottawa Charter for Health Promotion, 1986). Health is a subjective, partial, dynamic and complex concept, with multiple aspects including physical, environmental, and psychological factors (Meleis, 2007). It means living in harmony with others and the environment as well as being responsible for preventing illness and seeking medical care (Edlin & Golanty, 2007). Health is considered as normality, integrity, and well-being. Influencing factors on health include educational level, culture, age, and gender (Edlin & Golanty, 2007).

In order to achieve health in daily life, people utilize all of their resources to manage stressors. Health promotion is an essential aim of nursing. Nurses provide conditions that can facilitate patients' coping with changes in health, functions, and life (Harrison, 2001). Different situations such as illness decrease an individual's ability to carry out their roles. Nurses can help improve the patients' functions through their various roles such as caregiver, educator, and advocator (Potter & Perry, 2008).

There is a difference between disease and illness, but they are frequently utilized interchangeably (Larsen & Lubkin, 2009). Illness is a cultural perception of abnormality and disease is abnormalities in the function of organs and systems (Kleinman et al., 2006). Disease is defined as *"abnormalities in the structure and the function of the body and organ systems"* and illness is defined as *"experiences of disvalued change in states of being and in social functioning"* (Eisenberg, 1977, p. 11). Disease as an objective issue and a biomedical term means discomfort. It is pathologic or abnormal conditions, loss of or disability in social functions and health deviations which are identified and verified by health care providers (e.g. physician)

through diagnostic evaluations (Turnock, 2009). Moreover, disease also refers to the inadequacy of adaptive mechanisms to respond to stimuli and stress which result in functional disorders (Greiner & Edelman, 2010).

Illness as a wide and complex concept is a subjective experience of health loss that can be identified based on symptoms (Greiner & Edelman, 2010). A person may be diagnosed as having a heart disease even without symptoms, which means there has been no report of illness (Conrad & Barker, 2010). Illness is a socially and culturally constructed concept. Conrad & Barker (2010) note, "*Illness is a social designation, by no means given in the nature of medical fact*" (p. 180). The socio-cultural and biological aspects influence how patients consider themselves ill (Habib & Rahman, 2010). Illness refers to an imbalance between needs and resources, and an inability to interact with the environment for surviving and improving the quality of life (QOL) (Greiner & Edelman, 2010). "*It may include health conditions that limit the person's ability to lead a normal life*" (Wikman et al., 2005, P. 450).

2.2 SYMPTOM EXPERIENCE

Patients' symptoms (as a subjective experience) determine an alteration in body functions and health status, result in health-related behaviours and often trigger making the decision to seek health care (Dodd et al., 2001; Sidani, 2011). Symptoms, which are perceived physical and psychological abnormalities, need to be acknowledged by health care professionals because they are the patients' cry for help (Ekman et al., 2005). Symptoms are "*the expressions of experience of distress, communicated as an ordered set of complaints*" (Good, 1994, p. 8). Symptom experience may be considered as how patients perceive and express the frequency, severity, discomfort, and meaning of the symptoms (Ahlberg et al., 2005). Symptom experience is the perception of the symptom (informing about perceived changes in the body), the evaluation of the symptom characteristics (including timing, severity, and quality) and the response to the symptom (including judgments about the cause, meaning and impacts of the symptom on the patients' lives) (Dodd et al., 2010; Sidani, 2011). People respond to symptoms physiologically, emotionally, socially and behaviorally (Dodd et al., 2010) which is part of the adjustment process. The physiological part can be characterized by the symptom exacerbation and changes in functions. The emotional part manifests itself through uncertainty, anxiety and other emotional reactions. The behavioral part is indicated by activities for relieving symptoms including ignoring them or seeking help. How patients experience and evaluate their condition impacts their health seeking behaviors. There are factors that influence the

symptom experience, including age, gender and disease (Sidani, 2011). Patients with a long-term disease learn to adapt to and deal with their illness and symptom experience.

As Zambroski et al. (2005) suggest, the goal of health care providers is to help decrease the burden of illness and its symptoms. Caring is toward reducing the symptom frequency, intensity and distress (degree of discomfort) or other aspects of the symptom experience (Chang & Ingham, 2003). Understanding of the symptom experience is critical and important for symptom management and guides the choice of appropriate interventions (Sidani, 2011).

How an individual experiences and copes with his/her symptoms and illness is influenced by many factors including socio-cultural factors (Andrews & Boyle, 2008; Sidani, 2011). Symptoms are experienced and understood and made sense of within individuals' cultural worldview (Good & Good, 1980). Individuals establish cultural models to explain illness and its related symptoms and use these models to attribute a meaning to symptoms (Andrews & Boyle, 2008). One of the socio-cultural factors is gender that will be discussed later in this thesis. A better understanding of the significance of patients' background will result in a more timely care, decrease in morbidity, and control of costly consequences, which benefits both patients and society in general.

2.3 COPING

Throughout life, people learn to manage their problems and deal with stress through coping strategies. Illness as a source of stress influences all aspects of patients' lives (physical, social and psychological) and coping strategies can help patients live with this new condition and adapt to the associated changes. Individuals who have particular health conditions may experience various emotions including angry, disappointed, fear uncertainty. They grieve losses of or changes in their previous abilities (Baldacchino & Draper, 2001; Turnock, 2009). Experienced emotions enable them to recognize the situation. The way people evaluate the situation and plan for coping with it, demonstrates their emotional responses (Lazarus, 2006). In order to investigate the coping process, it is necessary to describe the person's thoughts, feelings and actions. In this research, we focus on the patients' experience of AP characteristics, and coping with CHD.

Lazarus & Folkman (1984) defined coping as "*constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person*" (p. 141). As Brannon

& Feist (2010) mention, according to these definitions, coping is a process-oriented, not static. Coping needs “*effort to manage the situation*” and is a “*learned pattern of responding to stressful*” conditions (p.105). It focuses on persons’ real reactions to a condition and the associated changes over time. Coping arises as a result of stress or changes due to harm or threat (Brannon & Feist, 2010). Coping strategies include stages to manage symptoms and utilizing resources in order to decrease the impacts of illness on daily life (Brannon and Feist, 2010).

There are many coping strategies and resources. People may use a problem-focused coping, emotion-focused coping or a combination of both (Brannon and Feist, 2010; Potter & Perry, 2008). Problem-focused coping helps to manage the source of stress (changeable and controllable source), whereas emotion-focused coping is needed to control the emotional response to stress (Folkman & Greer, 2000). Improved coping strategies depend on the individuals’ needs, beliefs, and social and problem-solving skills. Therefore, one coping strategy cannot be considered to be useful for everyone or for each type of stress (Lazarus & Folkman, 1984). Hence, understanding of the patients’ coping strategies with illness is essential. Personality factors, received or perceived social support and cultural issues related to illness can impact the process of coping with illness (Gurung, 2010). The ability to implement an effective coping strategy is a critical importance for accessing a health-care system.

2.4 GENDER PERSPECTIVE IN HEALTH CARE

Gender refers to “*the socially prescribed and experienced dimensions of “femaleness” or “maleness” in a society*” (Johnson et al., 2007, p.5). Gender is rooted in socially, psychologically, and culturally constructed expectations of men and women (Kendall, 2010) which impacts their social behaviors and chances (e.g. families and health systems), health and well-being. Gender is the collection of socially constructed notions such as tasks, traits, beliefs, and values. Society illustrates men and women according to their differential basis (Kendall, 2010). “*Gender is relational; gender roles and characteristics do not exist in isolation, but are defined in relation to one another*” (Health Canada, 2000, p.14). Sex is the biological and anatomical characteristics of being a woman or a man (Jacobsen, 2007; Kendall, 2010). Gender and sex affect identity, understanding of self, and relationships with others.

Gender is a critical issue in realizing ourselves and is the main concept for understanding and organizing the world and incidents. Gender has a profound effect on the personal and social aspects of our lives and our conceptualizations, norms, values

and attitudes. Gender should be considered in every kind and at every level of research (Jarviluoma et al., 2003).

Health-policy makers and health-care providers have recently recognized the critical role of gender in health and health-care, and this factor is included and considered in research for increasing health care efficiency and reducing health inequalities (Health Canada, 2003; Östlin et al., 2007; World Health Organization, 1998). Considering gender beside sex in health issues determines the importance of social and cultural factors in health protection and promotion (World Health Organization, 1998). Gender-specific activities and consideration in society are developed as a worldwide strategy. This issue is recognized as gender mainstreaming which is defined as:

“The process of assessing the implications for women and men of any planned action, including legislation, making women’s as well as men’s concerns and experiences integral dimension in the design, implementation, monitoring and evaluation of policies and programs in all political, economic and social spheres so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality” (Economic and Social Council, 1997, p. 2)

2.5 CORONARY HEART DISEASE

Coronary arteries are vessels that originate from the ascending aorta and provide oxygenated blood to the myocardium (heart muscle). CHD is a disease of the coronary arteries in which vessels become partly or totally blocked (Smeltzer et al., 2010). Its risk factors are high blood pressure and cholesterol, smoking, unhealthy nutrition, sedentary life, diabetes mellitus, age, genetic susceptibility, poverty, low educational level, depression, inflammation, and coagulating diseases (Alters & Schiff, 2010).

CHD is the first leading cause of death for both genders. Globally, 3.80 million men and 3.40 million women (7.20 million in total) die from CHD annually (Emslie, 2005; Mackay & Mensah, 2004). For women, CHD occurs about 10 years later than for men (Emslie, 2005). Cardiovascular and cerebrovascular diseases are the main cause of death and chronic conditions in women above 60 years old around the world (World Health Organization, 2009). However, CHD and cerebrovascular accidents are predicted to be the main cause of losing a healthy life by 2020 (World health organization, 2006). It was predicted that CHD deaths by 2010, 2020, and 2030 will be, 13.10, 14.30 and 14.90 percentage of all men deaths and 13.6, 13 and 13.1 percentage of all women deaths, respectively (Mackay & Mensah, 2004).

CHD impacts on patients' health condition and quality of life (Xie et al., 2008). In the study of determining differences in the effects of CHD according to socioeconomic status, for those with CHD and lower socioeconomic status, physical and mental health was poorer than that of patients with a higher socioeconomic status (Sacker et al., 2008). In a previous study in Turkey (Durmaz et al., 2009), marital status, financial condition, previous MI, and ability to perform daily work were considered as the major indicators for the quality of life in patients with CHD. Married patients and those having a high income had a better quality of life, and difficulty to perform works was associated with a poorer quality of life. Those results indicate that social support might increase the effectiveness of a rehabilitation programs, psychosocial activity, and quality of life (Durmaz et al., 2009).

In recent years, in international health policy, health-care providers have considered gender as an important issue for patients care (Emslie, 2005). Anatomical, physiological, biological, and psychosocial sex differences may contribute to differences in symptoms for women and men (DeVon & Zerwic, 2003). The Stockholm Female Coronary Risk Study showed that the risk of CHD for women with a low educational level is higher than that for women with a higher level of education. It is indicated that the increased risk of CHD in these groups of women is related mostly to psychological and social stress and unhealthy lifestyle. Other less important factors are haemostatic indicators, hyperlipidemia, and hypertension (Wamala et al., 1999).

Ford et al. (2008) in the study of gender differences in CHD and health-related quality of life performed a cross-sectional study in 10 states of the United States of America. They indicate that for women with CHD, the health-related quality of life is worse in comparison to men with CHD (Ford et al., 2008). It is essential that caregivers have an understanding of the gender aspect of health and illness in patients with CHD. What is known about CHD is mainly based on studies with male subjects. However, in the past decade, there has been a growing interest in and attention brought to gender differences in the symptom experience of CHD (e.g. McSweeney et al., 2005). More studies are essential to determine whether gender variations exist in symptom experience (Chen et al., 2005; D'Antono et al., 2006).

Fakhrzadeh et al. (2008) in the study of CHD in Qazvin, Iran found that when compared with women, MI was more usual between men. Whereas Ischemic phases in ECG were usual for women. Furthermore, in a previous study in Tehran, it was reported that the age-adjusted prevalence of CHD is 23.30% for women, 18.80% for

men and 21.30% in total. They indicated that postmenopausal women report more AP than men (Hadaegh et al., 2009).

In addition to gender, other socio-cultural factors, including race, can influence how patients experience and respond to CHD. Women are more likely to wait longer than men before seeking medical care (McGinn et al., 2005). McSweeney et al. (2007), in the study of pre-hospital delay for women, indicate that delay period to seek medical care was shorter in black women; however, it was not statistically significant. They indicated that relating symptoms to MI and benefit from insurance were important factors in seeking treatment. Moreover, black women were more likely to complain comorbidities including diabetes, hypertension and congestive heart failure. In the systematic review of the literature from 1960 to 2008, most of studies indicated that women and the elderly with MI were more likely to wait longer and to arrive at the clinic later when compared to men and younger patients. The pre-hospital delay might be related to differences between men and women regarding sociodemographic, clinical and contextual characteristics and co-morbidities (Nguyen et al., 2010). Sjöström-Stranda & Fridlund (2008) indicate that women have difficulties in interpreting, recognizing and attributing symptoms to CHD. These difficulties make the decision to seek medical care hard. In a previous study for examining CHD diagnostic experiences by women, McSweeney et al. (2005) emerged the following themes: 'awareness, seeking treatment, frustration, treatment decisions, and anger'. They indicated that CHD was diagnosed with delay in women with atypical symptoms which made them angry.

