Patients with unexplained chest pain

– Pain experience, stress, coping and health-related quality of life

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ABSTRACT

Chest pain is a common symptom that causes individuals to seek acute care at emergency departments; however, more than half of these patients are judged to have no organic cause to their pain. In Sweden, the number of patients discharged from hospital with a diagnosis of unexplained chest pain (UCP) has increased from 8,432 in 1987 to 17,555 in 2005. There are limited descriptions in the literature of the pain experience or of psychosocial factors which explain the development and maintenance of UCP. The overriding aim of this thesis was to provide a comprehensive assessment of UCP. Further aims were to determine psychosocial factors associated with UCP and how the chest pain experiences affect everyday life and health-related quality of life (HRQOL). The thesis consists of four studies: the first study describes patients' perceptions of their experiences of UCP; the second study describes the chest pain characteristics in patients with UCP versus ischemic heart disease (IHD); and the two following studies describe and explore UCP and its relationships to mental strain at work, stress at home, negative life events, sleep, coping and HRQOL. Both quantitative and qualitative methods were used. The studies were carried out at Sahlgrenska University Hospital/Östra in Göteborg, Sweden from December 2002 to September 2003.

The UCP patients explained that their pain gave rise to fear and anxiety, a feeling of uncertainty, stress and loss of strength, which to a great extent affected everyday life. They had difficulty managing activities such as household chores, socialising with friends, and taking part in recreational and sexual activity. Lacking medical explanations for their chest pain, the patients felt that they had no hope of being cured and thought they would have to live with it for the rest of their lives. The chest pain, assessed with a Pain-O-Meter, was described as pressing, stabbing, dull, worrying, troublesome and tiring. In comparison with patients with IHD, patients with UCP more frequently described their chest pain as dull, sore, annoying and troublesome. UCP patients perceived their condition as more painful than IHD patients and required more sensory and affective words to describe their pain. However, the UCP and IHD patients did not differ regarding the location of their pain.

In comparison with a random population sample, patients with UCP had impaired HRQOL with lower scores in all dimensions of the SF-36. Likewise, they were more often worried about stress at work, perceived more stress at home, more often had sleep problems and had experienced more negative life events than the controls. The patients used cognitive coping strategies in managing stress, but emotional reactions to stress seemed to increase the intensity of the chest pain. A larger proportion of the UCP patients was immigrant and had a sedentary lifestyle. Women with UCP had higher levels of cardiovascular risk factors.

Pain assessment and more extensive communication about how the pain affects everyday life are crucial for improved care. It is essential that ways be found to alleviate pain and to improve health and quality of life, as well as to promote physical activity and sleep.

Keywords: chest pain, coping, illness, life events, nursing, quality of life, sleep, stress symptom.

CONTENTS

ORIGINAL PAPERS

This thesis is based on papers referred in the text by Roman numerals I – IV:

I   Jerlock, M., Gaston-Johansson, F. & Danielson, E. (2005). Living with unexplained chest pain. *Journal of Clinical Nursing,* 14(8), 956-964.

II   Jerlock, M., Welin, C., Rosengren, A. & Gaston-Johansson, F. (2007). Pain characteristics in patients with unexplained chest pain and patients with ischemic heart disease. *European Journal of Cardiovascular Nursing* 6(2), 130-136.

III   Jerlock, M., Gaston-Johansson, F., Kjellgren, K. I., & Welin, C. (2006). Coping strategies, stress, physical activity and sleep in patients with unexplained chest pain. *BMC Nursing,* 5, 7.

IV   Jerlock, M., Kjellgren, K. I., Gaston-Johansson, F., Lissner, L., Manhem, K., Rosengren, A., & Welin, C. Psychosocial profile in men and women with unexplained chest pain: A case-control study. (Submitted for publication)

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ABBREVIATIONS

AMI	Acute Myocardial Infarction
BMI	Body Mass Index
CAD	Coronary Artery Disease
CHD	Coronary Heart Disease
ED	Emergency Department
HRQOL	Health-Related Quality Of Life
IASP	International Association for the Study of Pain
IHD	Ischemic Heart Disease
JCS	Jalowiec Coping Scale
JSS	Jenkins Sleep Scale
MI	Myocardial Infarction
NCA	Normal Coronary Angiogram
NCCP	Non Cardiac Chest Pain
POM	Pain-O-Meter
QOL	Quality of Life
UCP	Unexplained Chest Pain
VAS	Visual Analogue Scale
WDS	Word Descriptors
WHO	World Health Organisation

INTRODUCTION

Chest pain is a common symptom that causes individuals to seek acute care at emergency departments (ED); however, more than half of the patients are judged to have no cardiac cause to the pain and in many cases no organic cause is found (Mayou, 1999; Karlson et al., 2002; Mayou & Thompson, 2002; Eslick & Talley, 2004). There are few references to this problem in the nursing literature, yet ED nurses are often one of the main professionals that the patient encounters at admission.

According to statistics from the Swedish Social Board of Health and Welfare, the number of patients discharged from hospital with a diagnosis of unexplained chest pain (UCP) is increasing. The number of patients between 20 to 69 years of age diagnosed with UCP and hospitalized at least one night has increased during the last two decades by more than 100%, from 8,432 in 1987 to 17,555 in 2005 (Figure 1). In contrast, the number of patients in the same ages hospitalized with acute myocardial infarction (AMI) has decreased from 10,768 to 8,150 during the same period (Murphy et al., 2004; Socialstyrelsen, 2007).
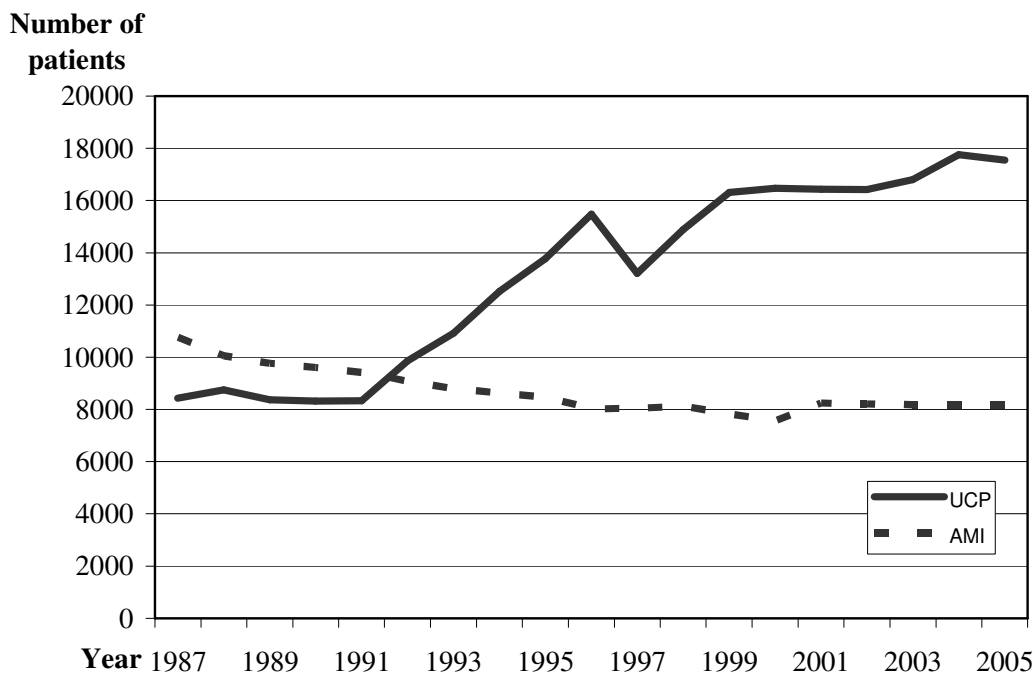
Figure 1. Number of Swedish individuals between 20-69 years of age with a diagnosis of UCP or AMI and admitted to hospital for at least one night.