Thus, exploring and describing experience of AP characteristics and coping with CHD from a gender-related perspective is critical, particularly in Iran. There is a lack of information about the condition of patients with CHD in this country, and this doctoral thesis was planned to investigate how these patients experience and cope with the disease from a gender-related perspective.

2.6 EXPERIENCING ANGINA PECTORIS CHARACTERISTICS

AP is chest pain or discomforts that occurs due to inadequate oxygen supply to some areas of the heart muscle. AP is a subjective symptom that precipitates with factors such as physical exertion (Smeltzer et al., 2010). William Heberden (1710–1801) was the first to describe AP in 1768. It is caused by myocardial ischemia (imbalance between metabolic needs and available blood flow) as a result of coronary disease, but it can happen in patients with normal coronary (Smeltzer et al., 2010). There are also various causes for chest pain, including gastrointestinal, musculoskeletal, and

pulmonary disorders (Fowler et al., 2007). This study considers symptoms derived from AP with cardiac origin.

AP as a symptom of CHD may be a predictor of future MI and death (Alexander et al., 2009). The long-term outcome of patients with acute coronary syndrome at five years is defined in a previous study. The authors indicate that, for patients with non ST-segment elevation MI and unstable AP, mortality and morbidity rates are as high as those for patients with ST-segment elevation MI (Fox et al., 2010).

AP is an individual and subjective experience that can be influenced by a person's social and cultural background. Gender-related perceptions may also influence the experience of AP characteristics. In a previous study of patients with MI, it is reported that chest pain is less common for women with MI than for men (Lövgren et al., 2006). Schenck-Gustafsson (2007) pointed out that there are differences between men and women in relation to the symptoms of MI and acute coronary syndrome. Gender differences in symptom experiences in patients with CHD have been reported in previous studies (D'Antonio et al., 2003; D'Antonio et al., 2006; DeVon & Zerwic, 2003; Granot et al., 2004; Khan et al., 2010). In contrast there are studies (e.g. Kimble et al., 2003) that reported no gender variations for CHD symptoms.

The differences between men and women in pain experiences can be related to possible gender differences in coronary pathology, experience of health and disease, social expectations and life conditions (Schenck-Gustafsson, 2006). Gender variations in symptom experience for CHD patients should be considered in clinical settings (Stramba-Badiale et al., 2006). By exploring AP characteristics in patients with CHD, timely evaluation and treatment can probably be started which can prevent future MI. There is a lack of knowledge about how patients with CHD evaluate and experience AP, particularly in Iran. Therefore, the current doctoral thesis was considered to study possible gender differences in symptoms experience in Iranian patients with CHD.

3 SYNTHESIZING THEORETICAL FRAME WORK: TRANSITION

For this doctoral thesis, the synthesizing theoretical frame work was based on the transition theory developed by Meleis (Chick & Meleis, 2010; Meleis et al., 2010). Every change in health condition may trigger a transition process, and everybody may experience it in their daily life. Transitions entail and follow changes and alterations in life, health status, interactions, and contexts (Meleis et al., 2010). Changes cause disruption in an individual's reality and construction of a new reality (Kralik et al., 2010; Selder, 1989). Transition is defined as: "*the passage or movement from one state, condition or place to another*" (Chick & Meleis, 2010, p. 25). It is the product and outcome of mutual relation between a person and the context (Kralik et al., 2010).

Transition is something more than change (Bridges, 2004); it is a complex and multidimensional process (Marineau, 2005). Transition occurs following change, and its product is change (Meleis et al., 2010). It is a psychological process for coping with and adapting to alterations and disruptions. Through transition, "*individuals redefine and reorient of self for internalizing changes into their life*" (Bridges, 2004, p. xii). It is a movement toward adjustment and not returning to a previous state (Kralik et al., 2010). Also, individuals can experience more than one change and endure more than one transition process at a time. Therefore, awareness of and engagement with all the changes is essential (Meleis et al., 2010).

VanGennep (1960) and Bridges (2004) explain transition as a process with three stages (beginning, mediate and ending phases). The focus of VanGennep (1960) as an anthropologist is the persons' live in the society. The main focus of Bridges (2004) as an educator is the process of redefining self-identity during transition. Meleis et al. (2010) characterize specific components in the transition process, such as patterns and properties. Their main focus is role identity and effective social and personal factors in this process. Nursing theories guide the practice of nursing and provide a conceptual framework for studies. The middle-range nursing theory of "Transition" developed by Meleis (Chick & Meleis, 2010; Meleis et al., 2010) was identified as a relevant synthesizing framework for this thesis in order to wrap up the findings from the sub studies and conclude them from Meleis (Chick & Meleis, 2010; Meleis et al., 2010) transition theory's point of view.

Important conditions in the transition process (experience and consequences) are 'meanings, expectations, knowledge levels, skills, environment, and emotional and

physical well-being' (Schumacher & Meleis, 2010, p. 42). These factors can inhibit or facilitate the transition. Transitions can be developmental, health-illness, organizational, and situational. The health-illness transition is the focus of this study. In health-illness transition, individuals' responses to a new event (illness) are investigated (Kralik et al., 2010; Schumacher & Meleis, 2010). The health-illness transition is a sudden or gradual alteration and change in roles, relationships, expectations, and abilities (Meleis, 2007) which result from movement from well-being to illness (acute or chronic) or illness to well-being.

The properties of the transition process include 'awareness, engagement, change and difference, time span, and critical points and events' (Meleis et al., 2010, p. 57). As Bridges (1991) notes, transition is the movement over time from instability to stability. Instability happens after critical changes and events in life. These critical changes and alterations can be different issues such as birth, death, or illness diagnosis or symptoms (Meleis et al., 2010). These critical and marker events enhance the awareness of alterations and moving toward a new condition (Kralik, 2002; Kralik et al., 2000; Kralik et al., 2010; Meleis et al., 2010).

To start the transition, individuals should be aware of changes in their life (Meleis et al., 2010). Following awareness, individuals engage and involve themselves in the transition process. They identify and assume activities and new ways of living (Kralik et al., 2010). Feeling connected with the situation and others are markers of awareness of and engagement in and occurrence of transition. Therefore, individuals can plan to cope with alterations and adopt a new lifestyle and identity (Kralik et al., 2010; Meleis et al., 2010).

Other important properties are change and difference. As Meleis et al. (2010) indicate, change is necessary for transition, but change can happen without transition. For transition, exploring changes (e.g. nature, severity) and their effects on the individuals' lives are necessary. Through transition, individuals experience differences and changes in their feelings about themselves, others' perception about them, and their world view (Kralik et al., 2000; Meleis et al., 2010).

In a transition process, an individual may need to obtain new knowledge and change his/her behavior and self-identity to adapt to the new condition (Davis, 2010; Meleis et al., 2010). Nursing is "*concerned with the process and the experiences of human beings undergoing transitions where health and perceived well-being is the outcome*" (Meleis & Trangenstein, 2010, p. 67). Nurses and health-care providers need to be informed patients about a process of transition. In this manner, they can plan effective

interventions to help individuals in this process of identifying changes related to illness and exploring new skills and behaviors to regain well-being (Davis, 2010; Kralik et al., 2010; Schumacher & Meleis, 2010).

Through investigating the coping process in patients with CHD and AP, this doctoral thesis can be helpful in increasing the knowledge of health professionals regarding the transition process in order to help patients with their transition to be able to deal with issues related to their illness. When illness and distress are replaced by well-being, we can conclude that the transition has occurred successfully (Kralik et al., 2010; Schumacher & Meleis, 2010).

4 RATIONALE FOR THE THESIS

Evaluating symptoms experienced by patients with CHD requires appropriate and standardized instruments applicable to patients with CHD and AP. Because of the lack of standardized instruments in Iran, the existing standardized instruments needed to be translated and cross-culturally adapted for utilization in Iranian patients. Symptom measurements with validated instruments are important because it gives us the opportunity to compare findings from different settings and patient samples.

In a previous study, it is indicated that CHD decreases the patients' quality of life (Xie et al., 2008). Moreover, it influences physical and mental functions (Sacker et al., 2008). According to the literature, CHD burden is high, and considering appropriate treatment and prevention measures is essential to decrease disease burden. Understanding patients' experience of symptoms and their coping process with CHD, integrated with effective caring plans developed to reduce and to manage the symptoms and illness consequences, allows to probably improve patients' functioning and quality of life. Knowledge of how patients experience symptoms and behave in a critical situation will decrease the impact of symptoms on patients' lives and improve their quality of life (Coldwell & Miaskowski, 2000).

Nurses as health-care providers have a critical role in patient education and in helping patients to identify experienced symptoms and to behave and to cope positively. This study provides nurses with information about patients' experience of AP characteristics and their coping with illness, which may be used in caring for these patients. In the study of the effects of educational program for patients with heart failure, it is indicated that it has great effects on the physical and mental dimensions of the quality of life by SF-36 (Mårtensson et al., 2005). Moreover, it is demonstrated that education and counseling programs in patients with CHD can improve their knowledge of CHD illness, and its symptoms and their appropriate response to symptoms (Buckley et al., 2007).

Furthermore, it provides knowledge on distinctions in experiencing and coping with CHD from a gender perspective, which can be utilized in developing gender-sensitive care and policies. Knowledge of the experiences described by patients with CHD and AP provides useful evidence required for nurses to evolve their practice to support these patients in achieving well-being. This knowledge can assist nurses in providing appropriate care particularly through considering gender aspect. At present, there is a

lack of information about how Iranian patients with CHD experience AP characteristics and how they cope with their condition.

Women postpone seeking medical care longer than men (Banks & Dracup, 2007), and understanding the symptom experience is important for symptom management and selecting suitable interventions (Sidani, 2011). In the current research, the gender aspect was considered in explaining symptom experiences and coping with illness. This will increase our understanding of the influence of gender on the decision to seek and receive treatment for AP symptoms. The findings may be used to decrease delay in seeking treatment for patients with AP. Recognizing and considering gender differences and considering can increase the quality of care (Celik et al., 2008). The findings may be used to develop an experiment to decrease the delay in diagnosing AP and to enhance the responsiveness of health-care professionals to cardiac care.

This research will contribute significant knowledge in this field in Iran. It can also show differences and/or similarities that might be indicated in relation to results from other studies.

5 MAIN AIMS

This study was aimed at exploring and describing experience of AP characteristics and coping with CHD from a gender-related perspective. The outcomes of this project were 4 sub-studies with following aims.

SUB-STUDY I

- 1) To describe the process of translating the SF-MPQ, MRQ and accompanying symptom checklist from English to the Farsi language
- 2) To evaluate substantial psychometric works (content and construct validity) for the entire instrument and each part of it (SF-MPQ, MRQ and accompanying symptom checklist)

SUB-STUDY II

To evaluate internal consistency and test- retest reliability of the Iranian version of the AP characteristics questionnaire

SUB-STUDY III

To examine gender differences in the description, intensity and location of AP in patients with CHD

SUB-STUDY IV

To explore experiences of and coping with CHD and describes how gender influences on experiences reported by the participants

6 METHODS

In the method section, the design, participants (sample size and method), data collection and analysis of each sub-study will be described. Ethical consideration and study site which were common between sub-studies will also be explained. Figure 1 is showing the research process in this doctoral thesis. It indicates the steps from writing proposal to analyzing data.

6.1 DESIGN

Papers I, II and III present studies that were conducted using quantitative methods. Cross-cultural adaptation of the Iranian version of AP characteristics questionnaire and evaluation of substantial psychometric works was conducted in sub-studies I and II. Paper III presents a study in which a cross-sectional design was performed for studying AP characteristics from a gender related aspect. In sub-study IV, a qualitative study using grounded theory (Charmaz, 2006) for studying the participants' coping with illness (CHD) is presented.

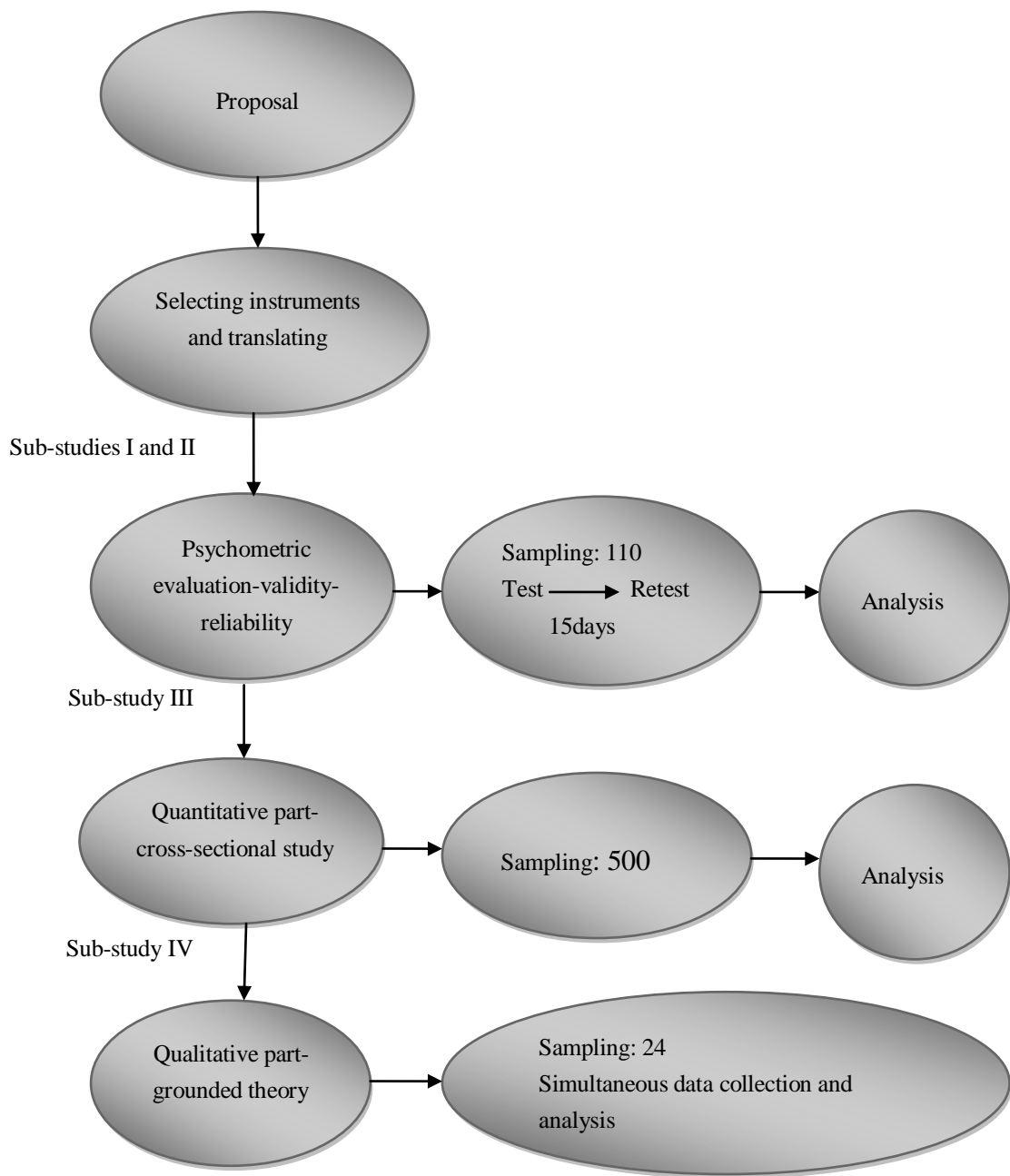
Quantitative and qualitative methods were used in this research project as complementary approaches. Such a combined approach was used to interpret and capture the variations of individual experiences of AP characteristics, and coping with illness through using the strengths of various methods that would focus on different aspects of the research questions to gain a deeper understanding of the phenomenon under investigation (Burns & Grove, 2009; Polit & Beck, 2010).

The quantitative method was utilized to gain comparable and generalizable knowledge (Polit & Beck, 2010). Various instruments were prepared and utilized for evaluating AP characteristics. Consequences of illness, meaning, coping process and responses to illness were investigated through qualitative method. Moreover, a qualitative approach was utilized to achieve a deeper understanding of experiences of and coping with illness by patients with CHD.

6.1.1 Quantitative method

The purpose of conducting sub-studies I and II was to establish validity and reliability of an instrument that could be utilized to determine AP characteristics in patients with CHD and explaining gender differences and similarities in sub-study III. Since the number of multicultural research studies are increasing, it is necessary to culturally adapt and translate instruments for use in different cultures and populations i.e. cross-cultural adaptation (Institute for Work & Health, 2007).

Figure 1 The research process



The steps for cross-cultural adaptation of instruments are: 1) Translating and adapting; 2) Synthesizing of the translation; 3) Back translation; 4) Reviewing; 5) Pre-testing; 6) Field test (Institute for Work & Health, 2007; Verra et al., 2006;). Although the cross-cultural adaptation process aims at ensuring that the psychometric properties are established, this is not enough and further evaluation should be conducted on the psychometric properties of the translated instrument (Institute for Work & Health, 2007; Murphy-Black, 2006).

Validity is concerned with how an instrument measures what it is purposed to measure and it is necessary condition for reliability (Polit & Beck, 2010). Instruments are partially valid and evaluating complete validity takes years (Higgins & Straub, 2006). Reliability is how a data collection procedure result in the same outcomes after repeated measurements (Polit & Beck, 2010). Reliability is the extent to which an instrument is without random error. Validity is the extent to which an instrument is without systematic bias (Burns & Grove, 2009; Higgins & Straub, 2006).

In sub-study III, a cross-sectional study was performed. Through cross-sectional studies, health-related variables are determined in participants at one particular time (Polit & Beck, 2010). Cross-sectional study may indicate the proportion of people with specific characteristics and how these characteristics vary by other variables such as age and gender (Machin et al., 2007). It is conducted mostly to compare data from different types of participants (Robertson & Williams, 2009). In sub-study III, AP characteristics in men and women were determined then their differences and/or similarities were investigated.

6.1.1 Qualitative method

In sub-study IV, the methodological approach (grounded theory) was based on a qualitative paradigm. For studying the participants' coping with illness (CHD), we used grounded theory. Qualitative approaches provide information about human experiences and provide conditions for exploring and discovering the meanings (Polit & Beck, 2010). Grounded theory is an appropriate method for studying social process and structures within a natural setting and identifying inherent processes (Charmaz, 2006). Coping with illness is a process and a grounded theory approach would be an appropriate choice of method for exploring process. Constructivist grounded theory seemed to be the best fit with this study. Charmaz (1995) presents a constructivist version of grounded theory. According to constructivism, the meaning of concepts develop through social interactions (Conrad & Barker, 2010), it means that reality is something constructed by us according to our ideas and views. Constructivist approach includes a relativist ontology (multiple realities), subjectivist epistemology (mutual creating of knowledge by researcher and respondent), and naturalistic (natural setting) (Guba & Lincoln, 2005). As Charmaz (2006) points out: "*we are part of the world we study and the data we collect. We construct our grounded theories through our past and present involvements and interactions with people, perspectives and research practices*" (p. 10).

In grounded theory, sampling, data collection, and analysis occur simultaneously. Constant comparison is utilized to develop and edify categories (Burns & Grove, 2009; Charmaz, 2006; Polit & Beck, 2010). At the beginning, generative questions for assisting the research were indicated. Then during data collection, codes and categories were developed and links were identified between the categories. The categories and their relationships were formulated for describing the process at a higher level of abstraction. For analyzing, coding and memo writing were utilized. *“Coding is the pivotal link between collecting data and developing an emergent theory to explain these data”* (Charmaz, 2006, p. 46). Memo writing is a recording the researcher’s presumptions, thoughts, ideas and questions within the study (Charmaz, 2006).

6.2 PARTICIPANTS

In following sampling method, inclusion and exclusion criteria and sample size will be described which is summarized in Table 1.

Table 1 Sampling method and sample size for each sub-study

Sub-studies	Sample size	Sampling method	Inclusion criteria	Exclusion criteria
Sub-study I and II	110	Convenience	Over 20 years old, diagnosed with CHD, an episode of AP within the previous week	Cognitive impairment, too ill, history of acute MI or coronary revascularization, active gastrointestinal conditions
Sub-study III	500	Stratified-stratifying based on gender		
Sub-study IV	24	Purposive and continued with theoretical sampling		

6.2.1 Sampling method

For sub-studies I and II, convenience sampling (utilizing the available persons as participants) was used (Polit & Beck, 2010). For sub-study III, sampling was performed through stratified sampling. In stratified sampling, the researcher identifies strata of the population and specifies the number of elements required from those strata in the sample (Burns & Grove, 2009; Polit & Beck, 2010). Patients with AP were stratified on the basis of gender (men and women). In the qualitative sub-study (IV), sampling was performed through purposive sampling and continued with theoretical sampling as the codes and categories emerged. In this sampling, the widest variety of respondents who meet eligibility criteria were considered (Polit & Beck, 2010). At the beginning, the transcript interviews of three patients were coded and categorized. For theoretical sampling and to have the widest variety, age, educational status, marital status, medical history and disease duration were taken into account during selecting patients.

Moreover, sampling was continued based on analysing interviews and raised questions until no new category was identified (Charmaz, 2006). In all sub-studies, patients met the eligibility criteria as follows below.

6.2.2 Inclusion criteria

The participants were patients with AP who:

1. were over 20 years old.
2. were diagnosed with CHD, confirmed by documented results of angiography.
3. had experienced an episode of AP within the previous week and as a result had same time frames for remembering pain.

6.2.3 Exclusion criteria

Exclusion criteria were patients who:

1. had severe cognitive impairment and patients who were too ill to participate.
2. had a history of acute MI or coronary revascularization in the last 6 months.
3. were experiencing any active gastrointestinal conditions such as ulcer or hiatal hernia.

6.2.4 Sample size

In sub-studies I and II, one hundred and ten patients with CHD who experienced AP were participated for evaluating validity and reliability of instrument.

In sub-study III, according to the pilot study in Iran, sample size was estimated with $P=0.80$, $\alpha=0.05$, $d=1.50$ (for existing statistical significance, the minimum difference of total score between men and women is 1.5) and $SD= 7.50$. Sample size was approximately five hundred in total and 250 for each group of men and women.

In sub-study IV, sample size was determined on the basis of informational needs and the guiding principle was data saturation (sampling until no new information is obtained) (Burns & Grove, 2009; Polit & Beck, 2010). Sample size for this sub-study was 24 patients.

6.3 STUDY SITE

This study was performed on patients, who attended Shahid Rajaei hospital, Tehran, and were admitted in the cardiac units.

6.4 ETHICAL CONSIDERATIONS

For the study, ethical approval for the project was granted by the research ethics committee of the Ministry of Health and Education in Iran (P-391, 31 July 2005).

1. Participants received information about the study.
2. Informed consent was obtained from all patients who met the inclusion criteria. For illiterate patients informed consent was obtained orally.

3. Sufficient time was given for patients to ask questions.
4. Participants were informed about their rights to decline participation or to withdraw at any time.
5. Confidentiality was guaranteed throughout the study.

6.5 DATA COLLECTION METHODS

For the *quantitative* part of the study (sub-studies I, II, III), the following questionnaires were combined to study the AP Characteristics: Modified Rose Questionnaire (MRQ), Short Form McGill pain Questionnaire (SF-MPQ) and Accompanying Symptom Checklist (Fischbacher et al., 2001; Melzack, 1987; Rose et al., 1977; Zinke et al., 2010). For the *qualitative* part (sub-study IV), data was collected through in-depth semi-structured individual interviews. Instruments and data collection procedure for quantitative part and semi-structured interview (data collection in qualitative part) will be illustrated below.

6.5.1 Instruments used in sub-studies I, II and III

6.5.1.1 *Modified Rose Questionnaire (MRQ)*

The Rose Questionnaire was used as a measurement of AP. Some of its items were not appropriate for patients with CHD who experienced AP; therefore, items related to the AP existence were modified by researchers. Questions regarding the existence of AP were deleted because the inclusion criterion was having AP within the previous week and all of them should have had AP for selection and inclusion in this study. This was conducted to fit the instrument for patients with AP. MRQ included five multiple and dichotomous choice questions related to factors which precipitate or relieve chest pain, and pain duration and location. It had a drawing of the human body (front and back). Patients were asked to mark the places where they felt pain or discomfort.

6.5.1.2 *Short Form McGill pain Questionnaire (SF-MPQ)*

Melzack (1987) developed the SF-MPQ as a pain measure. It has been used in several studies of acute and chronic pain and has been translated to many languages (Melzack & Katz, 2001). It contains 15 descriptors; the first eleven words are related to the sensory dimension. The last four words are related to the affective dimension (Melzack, 1987). It contains pain intensity measurements which are Present Pain Intensity (PPI) scale ('no pain' = 0 to 'excruciating' = 5) and a Numeric Rating Scale (NRS, 0= no pain/discomfort to 10= pain/discomfort as bad as it could be). It provides data on intensity and quality of the pain (sub-studies I, II, III) (Grafton et al., 2005).

6.5.1.3 Accompanying Symptom Checklist

An item was added following a review of the literature to address accompanying symptoms. The item included the following symptoms, dyspnea, coughing, diaphoresis, nausea, vomiting, heart burning, anorexia, dizziness, faint, tiredness, weakness, palpitation and anxiety (sub-studies I, II). Patients were asked to determine the existence of symptoms through selecting one of the dichotomous choices (yes/no).

6.5.2 Translation procedure

Translation is influenced by culture and translation is part of the cross-cultural adaptation of instrument for ensuring content validity (Institute for Work & Health, 2007; Peters & Passchier, 2006;). There are four types of translations methods; one way translation (fastest but with less quality), committee approach (translating by more than 3 bilingual translators), and forward and backward translation and combined translation technique (Cha et al., 2006). Jones et al. (2001) introduced combined translation. Combined translation is a combination of forward and backward translation and committee approach in which a group of translators conduct forward and backward translation (Cha et al., 2006).