The term UCP has been used in the literature to refer to chest pain without obvious organic cause (Epstein et al., 1979; Bass, 1991; Robertson, 2006). In the present thesis, the term UCP was chosen to emphasise that the chest pain was not explained by any obvious organic cause (i.e. gastro-oesophageal, cardiac or lung diseases). In the literature on chest pain without cardiac cause, different terms have been applied, for example, atypical chest pain (Chambers & Bass, 1998; Spalding, 2003) and non-cardiac chest pain (Anke et al., 1998; Eslick & Talley, 2004; Wise et al., 2005). When referring to results from other studies, the term used in each particular study was chosen.

Research about the origin of UCP is limited and results from different studies are divergent. Studies have shown that patients with chest pain of unknown aetiology have lower pain threshold, higher somatic awareness, and more anxiety than other patient groups (Roll, 1991; Bradley et al., 1992; Karlson et al., 1994; Cunningham et al., 2000). Goodacre et al. (2001) found that among patients seeking for chest pain at ED those with undifferentiated chest pain had psychological morbidity and impaired quality of life (Goodacre et al., 2001). Zachariae et al. (2001) found that psychosocial factors were related to, but not the cause of the chest pain. They investigated pain threshold, life change events, stress, coping, and anxiety in patients with chest pain and normal coronary angiogram (NCA) (n=30), ischemic heart disease (IHD) (n=30) and healthy controls (n=30). Their results showed that patients with IHD had lower pain tolerance than both NCA and controls, whereas no difference in pain intensity, assessed by visual analogue scale, was found between NCA and IHD patients. Patients with NCA and IHD had higher scores than controls on psychosocial measures. They concluded that their results support a physiological rather than a psychological cause to the chest pain in patients with NCA.

A higher prevalence of psychiatric diagnosis has been found among patients with non cardiac chest pain (NCCP) (Ho et al., 1998; Dammen et al., 1999). In a later study, Dammen et al. (2004) compared patients with coronary artery disease (CAD) and patients with chest pain without CAD with respect to psychiatric morbidity. They found a high prevalence of mental disorders in both groups; however, panic disorder was significantly more prevalent in patients without CAD.

More than half of the patients with chest pain are admitted to the hospital at least over night in order to rule out AMI or other organic causes. Moreover, the threshold to admit patients with chest pain is low, since a missed diagnosis can have dire consequences for the patient (Pope et al., 2000). Risk factors for AMI and pain characteristics influence admission decisions. However, in the majority of cases, no ischemia is documented (Karlson et al.,

2002; Kogan et al., 2003). It is still difficult to rapidly diagnose UCP at the ED as the symptoms are very similar to those in AMI. The chest pain characteristics in AMI have been described in many studies. For example, Patel at al. (2004) reviewed 15 studies comparing significant symptoms in men and women with AMI. Chest pain was the most typical symptom, but women experienced the pain as more stabbing and sharp than did men. They also reported upper central chest pain with radiation to the left arm, whilst men reported pain to the centre or the left side of the chest. Women also experienced more radiation to the back, neck and jaw.

UCP requires attention because of the increasing number of people who suffer from this type of intense pain, the cost to society and the need to develop comprehensive treatment strategies to alleviate the pain and improve quality of life (Pope et al., 2000; Esler & Bock, 2004; Forberg et al., 2006). Previous studies have shown that patients with unspecific chest pain are at increased risk of coronary heart disease (Wilhelmsen et al., 1998; Robinson et al., 2006) and thus it is important to gain an understanding of the complexity of UCP. Many of the risk factors for AMI are well known: male gender, increasing age, smoking, high cholesterol, hypertension and diabetes (Herlitz et al., 1998; Bjorntorp et al., 2000; Herlitz et al., 2000; Rosengren et al., 2004a).

There is currently little evidence available to guide management of patients with UCP and therefore these patients present challenges for health care professionals. There are limited descriptions in the literature of the chest pain experience and of psychosocial and psychological factors related to the development and maintenance of the chest pain (Esler & Bock, 2004). To investigate and identify these factors and to shed light on how the symptoms influence the patients' daily life would constitute important contributions to our understanding of patients with UCP.

BACKGROUND

Symptom experience

A symptom is a subjective experience and is the most common reason for people to seek care (Dodd et al., 2001). Unexplained symptoms are presented by more than 50% of patients at cardiological clinics, as well as at gastroenterological, neurological and gynaecological clinics (Nimnuan et al., 2000). How an individual perceives, evaluates and responds to the symptom affects the symptom experience. Perception is a process of receiving sensory inputs and an awareness of changes in the way an individual feels or behaves. Evaluation of a symptom reflects a set of factors, including its intensity, location, temporal nature and frequency. The individual's evaluation of the threat posed by the symptom, such as its threat, is also included. The evaluation of the symptom is also influenced by its association with the experiences of significant others in the individual's life. An individual with a family history of heart disease may experience the chest pain as an indication of a heart attack, whereas another individual with no such history might dismiss such pain as indigestion (Toombs, 1993).

The experience of the symptoms is also influenced by the context within which they occur (Dodd et al., 2001). Experiences of symptoms are related to demographic, disease and individual factors. Symptoms are also multiplicative in nature and may act as catalysts for the occurrence of other symptoms (Armstrong, 2003) that can induce increased symptom distress and emotional responses affecting everyday life (Kim et al., 2005a).

Threshold and tolerance are two concepts related to an individual's response to pain. Threshold refers to the point at which the pain is first experienced and tolerance is the point at which an individual no longer can tolerate the pain (McGuire, 1994). A person's response to a symptom includes physiological (e.g., heart palpitations and changes in respiratory rhythm), psychological (e.g., mood changes and decreased ability to concentrate) and behavioural components (e.g., crying, yelling and alteration in personal functioning) (Larsson et al., 1994; Dodd et al., 2001).

Pain

Pain is a multidimensional and subjective experience and is unique for each person. The experience of pain is comprised of physiological, sensory, affective, cognitive, behavioural and socio-cultural dimensions (Ahles et al., 1983; Ferrell et al., 1993). The International Association for the Study of Pain

(IASP) define pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" (IASP, 1994), (p. 217). Acute pain is differentiated from chronic pain in that acute pain is more associated with tissue damage and often responds to treatment by analgesics and treatment that causes the pain (McGuire, 1994). In contrast, chronic pain persists for more than three months and tissue damage may or may not be found. Chronic pain often causes changes in lifestyle, social relations, and functional and psychological health status (IASP, 1994).

Many UCP patients suffer from pain over a long period of time and up to 55% of these patients have chest pain daily. After two years, more than 65% of these patients still complain of chest pain and the main reasons why they need or want treatment is the pain intensity, the frequency of chest pain and the degree of limitation in activities (Karlson et al., 1994; Sullivan et al., 1994; Anke et al., 1998; Zachariae et al., 2001; Eslick & Talley, 2004). The pain is angina-like, but it more often occurs at rest, lasts longer than 10 minutes and short acting nitrates do not provide rapid pain relief as they do in patients with angina pectoris (Karlson et al., 1997). Uncontrolled and ongoing chest pain affects many aspects of an individual's life. It produces anxiety and emotional distress, undermines well-being and interferes with functional capacity. The pain also hinders the patient's ability to fulfil family, social and vocational roles (Katz, 2002).

McGuire (1992) defined pain assessment as follows: "… when the word assessment is applied to pain, it involves an overall appraisal of the experience of pain. Rather than rigorous evaluation in a bias-free manner, it connotes a more generalized judgement that is made for clinical purposes" (p. 313). Verbal report is the most reliable indicator of how much pain a person experiences (McCaffery, 1979; Turk & Melzack, 2001). According to McCaffery (1979), "pain is whatever the experiencing person says it is, and existing whenever he says it does" (p. 14).

Perspectives on health

Three perspectives on health can be described: a biomedical, a social and a person-oriented perspective (Snellman, 2001). The underlying premise in the biomedical model is that disease is a process deviating from the norm measured by biological parameters. The perspective on health in this model is that a person cannot be healthy or considered well in the presence of disease (Lyon, 2000). If health care professionals view the patient from this perspective, they will search for objective findings that can explain the cause

to the pain. The biomedical model is dichotomous in that it assumes that, as a result of a linear causal thinking, if there are no objective findings then there are no explanations for the pain (Foss & Rothenberg, 1988).