For translating the questionnaire in this study, combined translation technique was utilized. In the first step in cross-cultural adaptation, the instrument was translated blindly into Persian by four different translators (two bilingual translators familiar with the concepts for reflecting clinical aspects and two translators determining meanings in the original instrument). Then, the results of the translations were synthesized by consensus between translators and investigators. In the back translation phase, two other translators blindly translated the instrument back into English. There was agreement between both translations. Then an expert committee reviewed translations, and confirmed the questionnaire for field testing. The expert committee included methodologists, health care professionals and language experts. This is one of the ways for evaluating content validity. Then validity (sub-study I) and reliability (sub-study II) of the translated questionnaire were evaluated.

6.5.3 Data collection procedure for quantitative part

In sub-study I, the first step was translation of the instrument. Then for sub-studies I and II, data was gathered for testing the instrument during initial contact with one hundred and ten patients. Fifteen days after initial contact, data was gathered for the retest. Assessment of stability is derived through test-retest reliability procedures. Instructions on how to fill out the questionnaire were provided. The researcher read each item for illiterate patients and wrote their responses. For the pain descriptors, the

patients were asked to choose the pain descriptors which describe the quality of their pain and then rate their intensity. Participants were asked to remember their severest pain in the last week when answering the items. For sub-study III, five hundred patients were asked to fill out the validated questionnaires. These were similar to the above used for collecting the data for sub-studies I and II.

6.5.4 In-depth semi-structured interview used in sub-study IV

Patients were interviewed individually in the cardiac units. Each interview was conducted, tape-recorded, transcribed verbatim and analyzed consecutively and then the next interview was performed. Each interview lasted from 80 to 120 minutes. The interviews began by collecting general information and continued in order to clarify the underlying process by using the interview guide and other interviewing methods, including probing, paraphrasing and silence. An interview guide was included questions regarding the patient's experiences, and how they respond to and cope with CHD (e.g. what does cardiac disease mean to you? How do you deal with your illness? What do you do when you experience pain?) (Kvale & Brinkmann, 2009; Marshall & Rossman, 2010). For capturing emergent thoughts and questions, memos were written in the process of research (data collection, analysis). Memos facilitate engagement of the researcher with data, prompts further data gathering, crystallizes the researcher's inductive reasoning and aid in the developing of abstract concepts as well as facilitate revisions of data transformation steps.

6.6 DATA ANALYSIS

In this thesis, data analysis involved both quantitative (sub-studies I, II and III) and qualitative (sub-study IV) analysis.

6.6.1 Quantitative analysis (sub-studies I, II, III)

For sub-studies I, II and III, significance was assumed at $p < 0.05$. Descriptive statistics (e.g. means, standard deviation and percentages) were calculated for each variable. For the SF-MPQ, the sensory (the first 11), affective (the last 4), total (sum of sensory and affective scores), NRS and PPI scores were considered in analysis.

For sub-study I, content validity was evaluated and established by a committee consisting of 10 expert reviewers. They evaluated the relevance of the content of the questionnaire for the concept of experiencing AP characteristics. Face validity was evaluated and established by six patients who had eligibility criteria. Patients filled out the questionnaire. They evaluated the items through thinking out loud. Thinking out loud is a way to verbalize thoughts during conducting an action (Ericsson & Simon, 1993). They were interviewed to share their thoughts and ideas. This method can

evaluate content validity as well. For the SF-MPQ, the percent use of descriptors by patients indicated the instrument's content validity. If at least one third of the patients chose a descriptor, it was considered a suitable word for explaining patients' pain experiences (Georgoudis et al., 2000). Hence, frequencies of descriptors were determined (sub-study I). Moreover, the degree of association between different parts of the instrument indicate convergent construct validity (Georgoudis et al., 2000; Melzack, 1987). Through convergent validity, correlation of all dimensions of the concept was evaluated (Fayers, Machin, 2007). Pearson correlation coefficient and chi-square test was utilized for analyzing association (sub-study I).

For sub-study II, paired t-test was used in the analyses of the differences between test-retest. For evaluating internal consistency, Cronbach's alpha was used. The Kuder-Richardson Formula 20 (KR-20) was used for dichotomous data. The Intraclass correlation coefficient (ICC) and standard error of measurement (SEM) was calculated for the total, sensory, affective, NRS and PPI scores (sub-study II).

For sub-study III, chi-square test, t-test and Mann-Whitney test were used to examine AP characteristics between men and women. Chi-square test was used for categorical variables, t-test for continuous variables, and Mann-Whitney for ordinal variables and non normal distributions. Regression analysis was used while controlling for other demographic and clinical variables: Multiple linear regression for analyzing the association between pain scores and gender, and multiple logistic regression for evaluating the relationship between pain locations and explanatory variables (Bagley et al., 2001; Chatterjee & Hadi, 2006; Hosmer & Lemeshow, 2000) .

The Statistical Package for the Social Sciences (SPSS) versions 10, 14.0 and 16.0 were used for analysis.

6.6.2 Qualitative analysis (sub-study IV)

Constant comparison was used to explain relationships in the data, thus building up a theoretical understanding of the data (Charmaz, 2006). The constant comparative method of analysis was utilized to compare data with data, data with category, codes with codes, categories with codes, category with categories, and categories with core category. It was utilized for finding similarities and differences, directing simultaneous data collection and theorizing of the participants' experiences. Examples of the interpretation process are shown in Table2.

Following each session, the interviews were transcribed verbatim. The transcribed interviews were read several times to understand participants' condition. They were read line by line for distinguishing statements about experiences, actions, feelings and

Table 2 Examples of codes and categories (interpretation process)

Examples of codes	Subcategories	Subcategories	Categories	Core category
Uncertainty Hopelessness Fear Anger Role changes inability	Experiencing emotions Experiencing consequences	experiencing emotions and consequences	Losing normal life: experiencing emotions and consequences of illness	Transitioning to normalize life
Accepting one's self as patient Accepting illness, recognizing not the only patient Appreciation of life Hope for a cure Wanting to be alive to support children Determining coping goals Considering normalized life as main goal	Acceptance Self motivating Planning	Coming to terms	Coming to term and using coping strategies	
Seeking why Using information from media Using information from books Learning about illness	Searching for cause and information	Coping strategies		
Distracting through traveling Distracting through housework Comparing one's self with other patients with worse condition Feeling relaxation through comparison Minimizing one's condition through comparing Talking with colleagues Visiting family Talking with family	Cognitive strategies <i>Distracting</i> <i>Comparing to minimize</i> <i>Communicating</i>			
Expectations from family Distributing tasks among family members Accepting assistance from family members Handing over responsibilities to colleagues	Expectations and taking assistance			
Cooking separate meals Quit smoking Avoiding stressors Managing comorbidities Resting more and slowing down tempo	Modifying risk factors and changing lifestyle			
Supplication Rely on God Beliefs about God's control over everything	turning to religious and spirituality			

copings. Analyzing process began with initial coding in which actions or events were defined (Charmaz, 2000, 2006). For example, the interviewed persons described inability for doing previous activities as: '*I cannot do the things I used to do.*' Lacking strength was described as '*I can't wash the curtains; even I can't sweep the floor.*' Role reversal described as '*My wife works and I stay at home.*' Through focused coding, codes were sorted into categories based on common characteristics and distinctions (Charmaz, 2000, 2006). For example, role reversal, guilt over inability to meet role and relinquishing some of responsibilities were considered as 'role changes' category. The links and relationships between categories and subcategories were begun to build up. Role changes and other categories related to the effects of illness on the patient's

life were considered in a more abstract category which was 'experiencing consequences'. In addition to 'experiencing consequences', participants experienced emotions as well. These experiences were due to the illness and its symptoms and losing normal life. These subcategories were linked together and named as 'losing normal life: experiencing emotions and consequences'. In the next phase of coding, the core category that was 'transitioning to normalize life' was developed (Charmaz, 2000, 2006). In these differences, biological, social and psychological factors are important. The research process was constantly discussed with supervisors.

7 RESULTS FROM SUB-STUDIES

The results of each sub-study are presented in this section. They include demographic results (sub-studies I-IV), instrumentation (sub-studies I and II) and symptom characteristics which patients experienced (sub-study III) and coping with CHD (sub-study IV) from a gender-related perspective.

7.1 DEMOGRAPHIC RESULTS

Summarized demographic and clinical characteristics of men and women in sub-studies I-III are presented in Table 2. In sub-study III, there were significant differences between men and women's age, marital status, history of smoking, obesity and history of percutaneous transluminal coronary angioplasty (PTCA) (p-value 0.02). History of PTCA was reported by 16% of men and 12.40% of women.

In sub-study IV, half of the participants were women. The average (SD) age of participants was 54 (9.40) for women and 52.67 (7.25) for men. All the men were married and five of the women were widows. The range of disease duration was 2 months to 20 years. Only two women worked outside the home as a home cleaner and others were housewives. The average number of children for women was 5.08 and for men 3.10.

7.1 RESULTS FROM SUB-STUDIES I AND II

The results from these sub-studies were related to cross-cultural adaptation and assessed validity and reliability of the Iranian version of the AP characteristics questionnaire.

In the MRQ, in test and retest, half of the patients experienced AP while walking at an ordinary pace and more than 80% experienced AP when walking uphill or in a hurry. In both test and retest, more than half of the patients stopped walking as a response to AP. About 70% of the patients experienced pain relief following stopping. In more than 60%, AP was relieved after 10 min or less (sub-studies I and II). Further, there was significant association between items in MRQ ($0.008 \leq p \leq 0.001$) (sub-study I).

In both test and retest, patients reported chest pain in the left upper (about 80%) and lower side of the chest-apex (70.90 %). About 60% of the patients experienced pain in the left scapula. About 30% reported pain in the neck in both test and retest (sub-studies I and II). The percentage of palpitation, dyspnoea, anxiety, weakness and tiredness were 82.70%, 80%, 70.90%, 65.50% and 60%, respectively for test. For retest, the percentage of palpitation, dyspnoea, anxiety, weakness and tiredness were 77.30%, 77.30%, 68.20%, 62.70% and 55.50%, respectively (sub-studies I and II).

Table 3 Demographic and clinical characteristics of men and women in sub-studies I-III

Sub-studies	Sub-studies I and II (N=110)			Sub-study III (N=500)		
Demographic and clinical characteristics	Men (n=55)	Women (n=55)	P-value*	Men (n=250)	Women (n=250)	p-value*
Married, No. (%)	49 (89.30)	43 (81.10)	0.17	233 (93.2)	185 (74.00)	< 0.001
Age, Mean (SD)	53.90 (14.70)	58.8 (12.70)	0.06	59 (9.90)	62.10 (9.10)	< 0.001
Illiterate, No. (%)	7 (2.50)	19 (34.10)	<0.001	50 (20.00)	104 (41.60)	< 0.001
Disease duration, Mean (SD)	4.50 (3.50)	8.3 (6.10)	<0.001	23.90 (28.80)	28.80 (31.00)	0.70
Hypertension, No. (%)	31 (57.10)	40 (73.60)	0.06	138 (55.20)	155 (62.00)	0.12
Hyperlipidemia, No. (%)	17 (32.10)	18 (34.00)	0.78	122 (48.80)	132 (52.80)	0.37
Smoking, No. (%)	25 (46.40)	8 (13.20)	<0.001	100 (40.00)	27 (10.80)	< 0.001
Diabetes Mellitus, No. (%)	14 (25.00)	20 (35.80)	0.19	66 (26.40)	89 (35.60)	0.03
Obesity, No. (%)	10 (17.90)	22 (39.60)	0.01	54 (21.60)	116 (46.40)	< 0.001
Family history, No. (%)	19 (37.50)	17 (32.10)	0.56	116 (46.40)	130 (52.00)	0.21

* Chi-square test for categorical variables and t-test for continuous variables

The first sub-study indicated establishment of face and content validity. In the think aloud method, patients found the wording of the questionnaire clear. Moreover, they confirmed the relevance of the questions. The expert panel confirmed the relevancy of the content of the questionnaire for evaluating AP characteristics. The questionnaire has appropriate content for assessing AP characteristics. All descriptors (words) in the SF-MPQ were used by at least one third of the sample. Such a result was found in retest as well. Heavy, cramping, shooting, aching, tiring-exhausting, fearful and cruel punishing were used by more than half of the participants in both test (sub-studies I and II) and retest (sub-study II). The mean intensity of these descriptors was between 0.80-1 in both test (sub-study I) and retest (sub-study II).

Table 4 Mean (SD) of pain scores in sub-studies I-III

Sub-studies	Sub-studies I and II	Sub-study II		Sub-study III		
Scores	Test Mean (SD)	Retest Mean (SD)	p-value	Men Mean (SD)	Women Mean (SD)	p-value
Sensory	8.57 (5.74)	8.72 (5.47)	0.86	8.30 (5.10)	11.60 (4.80)	p< 0.001
Affective	3.34 (2.68)	3.37 (2.63)	0.58	4.40 (2.70)	6.00 (2.10)	p< 0.001
Total	12.08 (7.72)	12.09 (7.35)	0.97	12.70 (7.00)	17.60 (5.80)	p< 0.001
NRS*	5.42 (1.96)	5.37 (1.98)	0.26	6.40 (2.40)	7.20 (2.50)	p< 0.001

* Numeric Rating Scale

Table 4 summarizes mean (SD) pain scores in sub-studies I, II and III. There was significant correlation between scores in SF-MPQ and the NRS ($p < 0.001$). There was significant correlation between NRS and PPI ($p < 0.001$) (sub-study I). No significant

differences were found between the two measurements in SF-MPQ and NRS scores (sub-study II).

Internal consistency for the instrument at both assessments was found adequate with Cronbach's alpha about 0.80, for test and retest. The ICC for SF-MPQ and NRS scores were ranged from 0.95-0.98 with narrow confidence interval (CI). The ICC for PPI was 0.76 (CI, 0.68-0.83). The SEM for the sensory, affective, total and NRS scores were 0.55, 0.26, 0.74 and 0.19, respectively (sub-study II).

7.2 RESULTS FROM SUB-STUDY III

In comparison with men, women were more likely to locate pain in the left arm and hand ($p=0.006$), left scapula ($p<0.001$), jaw ($p=0.006$) and neck ($p<0.001$). Men were significantly more likely to report pain in the left lower chest ($p=0.007$). Multiple logistic regression analyses indicated that in comparison to men, women were more likely to experience pain in the left arm and hand, left scapula and neck. However, there was no association between men and women according to left lower chest pain. The predictors of left lower chest pain were being a widow (compared to being married) and diabetes. They negatively related with having pain in left lower chest. Being a woman was the only predictor which was positively related with left arm and hand location; furthermore, it was positively related with left scapula, jaw and neck pain. University level (compared to illiterates) and family history of CHD were factors that were observed to be significant predictors which related negatively with left scapula pain. Age positively and educational level (university and high school) negatively related with having jaw pain. Age, being single (compared to being married) and having a history of hyperlipidemia were significant as predictors of feeling pain in the neck. They positively related with having neck pain. In multivariate analysis, the Hosmer and Lemeshow test (0.13-0.97) illustrated the fitness of final models (in all pain locations). The model chi-square ranges were from 29.90 to 38.70 ($p\text{-value}< 0.001$ in all the models) which indicated that the models fit the data. There was not any interaction or multicollinearity problem observed.

Men and women mainly chose and rated the highest severity for aching, tiring-exhausting, cruel-punishing, sickening and heavy to describe AP. In comparison with men, women reported each of the pain descriptors (except heavy with $p\text{-value}= 0.11$) more frequently ($p\text{-values}< 0.001$) and they chose more words ($p< 0.001$). In comparison with men, women indicated significantly greater intensity for all the descriptors ($p\text{-values}$ ranged from 0.02 to < 0.001).

The summarized mean (SD) pain scores in sub-studies I, II and III are presented in Table 4. Pain scores were significantly higher in women in compared to men (p - values were < 0.001). However, there were not statistically significant differences, between men and women in PPI ($p= 0.45$). In multiple linear regression analysis after adjusting for demographic and clinical factors, being a woman was predictor variable in sensory, affective, total and NRS scores. The multiple linear regression results indicated that diabetes ($p= 0.05$) was negatively related; while sex ($p< 0.001$) and disease duration ($p= 0.005$) were positively related to sensory score. Educational level ($p= 0.001$) was negatively related; while sex ($p< 0.001$) and hyperlipidemia ($p<0.001$) were positively related to the affective score. Moreover, sex ($p< 0.001$), disease duration ($p= 0.04$) and hyperlipidemia ($p= 0.006$) were significantly positively associated with total score. NRS was positively related to being a woman ($p= 0.02$). Age ($p< 0.001$) and educational level ($p= 0.03$) were significantly and negatively associated with NRS.

7.3 RESULTS FROM SUB-STUDY IV

The findings in sub-study IV included three stages in transitioning to normalize life which were: losing normal life: experiencing emotions and consequences of illness, coming to terms and using coping strategies and recreating normal life. These categories were established based on participants' experiences. This process begins with CHD illness and experiencing AP. Whenever participants encounter a new condition (e.g. experiencing symptom) the process started again.

Participants realized disruption in their normal life due to illness. The participants perceived the heart as vital and an important organ for surviving and their illness and symptoms as a sign of becoming close to death, as they explained. They expressed some emotional feelings following this death awareness and losing normal life, such as shock, denial, fear, and anger. Participants' fear and worry was about death, futurity, infarction, becoming paralyzed or dependent and 'a burden' and illness heritage to their children, as they pointed out. Men as the head of the family were worried and uncertain about financial issues and their families' adjustment to the patient's illness and possible death. All of the participants expressed that they had reached the final point of their life. Participants noted that they were afraid to travel, to go outside their home or even to go to sleep at nights. They feared dying when they were slept and when they were outside the home and alone. They expressed anger from being affected by the disease. Many participants considered themselves as guilty for causing CHD through expressing self-blaming and self-injustice. The participants experienced that the illness and its symptom had consequences and limitations for them. The participants pointed out the

physical and social consequences of the illness and how their self-identity and life was changed as a consequence of the illness. They expressed limitation and inabilities to perform simple daily activities, such as, art, social and entertainment activities, role related task management such as housekeeping and motherhood for women, and job performance and fatherhood for men. Financial constraints were another area of challenge that were expressed by the participants, particularly men as breadwinner. Some of the participants from both gender expressed role reversals following illness. Women explained their inabilities to care for family members.

Throughout the process of their illness, the participants (both gender), at a certain stage, came to terms with their sick role and realized the loss of health. At that point the participants expressed an acceptance of their illness, and their new situation. They motivated themselves and planned for using coping strategies which they considered as a necessity for normalizing their life, as they pointed out. Participants (both men and women) found their family members, especially unmarried/single children, as an important motivator for surviving and for wanting to live longer, in order to support them. In this study, most of the participants often perceived women as more capable of coping with the illness. Women and men tried to cope through strategies such as searching for causes and information; utilizing cognitive methods; reducing expectations and accepting assistance; modifying risk factors and changing lifestyles, as well as turning to religion and spirituality, as they expressed.

Participants' explanations for their disease's causality were classified into risk factors, stress and divine punishment or being cursed as causes of CHD. Each woman and man mentioned themselves as more vulnerable for becoming a CHD patient. Moreover, only limited numbers of men sought information about their condition. Participants used cognitive exercises including distracting, comparing for minimizing and communicating for concentrating on positive thoughts and spirits. Men mostly used comparing method as a cognitive strategy.

Many reported taking actions (e.g. avoiding everyday activities) to prevent situations that could lead to symptoms exacerbation. Participants tried to modify risk factors and to control comorbidities, as they explained. Men mostly expressed that they gave up smoking. Moreover, through religious and spiritual practices the participants expressed a feeling of hope, and strength to cope with their condition. Male participants stated that they received help from their colleagues and family members who supported them emotionally, as they expressed. Women suggested that family members were the only source for help in conducting tasks as well as obtaining emotional support. Women

complained about receiving less support from family members. The majority of men and limited numbers of women expressed overprotective tendencies in family members particularly spouses.

At a certain point throughout the process the participants tended to create a new form of normality for themselves. They noted that they tried to cope with their illness and its impacts on their life. This process of transition to a normalized life helped participants to regain well-being and normality. It was shown that small numbers of patients (men and women) had reached to this stage. Our analysis showed that the participant's goal was to normalize their life and that socio-cultural variables e.g. gender had an influence when going through this process in various manners including coping strategies.

8 DISCUSSION

To evaluate AP characteristics experiences and coping with CHD, this study included 4 sub-studies. The results of each sub-study will be discussed in this section. The first part is a discussion about the cross-cultural adaptation and psychometric evaluation of the instruments used in this study. In the next part, symptom experience will be discussed, and in the last part, the coping process through transitioning to normal life will be discussed.

8.1 CROSS-CULTURAL ADAPTATION AND PSYCHOMETRIC EVALUATION

For measuring all aspects of the symptom characteristics of AP (e.g. location, severity and quality of the symptoms), the use of a comprehensive instrument is required. Therefore, a combination of two instruments with an additional item was considered for the cross-cultural adaptation of the standardized instruments (SF-MPQ, MRQ and accompanying checklist) to be used for the Iranian population.

The expert panel confirmed that the questionnaire was suitable and relevant for assessing experiences of AP characteristics in CHD patients. Content validity is a primary criterion for considering whether the instrument is appropriate for assessing the pain state of patients (Melzack, 1987). The thinking aloud method was also indicated face and content validity. Moreover, it was indicated that the SF-MPQ word descriptors were used by more than 33 % of patients. Therefore, the questionnaire was understandable for patients to complete and the content validity was established. These results were in line with the results of the Georgoudis et al. (2000) study which indicate that the Greek version of the SF-MPQ describes the chronic pain of musculoskeletal disease as well. The results indicated correlation between SF-MPQ scores and NRS, which established convergent validity of the instrument. The results are in line with the results obtained by of Georgoudis et al. (2000), Cook et al. (2004), Yakut et al. (2007) and Zinke et al. (2010). They also indicate correlation between pain scores in SF-MPQ. Cook et al. (2004) investigated psychometric properties of electronic version of pain questionnaires including SF-MPQ and pain disability index. They compared electronic version with paper one. They indicate that there are no differences between paper and electronic versions of those questionnaires. Also, the correlation of pain scores with total score was moderate to high in SF-MPQ. They indicate validity and reliability of electronic version of SF-MPQ. Furthermore, Sorlie et al. (1996) in a study of evaluating repeatability and validity of the Rose Questionnaire, indicate that a single report of AP

using the Rose Questionnaire have association with risk factors. The multiple reports using Rose Questionnaire and experiencing pain while walking at an ordinary pace (sever AP) have relation with more severe disease. The multiple reports of AP using Rose Questionnaire have association with thickness of carotid wall, risk factors (e.g. smoking), history of MI and taking AP relieving medications. They indicate validity and repeatability of Rose Questionnaire.

According to the results from sub-study II, there were no differences between test and retest results from the instrument in all the participant's responses. This indicated that the reliability of the instrument across time was good and it had the property of stability. The study of Georgoudis et al. (2001) concerned with the reliability of the Greek version of the SF-MPQ indicates no differences between test and retest related to day measurements of SF-MPQ. Although they found that the affective score in SF-MPQ was different in time intervals of two weeks. In the study of the Turkish version, SF-MPQ was filled out by patients with rheumatoid in the morning and afternoon of a day. They found no significant differences between test and re-test (Yakut et al., 2007). Cronbach's alpha was employed as an estimate for reliability. It can be calculated for the entire instrument and its parts or subscales (Jones & Rattray, 2010). A Cronbach's alpha < 0.60 is interpreted as unacceptable, a Cronbach's alpha between $0.60-0.65$ is considered as undesirable, a Cronbach's alpha between $0.65-0.70$ is interpreted as acceptable, a Cronbach's alpha between $0.70-0.80$ is considered as respectable, a Cronbach's alpha between $0.80-0.90$ and > 0.90 is interpreted as very good and redundant, respectively (DeVellis, 2003). Thus, the Cronbach's alpha for SF-MPQ in our study is considered to be very good. Further, the MRQ is respectable and good, and the accompanying symptom checklist is also acceptable. These results are in line with results of previous studies that have used the SF-MPQ questionnaire (Georgoudis et al., 2000; Yakut et al., 2007; Zinke et al., 2010).

In evaluating reliability, there was high ICC with narrow 95% CI for SF-MPQ scores for test and retest, which indicates that SF-MPQ is a reliable measure for men and women with CHD. There is no consensus about the cut-off range of ICC. Anastasi & Urbina (1997) indicate 0.60 as the minimum acceptable ICC value. Landis & Koch (1977) indicate that the ICC value for agreement is 0.00-0.20 (weak), 0.21-0.40 (poor), 0.41-0.60 (moderate), 0.61-0.80 (substantial), and 0.81-1.00 (almost perfect). In this study, the ICC was 0.95-0.98 for pain scores, which is an almost perfect. The ICC for PPI was 0.76, which shows substantial agreement. In total, an ICC above 0.70 is considered as an acceptable reliability (Baumgartner & Chung, 2001). In this study, the

minimum acceptable ICC value was 0.70. These findings are in line with the results of Grafton et al.'s (2005) study which investigated the reliability of SF-MPQ in patients with osteoarthritis. Also Georgoudis et al. (2001) and Yakut et al. (2007) report a high ICC for the Greek and Turkish versions of SF-MPQ, respectively.

SEM is "*the amount of error that can be expected for test scores*" (Groth-Marnat, 2009, p.15). There is no acceptable level for SEM (Groth-Marnat, 2009). In the current research, the SEM was small which indicates and increases the probability of the instrument reliability. This result is in line with the result of Grafton et al.'s (2005) who found a small SEM for SF-MPQ scores as well.

In Conclusion, the Iranian version of AP characteristics questionnaire that was established through combining two standardized instruments with an additional item is thus a cross-culturally adapted, valid and reliable instrument that can be used in clinical settings and research studies among the Iranian population in Iran.