In a social perspective on health, the assumption is that all individuals are embedded in interpersonal relationships. According to Whitbeck (1981), interpersonal relationships create the context in which an individual acts and as such are important for the health status. A social perspective on health focuses on the individual's ability to function in context; health is then related to an individuals' ability to perform social functions and tasks (Whitbeck, 1981). Nordenfelt (1987) regards health as something different from, and normally something more than the absence of disease, injuries and defects. According to Nordenfelt (1987), health is associated with the fulfilment of goals. All goals need not necessarily be fulfilled; just the goals that are vital for the person.

In the person-oriented perspective, health is related to a person's well-being and personal development. Nearly 150 years ago, Florence Nightingale defined health as being well and emphasised the influence of the physical, psychological and social environment in promoting optimal health (Nightingale, 1859, reprinted 1969). King (1981) also emphasises the role of the environment in maintaining health. She considers health to be a dynamic life experience in which the individual makes optimum use of his/her resources to manage internal and external stressors in order to achieve maximal potential for daily living. According to Watson (1988), health is referred to as harmony within the mind, body and soul and that it must focus on the entire nature of the individual. In the individual perspective, health is a process (Parse, 1987; Eriksson, 1989) in which the person strives to self-fulfilment and well-being. In the health process, the patients' inherent power is directed to reach his/ her goals and thereby improve well-being and quality of life. The person-oriented health perspective emphasises well-being without denying suffering.

Perspectives on illness, sickness and disease

According to social anthropologists, illness problems are the difficulties that symptoms create in daily life. Illness is often invisible for other persons and no one can objectively determine if the experience is real or not (Kleinman, 1988). Eisenberg (1977) distinguishes disease, which is biomedically defined, from illness, which encompasses the cultural meaning and social relationships and is experienced by the patient. Both perspectives are necessary in assessing the health state of an individual (Jones & Meleis, 1993). Eisenberg (1977)

defines illness as "the experiences of disvalued changes in states of being and in social function" and defines disease as "abnormalities in the structure and function of body organs and systems" (1977) (p.11). Benner and Wrubel (1989) define disease in a similar way and mean that disease is a pathological condition in organs or tissues, whilst illness is the individuals' experience of loss or dysfunction related to these pathological conditions. Everyday activities are a "common-sense" reality, taken for granted. Illness can affect an individual's confidence in health and normal bodily processes, which in turn can lead to catastophising and hopelessness (Schutz, 1970). The experience of illness can be the consequence of both disease- and non disease-based factors (Lyon, 2000). This is in accordance with Watson (1988) who defines illness as a subjective disharmony within a person's mind, body and soul. She believes that a troubled inner soul can lead to illness, and that illness can produce disease.

Sickness reflects the society in that illness and disorders are seen in relation to economic, political and institutional forces (Kleinman, 1988). Kleinman uses the concept sickness to describe the interpretation and view of what is normal in a society. Sickness is the interpretation of disease and illness, which means that the experience of a symptom can gain legitimacy in the society. To gain legitimacy the symptom has to be medically defined. For example, the "yuppie-disease" gained legitimacy as chronic fatigue syndrome at the end of the 1980s (Åsbring, 2001). The extent to which patients see themselves as sick varies within their socio-cultural context. In a highly technological society, concepts based on pathology and anatomy are used to describe experiences of illness. Individuals in such a society come to experience themselves not simply as having chest pain but also as having a heart attack (Toombs, 1993).

Health-Related Quality of Life

Quality of life (QOL) is one of a number of symptom outcomes. Other outcomes can focus on functional status, emotional status, self-care, costs and mortality (Dodd et al., 2001). The World Health Organisation (WHO) defines quality of life as "individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (WHO, 1998) (p. 551). WHO's definition applies a broad view, focusing on a person's evaluation of quality of life in a cultural, social and environmental context.

Health-related quality of life (HRQOL) is one dimension of QOL. HRQOL assesses treatment outcome beyond survival and clinical efficacy. HRQOL is

multidimensional, subjective and patient-reported. It reflects the patient's perspective on the impact of disease and its treatment on functioning and well-being (Revicki, 2002). The multidimensional aspects of HRQOL are emphasised in the following definition by Wenger and Furberg (1990): "[HRQOL encompasses] those attributes valued by patients: including their resultant comfort or sense of well-being; the extent to which they are able to maintain reasonable physical, emotional and intellectual function; and the degree to which they retain their ability to participate in valued activities within the family, in the workplace, and in the community." (p. 73).

A sizeable proportion of patients with UCP remain symptomatic with important limitations in daily activities (Karlson et al., 1994; Lau et al., 1996; Janson Fagring et al., 2005). Chronic pain of various causes has been shown to be associated with low levels of HRQOL in previous research (Picavet & Hoeymans, 2004; Dysvik et al., 2005; Kim et al., 2005b; Lamé et al., 2005). Goodacre et al. (2001), assessing quality of life in unselected patients at admission to a chest pain unit and one month after discharge, found that chest pain and psychological morbidity were associated with impairment in all dimensions of quality of life on the SF-36. Similar results have been reported in other studies (Atienza et al., 1999; Eslick et al., 2003).

Stress

According to Lazarus (1999), stress is a multidimensional concept including stressors, current state of the organism and the subjective experience of the stressor. An individual experiences stress when faced with situations that present demands that exceed his/her resources to manage effectively. Throughout life, human beings are confronted with a variety of stressful situations. Some of these situations may threaten the individual's life and/or quality of life. Life events can be both positive and negative, but negative life events play a much greater role in illness than do positive events (Lazarus, 1999). Major events which can be extremely stressful do not affect everyone in the same way (Benner & Wrubel, 1989). According to Lazarus (1999), there are four substantive environmental variables that influence stress and emotions: demands, constraints, opportunities and culture. These variables interact with the person variables which influence reactions to stressful situations. Environmental demands can create conflicts with inner goals and beliefs and are one of the sources to psychological stress.

Results have shown that stress related to demanding physical and psychosocial working conditions may contribute to the development and maintenance of general pain and musculoskeletal symptoms (Brulin et al.,

2000; Jablonska et al., 2006). During the two last decades, negative stressful situations have increased in many professions. This is due in part to the fact that psychological demands have increased, workloads are larger and working conditions have deteriorated for many people (Socialstyrelsen, 1997). Melzack (1999) discusses the relation between stress and pain. He proposes that psychological stress derived from the hassles of everyday life influence cortisol release which may lead to a destructive effect on muscle, bone and neural tissue and produce the conditions for chronic pain. This is confirmed by results showing that work with a high workload and much stress impairs sleep, and affects the pattern of cortisol secretion (Ekstedt et al., 2004; Dahlgren et al., 2005). Several studies have shown that patients with chest pain of unknown aetiology have significantly more life events than controls and other groups of patients (Roll & Theorell, 1987; Bass, 1991; Fisher et al., 1996; Lau et al., 1996).

Insufficient sleep is associated with many factors, including stress, bodily discomfort, fatigue, anger-aggression and bodily pain (Lau et al., 1996; Edell-Gustafsson et al., 2002; Haack & Mullington, 2005). Long term mental strain at work is associated with fragmented sleep, which can affect health and well being (Edell-Gustafsson et al., 2002). The relationship between sleep and pain seems to be directional. Pain can cause difficulties to fall asleep and/or maintain sleep, but pain intensity can also be exacerbated by the lack of sleep (Smith & Haythornthwait, 2004; Roehrs & Roth, 2005). Chronic pain can be a factor that contributes to the maintenance of sleep problems (Sutton et al., 2001; Brorsson et al., 2002; Giron et al., 2002; Ohayon, 2005). There is some evidence that sleep deprivation decreases thresholds for pain (Onen et al., 2001). In an epidemiological survey among women, Asplund and Åberg (1998) found relationships between disturbed sleep and the occurrence of cardiac symptoms.

Coping

Coping strategies are developed during the life span in order to solve problems and to handle stressful situations. The ability to cope appears to be a requirement for positive mental health. Lazarus and co-workers (1984) defined coping as "constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p. 141). Coping is a multidimensional process of cognitive and behavioural efforts to manage external and internal demands or conflicts created by stressful situations (Lazarus & Folkman, 1984). Lazarus and Folkman (1984) call the interpretation process cognitive appraisal. They divide appraisal into primary

appraisal which includes an evaluation of a situation as stressful or not, and secondary appraisal, which is the evaluation of resources to manage the situation. They describe two main strategies, problem-focused and emotion-focused coping. Problem-focused coping is used when the problem is experienced as changeable and controllable. Emotion-focused coping strategies are emotional reactions caused by the problem (i.g worrying, increased eating, smoking, catastophising, blaming, and nervousness). Lazarus & Folkman (1984) postulate that coping is contextual and that people rely on both forms of coping. Individuals also change coping strategies over time depending on the unique situation.

According to Benner and Wrubel (1989), emotions link the person with the experienced situation and enable the person to recognise situations as similar or dissimilar to past situations. The way a person appraises what is happening and how that person copes with the situation determines his/her emotional reactions (Lazarus, 1999, 2006). Lazarus (1999) proposes that when there are emotions then there is often stress, as stress and emotions exist in a relationship and belong together. In the present thesis, the Jalowiec Coping Scale (1988), which was developed based on Lazarus' model, was used to assess general coping strategies.

Findings suggest that patients with chest pain of unknown aetiology use avoidance and emotion-focused coping strategies (Bradley et al., 1992; Tennant, 1994). Contrary to these results, Cheng et al. (2003) found that patients with NCCP used problem-focused strategies, but had an inflexible coping style compared to patients with rheumatism and healthy individuals.

AIMS

The major aim of the thesis was to provide a comprehensive assessment of the UCP experience. Further aims were to determine psychosocial factors associated with UCP and how the symptom experiences affect everyday life and health-related quality of life. Specific aims were:

- To describe patients' experience of unexplained chest pain, and how the pain affects their everyday life (Paper I);

- To provide a comprehensive, multidimensional description of the symptom chest pain, including the dimensions of intensity, quality (sensory, affective), location and duration in patients with UCP. The secondary aim was to distinguish UCP from other closely related diagnoses by identifying similarities and differences in pain descriptions of patients with UCP and patients with ischemic heart disease (IHD) (Paper II);

- To describe general coping strategies in patients with UCP and examine the relationships between coping strategies, negative life events, sleep problems, physical activity, stress and chest pain intensity (Paper III); and

- To determine whether men and women with UCP can be distinguished from a random population sample, with regard to sleep problems, mental strain at work, stress at home, negative life events, and health-related quality of life (HRQOL) (Paper IV).

STUDY POPULATIONS AND METHODS

Design

The thesis forms a part of a larger project on the influence of psychosocial factors in patients' experience of unexplained chest pain. The present thesis focuses on chest pain experiences, everyday life, stress, coping, and health-related quality of life. Both inductive and deductive research methods were used. An outline of the included studies is shown in Table 1.

The qualitative study (Paper I) aimed to describe the patients' experiences of unexplained chest pain and how everyday life is affected by the chest pain. Content analysis was used to analyse both manifest and latent content in interviews. Paper II used a descriptive, correlational and comparative design to explore the chest pain in patients with UCP and compare their chest pain experience with that of patients with IHD. Paper III was a cross-sectional study focusing on relationships between chest pain intensity, coping strategies, mental strain at work, stress at home, negative life events, physical activity and sleep in patients with UCP. Paper IV used a case-control design to compare patients with UCP with a control reference population regarding mental strain at work, stress at home, negative life events, sleep and HRQOL.

Patients with unexplained chest pain (Papers I-IV)

The present studies were carried out at Sahlgrenska University Hospital/ Östra in Göteborg, Sweden from December 2002 to September 2003, with a five-week break in June-July.

All consecutive patients seeking care during daytime hours Monday through Friday for chest pain were pain assessed at the ED. Regarding patients with UCP, a cardiologist (A.R.) ascertained that the patient's chest pain had no apparent organic cause. Hence, there are patients included in the study with the diagnosis musculoskeletal diseases, such as myalgia (19 men and 16 women). In Papers II and III, patients with previous diagnoses of IHD (4 men and 7 women) were included as they were judged by the cardiologist to have UCP at this time. Table 1 shows the inclusion and exclusion criteria for each paper.

Table 1. Outlines of the papers comprising the thesis

	Study design	Inclusion criteria	Exclusion criteria	Subjects	Measurements	Data analyses
Paper I Description of the UCP experiences and how the pain affected everyday life	Interview	18-69 years old Diagnosed as UCP Lived with chest pain >4 weeks and >2 events of chest pain	Language difficulties Known IHD	19 UCP patients	Open-ended interviews	Content analysis
Paper II Chest pain characteristics in UCP patients compared to IHD patients	Comparative	18-69 years old Diagnosed as UCP	Poor general health Language difficulties	208 UCP patients	Pain-O-Meter	Student's two-tailed t-test Chi-square test Pearson correlation test
		18-69 years old Diagnosed as IHD	Poor general health Language difficulties	40 IHD patients		
Paper III Coping, stress, physical activity, and sleep in patients with UCP	Cross-sectional	18-69 years old Diagnosed as UCP	Poor general health Language difficulties	179 UCP patients	Pain-O-Meter Jalowiec Coping Scale Jenkins Sleep Scale Life Events Scale Physical activity Mental strain at work Stress at home	Student's two-tailed t-test Chi-square test Spearman correlation test Cronbach alpha Multiple regression analysis
Paper IV Stress, negative life events, sleep and health-related quality of life in patients with UCP compared to a randomly selected population sample	Case-Control	18-69 years old Diagnosed as UCP	Poor general health Language difficulties < 25 years old Known IHD	231 UCP patients	Jenkins Sleep Scale Life Events Scale Physical activity Mental strain at work Stress at home	Student's two-tailed t-test Chi-square test Spearman correlation test Multiple regression analysis
		25-69 years old Participation in the InterGene population study	Known IHD	1074 Control participants		

Paper I

Of the 179 included UCP patients in paper III, 11 men and 8 women (n=19) participated in the interview study. They ranged in age from 18 to 63 years (median: 51 yrs for women, 37 yrs for men). Two patients had university education, 5 were immigrants, 2 were single, 12 were married, 4 were divorced and one was a widow.

Paper II - IV

In total, 285 consecutive men (n=166) and women (n=119) were judged to have UCP (Figure 2). Four patients (2 men and 2 women) were excluded due to poor general health. Another 24 men (14.5%) and 10 women (8.4%) were excluded owing to language difficulties in paper II and 3 additional patients were excluded for this reason in paper III.

The patient group in paper II thus comprised 247 UCP patients (140 men and 107 women) and that of paper III consisted of 244 UCP patients (139 men and 105 women). Eight of the patients in paper II and 10 additional patients in paper III declined participation. Due to administrative reasons (e.g., an overcrowded ED), 31 patients in paper II and an additional 16 patients in paper III could not be investigated. Hence, the patient sample in paper II comprised 208 UCP patients (participation rate 84%; 118 men and 90 women) and the corresponding figure for paper III was 179 patients (participation rate 73%; 101 men and 78 women). Demographic characteristics and traditional risk factors among UCP patients in paper III are shown in Table 2.

In paper IV, 22 of the 179 included UCP patients in paper III were excluded. Eleven of these (7 men and 4 women) were excluded because they were younger than the age inclusion criterion (25 years) applied in the control group study (InterGene study). The other 11 patients (4 men and 7 women) were excluded because of known IHD, leaving a total of 157 UCP patients (participation rate 71%; 90 men and 67 women).

An additional 74 UCP patients (37 men and 37 women) who had sought care at evenings and weekends were included in paper IV. These patients were met at the medical ward on the work day following admission and, after agreeing to participate in the study, completed the psychosocial questionnaire. Thus, data from a total of 231 UCP patients (127 men and 104 women) were analysed in paper IV. Background characteristics of the UCP patients in paper IV are shown in Table 3.