8.2 SYMPTOM CHARACTERISTICS

A comprehensive assessment of patients with AP is the first step in determining basic information and evaluating the adequacy of the treatment program for pain relief. According to the results, men and women showed differences regarding AP characteristics experiences.

In comparison with men, women more commonly indicated the left arm and hand, left scapula, jaw, and neck as pain locations. According to the results, there were not differences between men and women in experiencing chest pain-apex (typical AP location); however, it was more prevalent for men. This result was congruent with the study of Khan et al. (2010) in patients with MI and other previous studies (DeVon et al., 2008; Dey et al., 2009). Dey et al. (2009), in investigating sex-related differences in the presentation of acute coronary syndromes, indicate that there are no differences between men and women in locating pain/discomfort in the chest-apex region. However, they reported that, in comparison with men, women were more likely to report jaw pain or nausea. Khan et al. (2010) indicate that women mostly experience pain in the neck, upper and middle central chest, upper and middle central back and middle right back. They report that men experience pain in the upper right chest. Moreover, in previous studies, women describe AP more frequently and in areas other than the chest (e.g. throat, neck, jaw, shoulder and middle back) (D'Antono et al., 2003; Patel et al., 2004; Philpott et al., 2001; Sheps et al., 2001). These gender differences may be associated with many factors including psycho-physiological, hormonal, clinical, and anatomical (DeVon & Zerwic, 2002; Johansson et al., 2007).

In sub-study III, more chosen and more intensified descriptors by participants were aching, tiring-exhausting, heavy, cruel-punishing and sickening. According to the results of D'Antono et al. (2006), men and women describe AP by descriptors such as tiring, pressing, throbbing, aching and heavy. McSweeney et al. (2003), in the study of prodromal symptoms in women with MI, indicated that women complain less about pain or discomfort in the central sternum. They found that most women complain of prodromal symptoms before an acute phase of MI. In the study of cluster analysis of prodromal symptoms, moreover, McSweeney et al. (2010) mentioned that there is a greater likelihood that prodromal symptoms reoccur in the acute phase of MI. McSweeney et al. (2003) showed that the most common prodromal symptoms are unusual fatigue, sleep disturbance, and shortness of breath and that the most common acute symptoms are shortness of breath and fatigue. These symptoms can make the diagnosis difficult. Most CHD symptoms can be attributed to other disorders (e.g. pulmonary disease or gastrointestinal problems) (McSweeney et al., 2010). They found three clusters of women based on the symptoms and their characteristics. These three groups are: 1) older and asymptomatic, 2) divers and mildly symptomatic and 3) younger, minority and multiple symptoms (p.314). They mentioned that knowledge about CHD symptom clusters can help women in realizing symptoms and seeking appropriate and prompt treatment (McSweeney et al., 2010).

Previous studies are in line with this one and indicate that women describe more severe pain compared to men (D'Antono et al., 2003; Granot et al., 2004). In a previous study performed by DeVon et al. (2008), women complained of a higher intensity of pain compared to men. Furthermore, these differences in the severity of symptoms might be related to gender differences in verbalizing (women's special ability to communicate and report symptoms) or actual variations in experiences (D'Antono et al., 2006). Fillingim et al. (2009) relate these differences in pain intensity to higher levels of depression and greater levels of anxiety in women as well as differences in coping mechanisms between men and women. Previous studies indicate that women report more pain, have negative reactions to pain, reveal a lower threshold and tolerance to pain stimuli, and have a greater pain sensitivity (Rollman et al., 2004; Wiesenfeld-Hallin, 2005). Schroeder (2010) mentioned that gender differences in pain experience and perception can be related to socio-cultural and psychological factors, biological issues, hormonal factors, or positive/negative emotions. Sundel et al. (2007) indicated an association between depression and AP in women with CHD. They show that depressive symptoms are most common in women with CHD, and these women

reported higher anxiety, AP, and a family history of CHD compared to a non-depressed woman.

Another factor which can explain gender-related differences is women's fear of pain, anxiety sensitivity, and panic reaction to pain (Keogh & Asmundson, 2004; Keogh et al., 2004). As Keogh & Asmundson (2004) indicate women with illness and related symptoms (particularly pain) might experience anxiety sensitivity. Anxiety sensitivity and being a woman can increase the frequency and intensity of pain (Keogh et al., 2004).

However, more commonalities between both genders are indicated in the pain intensity in patients with chronic stable AP (Kimble et al., 2003). The differences between the results of current research and those of some previous studies might be associated with socio-cultural issues. As Schroeder (2010) indicates, differences in pain experiences and perception can be associated to socio-cultural factors, including gender and ethnicity. There is a link between culture and how pain/discomfort is expressed. Nurses as health-care providers need to be aware that how patients perceive and experience pain varies across cultures, particularly in life-threatening conditions due to the extended changes that happen in this group of patients' lives and their fear from and uncertainty about the future. Good & Good (1980) mention, symptoms are perceived and experienced according to individuals' cultural worldview. Kvaren & Johansson (2004) investigated pain experience in patients with musculoskeletal pain from three different cultures (Iran, Iraq and Sweden). Participants from Iran and Iraq complain from greater levels of sensory and affective pain and pain intensity compared to the Swedish ones. They conclude that culture can affect pain experiences.

In the current study, some clinical factors (e.g. disease duration and diabetes mellitus) influenced on chest pain intensity and location. According to the results, diabetes mellitus was negatively related to pain scores. Because of diabetes neuropathy, patients may experience a decrease in pain sensation (Smeltzer et al., 2010). Therefore, this condition suppresses pain experience and patients may have a problem in recognizing cardiac pain. Brieger et al. (2004) indicated that patients with diabetes mellitus had higher frequencies of silent cardiac conditions (e.g. acute coronary syndrome). DeVon et al. (2008), in a study aimed at determining the association between diabetes and age in the absence of chest pain, found that diabetes mellitus and old age are associated with and predicted the absence of chest pain. One of the predictors of pain location, in our study, was marital status. Anyadubalu (2010) indicated the crucial role of marital status in patients' experiences, particularly for female participants.

In the current research, the heart was indicated as a vital organ, and its illness and symptoms were considered as an end point and a nearing to death by participants (sub-study IV). This issue could increase feelings of anxiety which could increase the number of experienced symptoms and their intensity (sub-study III). It shows the participants' judgments about how important the illness was for them. They considered it as a severe illness and evaluated the severity of the symptoms as high, particularly women (sub-studies III and IV).

Both men and women experienced limitations in their life and activities which led them toward coping and adjustment. In this coping process with illness and symptoms, they transitioned toward a normal life.

8.3 TRANSITIONING TO NORMALIZE LIFE

How patients interpreted the symptoms that they experienced was critical for the action they took subsequently (Lockyer, 2005). It seems that CHD illness caused disruption and changes in the person's current reality (health and normality) which means losing normal life. There were critical events which made them aware of changes (*c.f.* Meleis et al., 2010). They appraised their condition (CHD and AP) as harmful and threatening which is the primary appraisal in the cognitive model of stress and coping (Lazarus & Folkman, 1984). Following this awareness, patients could be informed of the need for transition and were immersed in the coping process and struggling towards normalizing life. This process can thus, be identified as a transition from a healthy and well role to a sick one.

The emotional experiences seemed to be related to the experience of loss of normal life. These are emotional components of responding to illness and its symptoms (*c.f.* Sidani, 2011). Kristofferzon et al. (2007) referred to emotional feelings and illness consequences as "threatening ordinary life". In the study of Plach & Stevens (2001), middle-aged women felt hopelessness, anger and frustration. They blamed themselves for being exposed to the disease. As Plach & Stevens (2001) indicated, a heart disease results in paradoxical feelings, emotions, incidents, and social conditions. Patients with CHD experience feelings such as fear, anxiety, and depression which has a negative influence on their health condition (Anyadubalu, 2010). Johansson & Ekebergh (2006) indicated that women experience imbalance in life and uncertainty following MI. Changing self-identity is reported in a previous study (Hildingh et al., 2007). They encountered their new identity as an individual living with an illness. Transition requires changes of self-identity (Kralik et al., 2010; Meleis et al., 2010).

In this study, participants pointed out many consequences due to illness, including limitations, inabilities, and role changes. These results are in line with previous studies (Kristofferzon et al., 2007; White et al., 2007). As Anyadubalu (2010) indicated, CHD makes patients inactive, helpless, and dependent. According to Lazarus & Folkman (1984), in the secondary appraisal of the cognitive model of stress and coping, individuals characterize the extent of harm, disruptions and damage. In this stage, participants appraise and determine the illness and the consequences of it.

In this study, patients came to terms with their illness and symptoms and motivated themselves toward coping. Some of the motivators are intrinsic and others are extrinsic motivations. Self-motivation can be considered as autonomous motivation in which persons have recognized and realized the value of behaviors and activities and integrate them into "*their sense of self*" (Deci & Ryan, 2008, p.182). As McSweeney (1993) mentions, self-motivation is internal thoughts and beliefs that trigger actions and attitudes to improve health.

Moore et al. (2010) in the study of '*perceptions of cardiac risk factors and risk reduction behaviors*' found that women described the trend to return to normal instead of concentrating on the chronic nature of CHD. It seems that patients utilized various coping strategies to normalize their life. Some strategies moved towards managing emotions which resulted from illness and symptoms, for instance cognitive exercises (Lazarus & Folkman, 1984). Another coping method in the current study was religious and spiritual practice. Utilizing spiritual coping strategies (both existential and religious methods) may help patients in finding meanings in their lives and achieving sense of control (Baldacchino & Draper, 2001). Spirituality is perceived as the meaningfulness and purposefulness of life which is a subjective and individual base phenomenon (Tuncay, 2007). Religion and/or spirituality can result in calmness and peace (Kelly, 2004), physical and psychological well-being and social interactions (Bonet, 2009; Seeman et al., 2003). As Anyadubalu (2010) indicated, religious beliefs and practices and being a member of religious group might be useful and benefit psychosocially for patients with CHD. Ebadi et al. (2009), in a study of coping approaches among Iranian patients with 'chronically affected by mustard gas during the war', indicate that spirituality is the main factor that helps patients come to term and deal with chronic illness in Iranian patients.

Some other coping strategies were used by our participants toward problem solving, for instance modifying risk factors. Condon & McCarthy (2006) highlighted the trends of

lifestyle modifications in patients with MI. The majority of patients who died from CHD had one or more risk factors which were related to lifestyle (Mackay & Mensah, 2004). Hence, considering lifestyle modification seems to be a useful and constructive strategy. Some of the participants limited their activities to avoid exacerbation of the illness and symptoms. Striving to maintain the quality of daily life was indicated in the study of experiences of physical limitations in patients with heart failure (Pihl et al., 2010). They indicate that patients with heart failure avoid activities which make them tired. They noted that this avoidance from activity for decreasing symptoms can cause underperformance.

In the current study, patients attributed illness to factors including stress, risk factors, and divine punishment. Anyadubalu (2010) found that patients attribute their illness to many other factors such as family history, chronic stresses and nutritional problems. Participants mainly tried to attribute illness to stress. This is reported in previous studies as well (Kristofferzon et al., 2007; Sjöström-Strand & Fridlund, 2007; White et al., 2007). Most Iranian women with low back pain attributed their pain and illness to stress in their lives, having to meet social expectations, managing house tasks and caring for others (Tavafian et al., 2008).

Moreover, some patients expressed overprotection from family members which was consistent with results from previous studies (Condon & McCarthy, 2006; Jensen & Petersson, 2003). Condon & McCarthy investigated lifestyle changes following MI and they indicated that overprotection tendencies from family members were extensively reported by patients. Iranian people view the family as the basic and most important unit of human life; it is the main source of support in dealing with problems encountered in life (Behjati-Sabet & Chamber, 2005). As Hafizi et al. (2008) suggest, interpersonal relationships are very important for Iranian people and they prioritize the preferences of others over their own.

It seems patients (men and women) who have a good psychosocial, physical and mental condition and have a strong support from their families and significant others experience less physical and mental dysfunction and manage to go through the entire process to recreate and reach a normal life stage. Limited numbers of men and women managed and reached to the recreating normal life stage. It seems that people from both genders who do not accept the illness remain in a stage of losing normal life and cannot proceed to the next level. Arman & Rehnsfeldt (2003) attribute it, as 'stuck' in the transformation process and suggest that the patients are not able to adapt and integrate

cancer into their lives. Perhaps special interventions (such as education and support) can help those patients to proceed to the next level.

In the current study, CHD was shown to have many effects on patients' lives and patients tried to cope with it. These findings are supported by previous studies. According to a previous study on patients with MI, the following themes were discussed: lifestyle warning signs, taking responsibility for lifestyle changes, professional support and looking forward to the future (Condon & McCarthy, 2006). Svedlund & Axelsson (2000) examined the meaning of lived experiences following MI. They indicate that some patients and their families loss their freedom and struggled with CHD to live as normally as possible.