Patients with ischemic heart disease (Paper II)

In total, 76 consecutive patients (50 men and 26 women) were judged to have IHD (Figure 2). Ten IHD patients (8 men and 2 women) were excluded because of poor health. Another 7 men (14.0%) and 3 women (11.5%) were excluded owing to language difficulties. The IHD patient group thus comprised 56 patients, 35 men and 21 women. Two of these patients declined participation and 14 patients could not be investigated due to administrative reasons (e.g., an overcrowded ED). A total of 40 IHD patients (participation rate 71%; 26 men and 14 women) thus participated in the study. Of these patients, 5 men and 3 women had MI, 3 men and one woman had unstable angina, and 19 men and 9 women had angina pectoris.

Table 2. Demographics, traditional risk factors for ischemic heart disease and analgesic medication in UCP patients (Paper III)
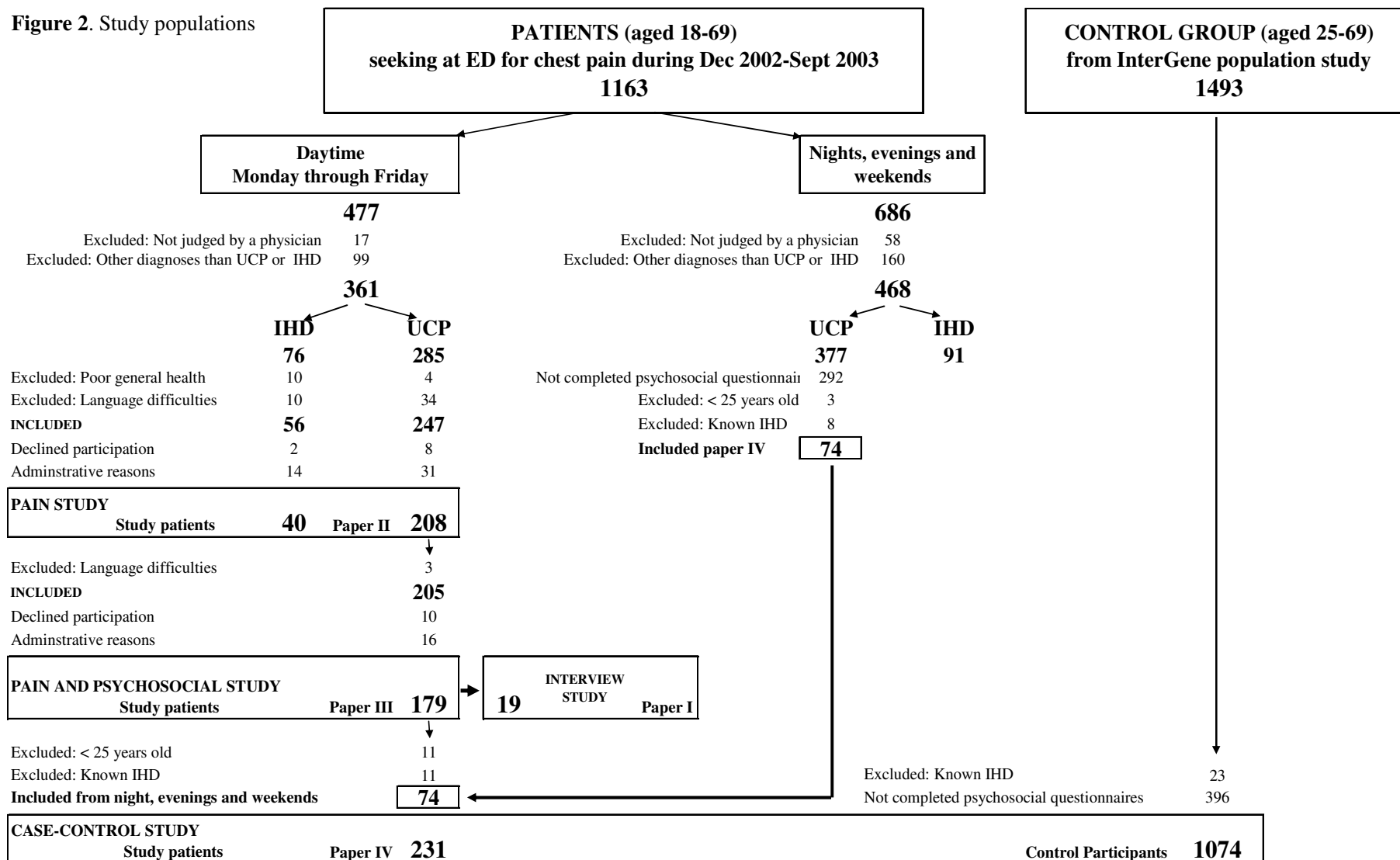
Variables	Men n=101		Women n=78		Total n=179	
Age, mean (SD)	44 (13)		47 (13)		45 (13)	
	%	(n)	%	(n)	%	(n)
Single	26	(26)	31	(29)	27	(49)
Immigrant	35	(35)	33	(25)	34	(60)
University education	23	(23)	22	(17)	22	(40)
Employed full time or part time	73	(74)	63	(49)	69	(123)
Sick leave during the last year	25	(25)	29	(22)	27	(47)
BMI[a] $\geq$25	70	(69)	45	(34)	59	(103)
Diabetes	5	(5)	10	(8)	7	(13)
Hypertension	20	(20)	32	(25)	26	(45)
MI in parents	31	(30)	34	(26)	32	(56)
Present smoker	17	(17)	35	(27)	25	(44)
Sedentary	27	(27)	21	(16)	24	(43)
Intake of analgesics, once a week or more	11	(10)	11	(8)	11	(18)

[a] Body mass index was calculated as weight (kg)/height (m)^2.

Population sample (Paper IV)

A control group, comprising a population sample, was recruited from the InterGene study. InterGene is a population-based research program, covering the entire Västra Götaland region, and assessing the INTERplay between

Figure 2. Study populations

PATIENTS (aged 18-69)
seeking at ED for chest pain during Dec 2002-Sept 2003
1163

CONTROL GROUP (aged 25-69)
from InterGene population study
1493

Daytime
Monday through Friday
477

| Excluded: Not judged by a physician | 17 |
| Excluded: Other diagnoses than UCP or IHD | 99 |

361

| IHD | UCP |
| **76** | **285** |

Excluded: Poor general health	10	4
Excluded: Language difficulties	10	34
INCLUDED	**56**	**247**
Declined participation	2	8
Adminstrative reasons	14	31

Nights, evenings and
weekends
686

| Excluded: Not judged by a physician | 58 |
| Excluded: Other diagnoses than UCP or IHD | 160 |

468

| UCP | IHD |
| **377** | **91** |

Not completed psychosocial questionnair	292
Excluded: < 25 years old	3
Excluded: Known IHD	8
Included paper IV	**74**

PAIN STUDY
Study patients **40**   Paper II **208**

Excluded: Language difficulties	3
INCLUDED	**205**
Declined participation	10
Adminstrative reasons	16

PAIN AND PSYCHOSOCIAL STUDY
Study patients Paper III **179**   →   **19** INTERVIEW STUDY   Paper I

Excluded: < 25 years old	11
Excluded: Known IHD	11
Included from night, evenings and weekends	**74**

| Excluded: Known IHD | 23 |
| Not completed psychosocial questionnaires | 396 |

CASE-CONTROL STUDY
Study patients Paper IV **231**   Control Participants **1074**

Table 3. Background characteristics of patients with UCP (n=231) and controls (n=1074)

	Men					Women				
	UCP (n = 127)		Controls (n = 494)		p- value	UCP (n = 104)		Controls (n = 580)		p- value
Age, mean (SD)	45.7	(11.1)	48.8	(12.3)	0.01	47.7	(11.9)	47.1	(12.2)	0.69
Single, n (%)	31	(24)	133	(27)	0.50	31	(30)	195	(35)	0.34
Immigrant, n (%)	42	(33)	78	(16)	<0.0001	32	(31)	63	(11)	<0.0001
University education, n (%)	35	(28)	159	(40)	0.01	26	(25)	221	(47)	<0.0001
Employed full time or part time, n (%)	90	(71)	345	(71)	0.95	62	(60)	390	(69)	0.06
Sick leave last year in days, mean (SD)	16.2	(56.9)	8.2	(6.8)	0.19	37.3	(92.9)	14.0	(21.2)	0.009
BMI[a] 25-29, n (%)	70	(71)	228	(55)	0.003	28	(36)	175	(34)	0.75
BMI[a] ≥30, n (%)	22	(18)	79	(16)	0.54	23	(23)	73	(13)	0.006
Diabetes, n (%)	5	(4)	18	(4)	0.83	6	(6)	5	(1)	0.001
Hypertension, n (%)	25	(20)	50	(12)	0.03	30	(30)	49	(10)	<0.0001
MI in parents, n (%)	37	(31)	123	(25)	0.26	36	(36)	142	(25)	0.03
Current smoker, n (%)	20	(16)	83	(32)	0.0007	35	(34)	123	(40)	0.29
Sedentary, n (%)	31	(25)	53	(11)	<0.0001	20	(20)	50	(9)	0.0008

[a]Body mass index was calculated as weight (kg)/height (m)^2.