A sense of control and reorientation of the active self in the study of Brink et al. (2006) and struggle to maintain a status quo in the study of Sutherland and Jensen's (2000) were shown to be a part of struggling for normalizing life in the current research. Ononeze et al. (2009) studied the experience of patients with heart disease and they indicate that a common attitude for those patients was to keep it going. Kristofferzon et al. (2007) indicated the following themes for the description of women and men six months after MI: 'threatening ordinary life', 'struggling for control' and 'ambiguous network'. Johnson (1991) in the study of 'the process of adjustment following heart attack', found that patients were confused by the existing symptoms. They struggled to protect themselves from the threat of losing control and health and they tried to normalize their symptoms.

Kralik et al. (2000) and Kralik (2002) studied women's experience of chronic illness. A structure of transition in chronic illness was identified in these studies that involved complex movement between two states, referred to as 'extraordinariness and ordinariness'. In the 'extraordinariness' state, women encounter the changes and disruptions to their health. In passage to ordinariness as struggling to normalizing life in the current study, patients learned ways to manage and incorporate the changes into their daily life.

Gender aspect in the coping process

Gender is a socially and culturally constructed way of understanding human bodies and relationships (Jarviluoma et al., 2003). In sub-study IV, women are mostly concerned about the status of their home and housekeeping management. The results of this study were in line with those of the study of Bagheri (1992) about the psychiatric problems of Iranian immigrants in Canada. They indicate that Iranian women worry most about the arrangement and management of their house, making their home respectable and

making the appearance of their home good. While in the current research, men expressed that social expectations from them were to be a breadwinner. These indicated traditional gender roles, man works outside the house and woman inside for housekeeping. Consistent with the study by Rankin et al. (2002), resuming work was important for men in the current research. Men have been taught by society to accept and conduct men's roles, to be in a power position, to solve problems, and to not express most of their feelings. Gender-related identities and behaviors in men are mostly affected by socialization processes (Thompson, 1994).

Women experienced lower levels of support and needed more support from their families. This result was consistent with the result of a study that was conducted by Kristofferzon et al. (2003). In their study, women complained about less social support compared to men. *"In women roles as informal health-care providers at home or the community, women are often unsupported, unrecognized and unremunerated"* (World Health Organization, 2009, p.xiv). Furthermore, Kristofferzon et al. (2003) indicated that men reported more support from their spouses. Support has been found to have a positive effect on the promotion and restoration of health (Lett et al., 2005). Family is an important source of support for patient (Rantanen et al., 2004); this form of support can help in lifestyle modifications, problem solving and undertaking roles and responsibilities (Kärner et al., 2004). Previous experiences, ability to conduct roles, and self-esteem are essential for directing support and care toward feelings of well-being or burden (Halm et al., 2006, 2007).

In the current study, each men and women considered themselves as more vulnerable to CHD. This is not in line with the results of Emslie et al. (2001), Lockyer (2005) and Hildingh et al. (2007). They mention that men and women consider men as CHD candidates; thus, they call CHD the men's disease. In this study, men and women evaluated susceptibility to CHD in association with the amount of stress they were under. Men mostly reported stress at the work place and in the society, and women talked about their stress in interpersonal relationships, childbirth and caring responsibility, which was in line with the study of Good (1977). Women tend to talk about their stress, concerns and personality in their interactions (King, 2002). Men mentioned and concentrated on their job as the main stress factor. They also considered behavioral and life style factors, including diet and smoking, as important causes of illness.

In the current study, women were perceived as more capable of coping with illness and its symptoms. This could be associated with social expectations of women. In society, it

is expected of women to be adaptive and submissive (Löfmark, 2007; Williams, 2000). Male participants were more interested in searching for information than women. This could be related to a higher range of illiteracy and a lower level of education of women. In previous studies (e.g. Kristofferzon et al., 2007), women tended to use this strategy more than men. However, we did not find such a trend in our study. The majority of male participants tended to compare themselves with others. This can be related to gender differences in life conditions, and socio-cultural issues. Social comparison can have different outcomes for people, including self-evaluation, self-improvement and self-enhancement. It can affect people's thoughts and feelings about themselves (Zell & Alicke, 2009). Downward or inferior social comparisons (individuals comparing themselves with less fortunate ones) are a type of emotion-focused coping. Kohn & Smith (2003), in the study of social comparison in depressive symptoms, indicated that, in comparison with older women, older men were more likely to compare themselves with others. They suggested that this difference might be related to social issues. Men's social orientation is toward independency and for women, it is toward interdependency. Men enhance their self-esteem through comparing themselves with others, and women increase their self-esteem through interactions with others (Kohn & Smith, 2003).

9 IMPLICATIONS FOR NURSING SCIENCE

Nurses are the caregivers of patients because they are close to them and their relatives, can ease and decrease their symptoms, and provide comfort and relaxation which is an important part of the caring process. Exploring the nature of the illness and its symptom experience is necessary in order to plan for supporting patients in the coping process. By knowing about the descriptions of the patients' symptom experience, nurses can better direct and plan the care for them. Furthermore, considering gender differences can be helpful for a more timely diagnosis and evaluation of CHD patients.

Moreover, the process of transition to normalize life seems to help patients with CHD manage their difficult situation. Nurses deal with CHD people who are experiencing, anticipating or completing the act of transition and need help in the process of reaching a normal life. Nurses in different clinical settings help individuals to direct transitions; providing ease for the patient's transition from illness and new situation to well-being is the art and responsibility of nursing (LeVasseur, 2002). The main focus of nursing is to facilitate and lead life transition for people including individuals and families. Nursing is concerned with *"the process and the experiences of human beings undergoing transitions where health and perceived well-being is the outcome"* (Meleis & Trangenstein, 2010, p. 67).

Through transitional processes, individuals disengage from their previous condition and alter their previous definition of self; they engage themselves into a new situation. Nurses play an important role in helping these individuals identify disruption (change) and illness and in providing and facilitating the movement toward the new condition of well-being. Nurses will be able to provide holistic care through understanding and learning more about transition (Kralik, 2002; Kralik et al., 2010).

This study also has implications relevant to nursing education in nursing schools as well as to in-service education of the health-care systems. Knowledge regarding AP characteristics experience and coping with CHD must be integrated in the educational curricula to better equip and prepare nurses for a more competent and skilful care of patients with AP and CHD. It is essential that information about the gender issue in illness and symptom experience is well discussed in continuing education programs and seminars. Clinical trials can be useful for making health care providers familiar with AP and CHD experience as well as coping and gender issues.

On the basis of the results from this study, health-care providers need to be sensitive to gender-specific variations in symptoms. Patients, particularly women, and health-care providers (including nurses) need to be informed of symptoms in women and men with CHD to make an accurate diagnosis, and choose the most appropriate therapy and care. Nurses should be educated and sensitized to CHD symptoms and differences between men and women. They can educate patients about all the aspects of the disease, its management, and its symptoms. These education programs might reduce delays in seeking health care by patients and can help patients go easily and effectively through their transition process.

The results of this study contribute to expand the understanding of experience and coping process with the illness and its symptoms in patients with CHD. It also may provide helpful guidance for caring and facilitate future studies. Nurses need to pay attention to and consider the differences in the coping process between women and men. Coping with a chronic condition is sometimes a life-long issue with expenses and consequences. Long-term support for these individuals and their families is essential and should be given by knowledgeable persons. Moreover, the fear of dependency or paralysis and risks for MI was raised by all participants in the study. This should be taken into account when following up patients with CHD to help them with the coping process.

Bostock et al. (2007) investigated the members and facilitators view about a support group in Scotland. They indicate that participants in support groups can help patients in the process of normalizing their lives. Moreover, Andersson and colleagues (2010) studied the effects of a five year rehabilitation program on emergency use of hospital services as well as work absence. They found that this long-term rehabilitation program can reduce referring to the emergency department and absences from the workplace. They concluded that this program can influence financial issues and quality of life. Rehabilitation programs need to be considered by health-care providers to help patients in coping with illness and their transition to normalize life.

10 FUTURE RESEARCH

We utilized an instrument with a limited list of accompanying symptoms that may have excluded some symptoms experienced by patients. This forced-choice instrument limited the investigation of possibly existing symptoms. Therefore, it would be helpful to conduct complementary qualitative studies to acquire a deeper and more comprehensive understanding of all the existing symptoms and their gender-related variations. Future research is recommended to investigate other aspects of symptom experience including response to and meaning of symptom through considering gender-related perspective.

Because women seemed to experience pain in most of the locations to a higher extent than men, it can be considered to study to which extent women experience pain in a certain location when adjusting for experienced pain in the other locations.

In the current study, there were gender differences in the frequency and intensity of pain descriptors and pain scores. It would be interesting to study whether there are differences between men and women in a specific pain score (e.g. sensory score) when adjusting for the other scores (e.g. affective, total and NRS). Furthermore, it would be interesting to investigate whether there are differences between men and women in a specific descriptor when adjusting for the other descriptors of pain.

For women, anxiety might have greater effects on pain (Keogh, 1999; Keogh & Asmundson, 2004). Further research is suggested to determine the role of anxiety in the experience of AP. Through studying these factors, we can better develop specific interventions that may be effective in improving pain and symptom management (Keogh & Asmundson, 2004).

According to the results from this study, one of the coping strategies was to receive assistance from family. On the other side, in previous studies, it has been shown that one family member's suffering from CHD also impacts on the rest of the family (Eriksson & Svedlund, 2006; Gregory, 2005). It will be interesting to study the impacts of illness on the families of the Iranian patients with CHD who participated in this study in regards to the above mentioned issues. The support system can be one of the important factors in the coping process of patients with CHD and their physical and psychosocial well-being. A functional support system may help patients successfully go through their transition process. There is a lack of information about the role of support systems in patients with CHD in Iran that should be investigated in future research studies.

This study investigated how CHD patients cope with their illness and the symptoms after diagnosis; it would be interesting to study CHD patient's early and pre-diagnosis experiencing of symptoms and their medical seeking patterns. Further, in this study, men and women considered themselves as more vulnerable to CHD disease. This was not in consistent with previous studies (Emslie et al., 2001; Hildingh et al., 2007; Lockyer, 2005). This issue should be explored further to ensure that this perception will not lead to delay in seeking medical care in Iranian patients (men and women).

11 METHODOLOGICAL CONSIDERATIONS

The quality evaluation of a scientific work is conducted at various stages of the research process, including writing a proposal, data collection, data analysis and reporting as well as sharing of the findings (Akkermann et al., 2008). The process of conducting a study for my doctoral thesis has been an enriching journey with numerous scientific experiences that have taught me critical thinking, rigor and humility toward the little I know and appreciation for all that I need to learn. In the stage of writing the proposal, its quality of the proposal was evaluated by supervisors, peers, KIs doctoral admission committee and funding institutions. The quality of data collection and analysis was evaluated by my supervisors and by peer committees who constantly reviewed and discussed the work with me. When reporting the research findings, the quality evaluation was performed by colleagues, supervisors, external committees, the scientific peer reviewers and editors of the journals.

11.1 METHODOLOGICAL CONSIDERATION RELATED TO SUB-STUDIES I-III

Quantitative research determines causality and prediction for generalizing findings. In this thesis, sub-studies I-III were carried out with a quantitative approach focusing on psychometric analyses.

In sub-studies I and II, the sampling was performed through convenience sampling which was a non random sampling. Convenience sampling may limit the external validity. Thus, the results should be utilized with caution in other contexts.

Psychometric analyses have been performed in order to evaluate the questionnaire and adapt it to the Iranian population's circumstances. Psychometrics is a statistical discipline, and includes methods to examine the quality of the questionnaire. After reviewing the relevant research and literature, the questionnaires were found, and were considered to be appropriate for using if the psychometric analysis showed that validity and reliability was acceptable. However, we cannot consider the instruments as completely valid or reliable. Generally, one can say that they are partially valid and reliable. The more we work on evaluating the instruments, the more their validity and reliability will increase. Sub-studies I and II provided acceptable and adequate psychometric testing as a basis for utilizing the instrument in research.

The validity of the instrument was assessed by so called 'face validity', 'content validity' and 'convergent construct validity' methods. Reliability was assessed through testing the internal consistency and stability. *Face validity* is concerned with

the appearance of the instrument and is related to content validity. In the current study, it was done through asking six patients with CHD to fill out the questionnaire and share their thoughts about the wordings. They found the questionnaire and its wording clear and relevant.

Assessing content validity is a way of ensuring that the questions cover all relevant and necessary areas required to measure and describe the phenomenon. The four evaluation methods are: 1) A review of the literature representative of the relevant population (Burns and Grove, 2005, Higgins and Straub, 2006); 2) an expert panel of at least five persons: experts make an independent assessment and then meet for a group discussion of the specifications (Berk, 1990); 3) Content Validity Index -CVI: this is a numerical value developed by Waltz and Bausell (1981) that reflects the level of content related validity evidence. With this index, experts rate the content relevance of each item by using a four-point rating scale; and 4) personal reflection (Higgins and Straub, 2006). In the current research, the content validity was evaluated by reviewing the literature and by an expert panel. Experts made an independent assessment, met for a group discussion of the specifications, and reached a consensus about discrepancies. It would be interesting and useful to consider other methods in evaluating the content validity as well.