GENetic susceptibility, environmental factors, lifestyle, and psychosocial background for the risk of chronic diseases and cardiovascular diseases (Berg et al., 2005). The control group participants were assessed according to the protocol for the InterGene study, which is described in detail at http://www.sahlgrenska.gu.se/intergene/. About 40% of the total InterGene population attended the screening examination.

In total, 1493 inhabitants of Göteborg attended the screening examination during the actual study period (Figure 2). Twenty-three of these individuals were excluded from the case-control study because of known IHD. The control group thus comprised 1470 individuals (693 men and 777 women). Of these, 396 individuals did not complete the psychosocial questionnaire, leaving a total of 1074 individuals in the control group (494 men and 580 women). Background characteristics of the control group are shown in Table 3.

Investigation procedure

The investigation procedures were standardized in the following way. All eligible patients were met by a nurse at the ED and assessed according to standard clinical routines. Blood pressure, pulse and a standard 12-lead electrocardiogram were taken and subsequently one of the two investigators in the research project asked the patients to participate in the study. The investigator provided patients with both written and verbal information about all steps in the study. After written informed consent was obtained, the investigator performed a pain assessment on each patient. Chest pain was assessed using the Pain-O-Meter (POM) (Gaston-Johansson, 1996). To standardize POM administration, a questionnaire was prepared and patients were asked to rate ongoing chest pain, worst pain during the last 24 hours and the pain that caused them to seek care at the ED, as well as if they had chest pain at rest and if their pain increased with activity. They were also asked about intake of pain-relieving medicine within the last 24 hours. Pain assessments were conducted at a mean of one hour after admission to the ED. The patients answered the questions orally and the investigators noted the answers on the questionnaire (Paper II). After the pain assessment, the patients were asked to fill in the questionnaire concerning psychosocial factors before discharge from hospital (Paper III-IV).

During the last two months of the data collection, the UCP patients were asked whether they would be willing to participate in an interview study (Paper I). After informed consent, the patients (n=19) were contacted by telephone a few days after discharge from hospital in order to make an

appointment for the interview. The patient was free to decide the time and place for the interview. Seventeen interviews were conducted in a room at the hospital ED, one interview took place at the patient's home and one was conducted at the patient's workplace. One more interview was conducted but was excluded from the study when it became apparent that there was an organic cause to the pain. The interview was open-ended and narrative in form and was conducted as a conversation in which the patient was encouraged to talk freely (Mishler, 1986). Introductory questions were: Can you tell me what it is like to have chest pain and can you tell me how the chest pain influences your everyday life? The interviews lasted from 40 to 75 minutes, with the exception of one, which lasted 140 minutes. The data collection continued until no further information was yielded. The interviews were audio-recorded and transcribed verbatim by the author (MJ). Before analysis, the transcriptions were corrected and names were changed to ensure confidentiality.

Measurements

The results are based on data from interviews (Paper I) and from assessments of pain and health-related experiences by means of instruments (Paper II-IV). In addition to the validated assessment instruments used in the study, questions were asked about mental strain at work, stress at home and physical activity.

Pain-O-Meter

The Pain-O-Meter (POM) was used to assess pain (Gaston-Johansson, 1996). The POM is designed as a multidimensional measure of pain, is based on the gate control theory (Melzack, 1987) and provides information about pain intensity, quality, location and duration. According to the gate control theory cognitive-evaluative and affective-motivational factors interact with the sensory component to produce pain. These three factors determine the pain experience. Therefore, according to this theory, pain is a multidimensional phenomenon (Melzack, 1987). The POM combines the qualities of the Visual Analogue Scale (VAS) and the McGill Questionnaire with sensory and affective words (Melzack, 1987). On one side of the POM is a 100-mm vertical visual analogue scale with anchors of no pain on the bottom and excruciating pain at the top. The patients move an adjustable tab to indicate the intensity of their pain. On the other side of the POM there are two lists of word descriptors (WDS), 12 sensory descriptors (sharp, dull, stabbing, crushing, cramping, tearing, aching, stinging, burning, sore, gnawing and pressing) and 11 affective descriptors (annoying, frightening, troublesome,

suffocating, killing, unbearable, terrible, tiring, worrying, excruciating and torturing). Each WDS has an assigned intensity value (range 1-5). The sensory and affective scores are added together to form a total pain intensity score for POM-WDS. Duration of pain can be specified as either continuous or comes and goes. Pain location is identified on a plastic plate with an image of a body with a front and a back view with numbered fields from 1-79, where the patient can indicate the location of their pain. The reliability and validity of the POM-VAS and the POM-WDS is well documented (Gaston-Johansson, 1996). High correlations were found between initial and repeat pain intensity ratings for the POM-VAS (r=.88, p<0.001). Concurrent validity of the POM-WDS was supported by correlations between the POM-WDS and the MCGill Pain Questionnaire (r=.69, p<0.001) and POM-VAS (r=.85, p<0.001). The POM takes about two minutes to complete.

Jenkins Sleep Scale

Sleep problems were assessed using the Jenkins Sleep Scale (JSS) (Jenkins et al., 1988). This questionnaire comprises 4 items rated on a 6-step Likert scale, where 0 corresponds to no problems with sleep and 5 indicates sleep problems (scale score 0-20). The internal consistency of the sleep scale has been tested in a sample of British civil servants (Cronbach´s alpha 0.77) (Nasermoaddeli et al., 2005) and in the present study the alpha value was 0.80. The four items ask how often during the last month the subject has experienced the following: trouble falling asleep, trouble staying asleep, waking up several times per night, and waking up feeling tired and worn out after usual amount of sleep. The response alternatives are: not at all (0), 1-3 days (1), 4-7 days (2), 8-14 days (3), 15-21 days (4) and 22-31 days (5). Patients were also asked to indicate their average number of hours sleep per night. The response alternatives were: 5 hours or less, 6 hours, 7 hours, 8 hours, 9 hours, 10 hours or more.

Jalowiec Coping Scale

General coping strategies were assessed using the Jalowiec Coping Scale (JCS) (Jalowiec, 1988). This 40-item questionnaire is based on Lazarus' model of coping (Lazarus & Folkman, 1984) and was developed to cover and assess the variety of cognitive and behavioural strategies that subjects use to reduce stress. Jalowiec included a third concept, palliative coping which is a way of making the situation more tolerable or keeping it under control without taking care of the problem. Each item assesses how often a strategy is used to handle stress. Items are rated on a 4-point response scale ranging from never (1), sometimes (2), often (3) to almost always (4). Factor analysis of the JCS has yielded a three-factor structure solution with three independent

coping dimensions labelled confrontive coping (COS; 13 items, score range 13-52), emotive coping (EOS; 9 items, score range 9-36) and palliative coping (POS; 14 items, score range 14-56) (Jalowiec, 1988, page 18). Confrontive coping strategies focus on constructive handling of the stressful situation and facing up to the problem. Emotive coping strategies express emotions evoked by the situation. Jalowiec has comprehensively evaluated the construct validity of the JCS and has reported adequate internal consistency for the three factors (Cronbach's alpha 0.70-0.85) (Jalowiec, 1988). The instrument has been translated from English into Swedish and used in Swedish patient populations (White & Elander, 1992; Klang et al., 1996; Forsberg et al., 2002).

SF-36

Health-related quality of life and functional capacity were measured with the generic questionnaire Short Form-36 (SF-36) (Sullivan et al., 1995). The SF–36 was developed to achieve a multidimensional health concept and to measure personal evaluations of health and levels of well being. The SF-36 is a 36 item questionnaire assessing 8 domains of quality of life: Physical Functioning (PF) (10 items), Role Physical (RP) (4 items), Bodily Pain (BP) (2 items), General Health (GH) (5 items), Vitality (VT) (4 items), Social Functioning (SF) (2 items), Role Emotional (RE) (3 items), and Mental Health (MH) (5 items). Each of the eight health concepts is measured on a scale from 0 to 100. The Swedish version of the SF-36 has been validated in the general Swedish population (Sullivan et al., 1995) and used extensively for evaluating many different patient groups.

Negative life events

Negative life events were assessed in relation to the following 10 events: serious illness in a close relative, death of a close relative, worry about a close relative, divorce, forced to move to a new home, forced to change jobs, unemployment, insecurity at work, serious financial worries and an event leading to legal consequences. The response alternatives were: no (0); yes, earlier than the last year (1); yes, during the last year (2); yes, both during the last year and earlier (3) (scale score range 0-30). A summary score assessing negative life events during the last year was computed using recoded values of the above response alternatives, such that the alternatives "no" and "yes, earlier" were coded as 0 and "yes, during the last year" and "both during the last year and earlier" were coded as 1 (summary score range 0-10). (Paper III and IV) The instrument has been used in patients with acute myocardial infarction (Welin et al., 1995).

Mental strain at work

Mental strain at work was assessed with two questions: "How often do you worry about being rushed at work?" and "How often do you worry about keeping up with your workload". Ratings were made on 5-step response scale: never (1), seldom (2), sometimes (3), very often (4) and almost all the time (5). A summary score was obtained by summing the ratings of the two questions (score range 2-10). These two questions have been used in a case-control study in patients with acute myocardial infarction (Welin et al., 1995) and Cronbach's alpha for the controls (n=412) was 0.91 for the scale. For the UCP patients in the present study, the Cronbach's alpha coefficient was 0.76.

Stress at home

Stress at home was assessed with a single question. Stress was defined as feeling irritable, filled with anxiety or having sleep problems. The participants were asked to report how often they had felt stress on a 6-step scale: never experienced stress (0), experienced some period of stress (1), some period of stress in the last five years (2), several periods of stress in the last five years (3), permanent stress in the last year (4) and permanent stress in the last five years (5) (score range 0-5). This question has been used in several studies of psychosocial risk factors and acute myocardial infarction (Rosengren et al., 2004a; Rosengren et al., 2004b).

Physical activity

Physical activity in leisure time was assessed on a 4-step scale: sedentary (1) moderate physical activity (2) regular physical activity (3) and hard training or competitive sports (4) (Rosengren et al., 2004a).

Analyses

Content analysis (Paper I)

Content analysis was originally developed for the analysis of the written word, but has evolved into a research method which enables data to be analysed with respect to their meanings, symbolic qualities, and expressive contents (Krippendorff, 2004). Early definitions of content analysis have quantitative perspectives and focus on manifest content (Berelson, 1952). When analysing manifest content, little or no interpretation is used and only the visible surface is described. Krippendorff (2004) argued that content analysis should not be restricted to summarising surface features of messages,

but should interpret the meaning of content. In latent content analysis, the underlying meaning in each passage is focused on. Data can be analysed by creating and defining categories or themes. The categories should be distinguished from each other and data cannot fit in more than one category. Themes can be found through identifying core consistencies and meanings (Baxter, 1994; Patton, 2002). In paper I, the domain (Baxter, 1994) of pain described more manifest and concrete content and the results were presented in categories and sub-categories. The domain of pain experience in everyday life contained more latent content with a deeper meaning, which required interpretation.

The analysis started after all interviews had been carried out. The first step consisted of listening to, reading and summarising every interview. This provided a general sense of the content. The analysis proceeded according to the following steps. The text was divided into meaning units, i.e. single words, parts of and whole sentences. The meaning units were then condensed in each interview. The content of the condensed meaning units regarding pain was formulated into categories and sub-categories. This continuous analysis of the data was influenced by Baxter (1994) who describes thematic analysis of the data. The interpretations were based on a holistic analysis and included more than one sub-theme. When several sub-themes had been interpreted, the next step was to analyse the common meaning in the sub-themes. The theme can be seen as a thread of meaning that recurs in sub-theme after sub-theme.

Statistical methods (Papers II –IV)

All statistical analyses were performed in SAS (Statistical Analysis System) version 8.2 (SAS, Cary, NC, USA). Standard descriptive statistics were used to characterise the sample. Means, standard deviation, and range were calculated for continuous variables and frequencies and percent for categorical variables. Student's t-test was used to test for possible significant differences in ordinal and continuous variables. The chi-square test was carried out to compare proportions in nominal and dichotomous variables. All tests were two-tailed and a p-value <0.05 was accepted as statistically significant.

The Pearson correlation coefficient was used for testing relationships between experience of worst pain in 24 hours, pain when seeking ED and current pain (Paper II). Spearman's correlation coefficient was used to evaluate relationships between selected psychosocial factors and chest pain intensity (Paper III).

Missing items in the scales were extrapolated as the mean of the completed items in the scales when 75% of the items were completed. For transformation of the scales (Jenkins Sleep Scale, Negative Life Events Scale and Mental strain at work) to dichotomous variables, the cut-off was set at the upper 20th percentile of the cumulative distribution in the control group.

Odds ratios were calculated by logistic regression in order to investigate associations between UCP and selected psychosocial variables (Paper III, IV). In Paper IV, a multivariable analysis was conducted in two steps. All variables with a p-value <0.10 in the univariate analysis were included in the first step. Variables with p-value <0.10 in the first model were included in the second step.

Ethics

Ethical considerations in the study followed the World Medical Association's Helsinki Declaration (WMA, 2000) and the ethical principles of the Swedish Medical Research Council, which comprise the principles of respect for autonomy, beneficence and justice (Beauchamp, 2001). Autonomy involves giving informed consent, respect for privacy and confidentiality. All participants in this study received both written and verbal information about the study and information explaining that participation was voluntary and that they could withdraw from the study at any time. All participants gave their informed consent to participate in the study. The participants were guaranteed confidentiality and anonymity in the presentation of the results.

The data were collected at the ED where the patients had sought care for acute chest pain, which many of them experienced as threatening. Respecting the participants' acute need to be diagnosed and treated for their pain, the patients were assessed according to standard clinical routines at the ED. Contact with the physician or the nurse was never delayed by the data collection. Flexibility, while maintaining the integrity of the study, was necessary to ensure the continuity and success of the data collection. Furthermore, ethical considerations were taken into account regarding the interviews. Hence, the principles of beneficence, doing good and doing no harm were abided by. Many patients expressed gratitude for the opportunity to talk about reasons that they felt might explain their chest pain. They talked about their lives and sometimes about events and feelings that they had never mentioned to anyone else. All participants were given the opportunity to continue the conversation after the interview was completed, if needed. The studies were approved by The Ethics Committee of Göteborg University, Sweden (Study code 169-02).

RESULTS

Chest pain experience

Aspects of the chest pain were categorised in pain intensity, pain quality with sensory and affective aspects, pain location and pain duration.

Pain intensity

Seventy-nine percent of the patients with UCP versus 60% of IHD patients reported ongoing chest pain when pain was assessed at the ED (p=0.001). Assessments of pain experienced when the patients decided to seek acute care yielded POM-VAS pain intensity scores ranging between 31-70 in 69% of the UCP patients and between 71-100 in 25%, which was significantly higher than current pain assessed at the ED (p<0.001). No significant correlations were found between time of intake of medicine and POM-VAS ratings of current pain. Compared to current pain at the ED, the pain for the last 24 hours was also more severe (p<0.001) (Paper II). When the patients freely described their pain intensity they used the adjectives "severe", "intense", "very hard" and "terrible" (Paper I).