Factor analysis is utilized in psychometric evaluation to identify the items that need to be considered for specific factors (Fayers & Machin, 2007). In this study, a factor analysis would be useful for evaluating different dimensions of pain quality in Iranian patients with CHD and should be incorporated in future analysis of our data.

Cronbach's alpha is one of the most common methods for testing 'internal consistency' (Streiner & Norman, 2008). The acceptable level of Cronbach's alpha is a value larger than 0.70 (Aday & Cornelius, 2006). In this study the Cronbach's alpha for the entire instrument was larger than 0.81. For stability, test-retest was done and showed the stability of the instrument over time.

In the current research, we did not evaluate the instrument according to gender-related aspect. However, we conducted additional analysis included in the KAPA to clarify our assessments. In the additional analysis, there were significant differences between men and women's educational level, disease duration, history of smoking, and obesity. Correlation coefficients were calculated for the SF-MPQ scores and the NRS separately for men and women. Except for affective score, there was a significant correlation between NRS and SF-MPQ scores for men. The NRS did not correlate significantly with affective score for men. There was a significant correlation between

NRS and SF-MPQ scores for women. A significant correlation was shown between the affective, sensory, and total scores for both men and women (p value ranged from 0.04 to <0.001). These significant correlations indicated the convergent construct validity of the instrument for both men and women.

Moreover, we analyzed the instrument to assess the reliability related to the gender aspect and we calculated Cronbach's alpha. In the additional analysis, Cronbach's alpha for women in test and retest assessments was 0.83. For men, Cronbach's alpha in test was 0.76 and in retest was 0.75. The calculation of Cronbach's alpha indicated internal consistency of instrument for men and women. The ICC and SEM for men and women with mean (SD) are shown in table 5. The ICC ranged from 0.94 to 0.98 in men and women with a narrow CI. High ICC and small SEM are evidence of the reliability of the instrument for men and women.

Table 5 Intra-class correlation coefficient (ICC) and standard error of measurement (SEM) in men and women

Scores	Men			Women		
	ICC (95% CI)	SEM	Mean (SD)	ICC (95% CI)	SEM	Mean (SD)
Sensory	0.94(0.90-0.96)	0.69	8.02 (5.22)	0.97(0.94-0.98)	0.85	9.38 (6.19)
Affective	0.95(0.91-0.97)	0.28	2.86 (2.09)	0.97(0.95-0.98)	0.43	3.75 (3.09)
Total	0.92(0.87-0.95)	0.84	10.88(6.32)	0.97(0.94-0.98)	1.20	13.13(8.79)
NRS	0.97(0.95-0.98)	0.26	5.21 (1.91)	0.98(0.97-0.99)	0.28	5.60(2.02)

In the additional analysis, there were no statistically significant differences between test and retest in SF-MPQ and NRS scores for women (p-values ranged from 0.25 to 0.95). For men, there were no significant differences between test and retest in SF-MPQ and NRS scores (p-values ranged from 0.18 to 0.90). These results indicated that the AP characteristics questionnaire has a good reliability and stability over time for both men and women.

Furthermore, in developing the accompanying symptom checklist, only dichotomous items were used and the frequency of those symptoms was characterized. The possible answers were yes or no. The reason for this choice was to focus on accompanying symptoms. It was considered to make the questionnaire easier to fill out by respondents. But the questions could have been more specific. It could be more appropriate to use a visual analog scale in addition to these dichotomous items to evaluate the intensity of each symptom and draw a comparison men and women. We aim to consider this issue in future studies.

In sub-studies I and II, some information related to past medical history, including history of MI and so on, were not gathered. However in sub-study III, this information was added to the questionnaire to make it more comprehensive.

In demographic information, unfortunately we did not ask women about their menopausal condition. This limited the options to analyze risk factors and pre- and post-menopausal differences of symptom experience. However, Mega et al. (2010) indicated that in comparison with men, pre- and post- menopausal women reported more chest pain symptoms. Furthermore, CHD severity was not considered in our analysis. The possible impact of the variable should be examined in our future studies. In a previous study, women with unstable ischemic heart disease and less obstruction of coronary artery in angiography (less CHD severity), were more likely to complain of AP and had more ischemic phases on continuous ECG in comparison with men (Mega et al., 2010).

In sub-study III, our sample of patients with CHD from one center might have limited the generalizability of our results. However, this center, in Iran, was specialized in cardiac diseases; many patients with cardiac illnesses from other parts of Iran come to Tehran for admission in this center. In the current study, AP characteristics related to quality, quantity and location of pain were investigated. Accompanying symptoms and pain duration will be investigated in a future analysis. Results related to the accompanying symptoms checklist and MRQ will be presented in a forthcoming paper. In sub-study III, to ensure the reliability of the instrument in a large population, Cronbach's alpha was calculated; it was high (0.83) and indicated the internal consistency of the instrument.

Because of the illiteracy issue among some of the participants, data were gathered through reading the questions for them and filling out their answers. This data gathering method was different from the way data were gathered from literate participants. Therefore, there might be differences between the response gathered from illiterate and literate patients. Although we tried to control the bias that might have occurred by conducting a regression analysis, we realize that this issue needs to be further investigated.

11.2 METHODOLOGICAL CONSIDERATION RELATED TO SUB-STUDY IV

When conducting qualitative research, it is imperative to gain a comprehensive understanding about the paradigm used by studying the ontological and epistemological basis of the paradigm prior to conducting research. Such knowledge

is vital for addressing the trustworthiness and quality of the study (Bradbury-Jones, 2007). In the current study, constructivist paradigm with relativist ontology (multiple realities) and subjectivist epistemology (mutual creation of knowledge) was considered with the grounded theory methodology. The trustworthiness of a qualitative research can be established with the following criteria: credibility, dependability, confirmability and transferability (Denzin & Lincoln, 2005).

Credibility is the extent to which the findings are congruent with the purpose of the study which is the perspective of the participants. Credibility is how one can be confident about the truth of the data and findings (Polit & Beck, 2010). It corresponds to internal validity. Credibility is increased in different ways, including gathering rich data, triangulation, prolonged engagement, peer-debriefing and member checks (Polit & Beck, 2010) as well as examination of previous findings (Shenton, 2004). For the work presented here, I spent a long time in the field of study, which provided a greater likelihood of credibility. Prolonged engagement provided a condition to in-depth understanding of the experiences of the participants with CHD and AP. In sub-study IV, to illustrate the interpretation process, examples were used to indicate the analysis process. Memos helped increase the researchers' awareness about what was missing and how additional and complementary information should be gathered. This can help enhance the credibility of our study (Koch, 2006).

Credibility is assumed to be strengthened by member check with the aim of checking the data with the participants. In the current study, some of the participants were asked to look at the findings in order to confirm or reject them (Horsburgh, 2003). It helped the researcher to maintain reflexivity, to provide participants' validation and more information, and to provide an opportunity to correct errors. This was conducted to ensure that the results of the study represent the participants' experiences. Moreover, a 'peer-debriefing' was used to establish credibility. In this process, the researchers together with other colleagues in the field discussed the findings.

Dependability is the “*stability of the data over time and over conditions*” (Polit & Beck, 2010, p. 492). It corresponds to reliability and is shown through inquiry audit.

Confirmability is the degree to which the findings and interpretations are confirmed by other researchers (Polit & Beck, 2010). It is addressed through inquiry audit and recording interpretations and their meanings for review by another persons (Polit & Beck, 2010). Concerning the conformability and dependability, I constantly communicated the protocols of data collection, the interview transcripts and the data analysis including coding and categorizing with my main supervisor and my Iranian

co-supervisor who reviewed the material. Then, we discussed the interpretations and our possible findings through constant interactions until reaching common clarity and understanding. Our findings were also discussed with my Swedish co-supervisor. To present the findings, figure and table including all steps of the data analysis process were used to demonstrate the process of interpretative analysis, which can increase the confirmability of the research.

Transferability is similar to external validity. It is the extent to which the findings can be transferred to and be applicable in other contexts. The readers are best judges about the transferability of the study. For enhancing transferability of the findings, thick, rich and detailed descriptions of the sampling process, setting, data analysis, and findings including quotations from the data were included in the presentation of the study (Polit & Beck, 2010). Transferability was also addressed so that the reader is able to review the applicability of the findings in other settings.

Morse et al. (2002) indicated some criteria for verifying the reliability and validity of qualitative studies, including the appropriateness and sufficiency of sample and simultaneous gathering and analyzing of data. In sub-study IV, we tried to have a variety of sampling and we considered saturation criteria to ensure the adequacy of the sample size. Further, data collection and analysis were conducted concurrently.

12 CONCLUSION

In conclusion, this study indicated reliability and validity of the Iranian version of the AP characteristics questionnaire. This instrument can be utilized to measure AP experience in Iranian patients with CHD in Iran. It can be used by health-care providers and researchers to evaluate chest pain.

The results indicate that there are gender differences in the description, intensity, and location of AP with cardiac origin. Women and men indicated different pain locations. Women, in comparison with men, chose more commonly and reported the pain intensity higher for descriptors in SF-MPQ. Furthermore, compared to men, women described greater sensory, affective, and total scores. These differences might be related to: 1) socio-cultural, psychological, biological and hormonal factors; 2) women's special ability to communicate and report symptoms; and 3) higher depression and anxiety sensitivity in women. Nurses as health-care providers need to consider these differences in the prevention of CHD and in caring for and educating patients with CHD and AP.

Participants experienced limitations in their life and activities which trigger them toward coping and adjustment. They transitioned to normalize their life. The knowledge from these results can guide nurses in providing appropriate caring programs by considering the differences between men and women. Moreover, in this process, factors such as gender influence coping with the illness. Considering gender in developing care plans and helping patients in their coping process would be helpful and would facilitate their transition.

13 POPULÄRVETENSKAPLIG SAMMANFATTNING

Kranskärslssjukdom (CHD) är en viktig orsak till död för både män och kvinnor världen runt. Därför är det av stor vikt att identifiera effektiva metoder för att förebygga kranskärslssjukdom, och effektivisera insatserna för att säkerställa att patienter med angina pectoris (AP) söker och får lämplig behandling för sina symtom. En viktig komponent för att utveckla dessa metoder är behandlingen av symptomupplevelser och copingstrategier med fokus på genus perspektivet. Mer forskning behövs för att avgöra om könsskillnader existerar i symptom erfarenheter och om det finns likheter och skillnader i copingstrategier hos de båda könen. Denna avhandling som omfattar fyra individuella studier syftar till att utforska och beskriva erfarenheter av coping strategier som används av patienter med AP ur ett genusperspektiv.

Syftet med studie ett och två var att kulturellt anpassa instrumentet (översätta, validera och realibilitets testa). Instrument som ingår i avhandlingen är Characteristics Questionnaire som innehåller delarna Modified Rose Questionnaire (MRQ), Short Form-McGill pain Questionnaire (SF-MPQ) och Accompanying Symptom Checklist. Instrumentet översattes genom att använda olika tillvägagångssätt. Hundratio patienter med kranskärslssjukdom (diagnostiserad baserad på genomförd angiografi) som upplevde AP valdes ut för att utvärdera validitet och reliabilitet. Tredje studien undersöker könsskillnader i beskrivningen, intensiteten och lokaliseringen av AP hos patienter med kranskärslssjukdom. I denna tvärsnittsstudie ingick fem hundra patienter med AP som fyllde i den iranska versionen av Characteristics Questionnaire. Sista studien syftar till att undersöka copingstrategier hos patienter med kranskärslssjukdom som upplevde angina pectoris. Tjugo fyra patienter valdes ut genom fokuserat urval för att delta i studien. Enligt den första och andra studien i avhandlingen så var den iranska versionen av AP instrumentet ett valid och säkert instrument för att utvärdera AP i iranska patienter. I studie III visade resultaten att i jämförelse med män så kände kvinnor större intensitet, beskrev smärtan med fler ord och mer benägna att rapportera smärta i nacke, vänster arm, hand och skulderblad. Resultaten av studien visade att patienter med kranskärslssjukdom som upplevde AP försökte att internalisera sjukdomen och dess konsekvenser i sina liv. Resultaten visar övergångsprocessen till normalisering av livet och delar upp processen i följande kategorier: att förlora ett normalt liv: att uppleva känslor och konsekvenser av sjukdomen, komma till rätta och använda copingstrategier och återskapa normalt liv. I frågor gällande relationer, reaktion på

sjukdomen, söka information och ta emot stöd från familjen visade det sig vara skillnad mellan könen. Dessa skillnader kan relateras till olika psykologiska och fysiologiska, kliniska och anatomiska faktorer, ångest relaterade depression och kommunikativa förmågor. Symtomen visade sig utlösa starten på övergångsprocessen (transiton) att kunna bättre hantera dessa symtom och leva med sjukdomen. Under denna process, övergick deltagarna till att leva ett normalt liv och bevara sin normalitet så gott det går. Med tanke på att studien visade könsskillnader så skulle denna avhandling vara användbart för att bedöma jämställdhetsperspektivet inom hälso-och sjukvården, utbilda vårdpersonal, och även informera samhället till att bli medveten om könsskillnader i upplevelser AP symtom.

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