Chest pain at rest was reported by 74% of the UCP patients versus 58% of the IHD patients (p=0.05). The mean POM-VAS pain intensity score at rest was 28 for the UCP patients and 21 for IHD patients. Increased chest pain on activity was reported by 31% of the UCP group versus 33% of the IHD group (Paper II). The patients reported that their pain often came in the evenings when they were relaxing; some of the patients were woken at night by the pain; and some had pain when they woke up in the morning (Paper I). For some patients with UCP, physical exertion relieved the pain and for some it exacerbated it (Paper I).

Relationships between worst chest pain intensity in the last 24 hours, demographics and psychosocial factors (total negative life events, stress at home, sleep problems and mental strain at work), and physical activity were evaluated but no realtionships were found.

Pain quality

When the patients freely described the sensory aspects of the pain in the interviews they used the following words: "it really hurts", "it is like a pressure", "it tightens", "it grabs", "it crushes", and "it is like a cramp". The affective aspect was described as "terrible", "hard and unpleasant", "tiring",

"worrying" and "frightening" (Paper I). Similar words were used in the pain assessment with the POM. Sensory aspects of the pain were characterised using the following POM sensory descriptors: pressing (38%), stabbing (24%), dull (23%), cramping (18%) and crushing (15%). Affective aspects of the pain were characterised using the following POM affective descriptors: worrying (41%), troublesome (31%), frightening (26%), tiring (25%) and annoying (23%) (Paper II). In comparison with the IHD patients, the UCP patients more frequently described their chest pain using the descriptors dull, sore, annoying and troublesome ($p<0.05$) and they used more words to describe their pain ($p<0.05$).

Pain location

At admission to the ED, UCP patients reported that current chest pain was most frequently located in the mid left (53%) and upper left (19%) front regions of the chest, left shoulder (15%) and the mid right front region (13%) (Paper II). The pain was experienced as "deep" and sometimes "superficial" (Paper I). Pain locations were largely similar in the IHD and UCP patients. However, the UCP patients had significantly more pain located in the front mid left region ($p=0.05$) than did the IHD patients. Radiation of pain to the left upper back region was reported by 8% of the UCP patients when rating current pain and by 9% when rating worst pain in 24 hours. IHD patients reported no radiation at either of the two pain assessments. Regarding current pain at the ED, the number of fields and surface area of the body where pain was located were strongly correlated with the POM-VAS pain intensity scores in both the UCP and IHD groups ($r=.49$ versus $r=.67$, $p<0.001$) (Paper II).

Pain duration

Pain duration among the interviewed UCP patients varied from 8 months to 27 years (median 6 years) (Paper I). The chest pain was experienced as episodic and unpredictable. The patients described the pain episodes as occurring "every few hours", "once a week", "four to five times a year" or "once a year". During the pain period, which could last for periods of only days or up to several months, the pain was present almost every day or it was experienced as continuous with intermittent exacerbations. Some of the patients experienced chest pain with one or two week pain-free periods now and then. Over the years, the pain tended to recur increasingly frequently and to appear suddenly without prior warning (Paper I).

Fifty percent (n=82) of the patients with UCP had continuous pain at ED and 47% (n=97) had continuous pain the last 24 hours. When deciding to seek acute care 44% (n=84) had continuous pain (Paper II).

Psychosocial factors

Compared with the control group, the UCP group was more poorly educated and consisted of a higher proportion of immigrants (Table 4). Women in the UCP group had a higher prevalence of cardiovascular risk factors, such as obesity (BMI ≥30), smoking, diabetes, and hypertension than did women controls. Both men and women in the UCP group were also markedly more sedentary than controls. (Paper IV)

Stress

Forty-four percent of the men with UCP, versus 16% of the men in the control group, were often worried about being rushed at work and/or keeping up with their workload (OR 4.2; CI 2.6-6.8). Corresponding figures for women were 42% versus 24% (OR 2.2; CI 1.3-3.7) (Paper IV). The UCP patients had also experienced more stress at home than did the controls (p<0.0001). Seventeen percent of the UCP men, versus 5% of the controls, reported constant stress during the last year or longer (OR 3.8; CI 2.0-7.2). Corresponding figures for women were 26% versus 12% (OR 2.6; CI 1.5-4.3) (Paper IV). In the interviews, the patients expressed concern that stress or mental strain could have caused their chest pain. Both men and women stated that they felt stress in their lives. They experienced stressful situations at work or/and at home and felt a nervous tension all the time (Paper I).

Negative life events

Negative life events, total as well as during the last year, were more than twice as common in men with UCP as in controls (total events OR 2.4; CI 1.5-3.9; and events during the last year OR 2.5; CI 1.6-3.9). Corresponding results in women were OR 1.8 (CI 1.1-3.0) for total events and OR 1.6 (CI 1.0-2.5) for events during the last year (Paper IV). Serious illness and worry about a close relative were the most common negative life events in both men and women. During the last year, 47% of the UCP patients versus 37% of the controls had been worried about a close relative and 34% of the patients versus 23% of the controls reported that a close relative had had a disease/accident. Although a significantly greater percentage of both men and women with UCP reported disease/accident or death in a close relative than did controls, the frequency of reported worry about a close relative was only significant greater in UCP men. Furthermore, men with UCP reported more insecurity at work, more financial worries and had more often been forced to move to a new home compared to men in the control group.
(Paper IV).

Sleep problems

Compared with the controls, both the UCP men (p<0.0001) and women (p=0.01) reported more sleep problems during the last month. For those UCP men and women who reported sleep problems 8 nights or more in the past month, trouble staying asleep was the most common complaint (45%), followed by waking up feeling tired and worn out (44%). Concerning number of hours sleep per night, both men and women in the UCP group slept fewer hours per night than did the controls. Thirty-seven percent slept ≤6 hours per night (Paper IV).

Mental strain at work

Patients with UCP reported more mental strain at work. Forty-four percent of the UCP men, versus 16% of the controls, were often worried about being rushed at work and/or keeping up with their workload. Corresponding figures for women were 42% versus 24%. Patients with UCP had also experienced more stress at home. Seventeen percent of the men with UCP, versus 5% of the controls, reported constant stress during the last year or longer. Corresponding figures for women were 26% versus 12% (Paper IV).

The results form the univariate analysis showed that all psychosocial variables measured were higher in the UCP group than in the control group (OR 1.9-3.0). Results from the multivariable regression analysis showed that mental strain at work and stress at home were four times more common in the UCP men than in the control group. In the UCP women, stress at home was nearly three times more common than in the control group, and work-related strain was twice as common. Furthermore, the analysis showed that more UCP patients were immigrants. Mental strain at work and negative life events during the last year were associated with UCP in men and stress at home and hypertension in women (Paper IV).

Coping

There were no significant gender differences in the use of confrontive or palliative coping strategies. Women used emotive coping strategies to a greater extent than did men. Relationships between worst chest pain intensity in the last 24 hours and coping were evaluated. A relationship was found between increased chest pain and emotive coping (p=0.02). A multivariable analysis conducted to investigate how emotive coping was related to demographics and psychosocial variables showed that physical activity seemed to affect emotive coping. Specifically, patients who were physically

active had less emotional reactions to stress than did sedentary patients ($p < 0.0001$) (Paper III).

Health- related quality of life

It was obvious that chest pain considerably disturbed and affected the patients' lives. The chest pain produced fear and anxiety, feeling of uncertainty, feeling of stress and loss of strength. Unpredictable chest pain and questions about the cause created uncertainty. The pain could come at any time and followed no pattern, which led to thoughts about the origin or cause to the pain. As one patient wondered, "Could it be a virus, psychological, muscular, stress, panic disorder or could it be angina anyhow? What does the symptom mean? How dangerous is the pain? Is it possible to have a healthy heart despite the pain?" Fear of MI made them acutely aware of their bodies and body fixated. The patients noted every signal from the body, analysed it and tried to assess the level of threat it might imply. When the pain changed in nature, intensified or failed to disappear as it usually did, their fear of MI escalated. When the patients could no longer handle the pain, they sought care at the ED because they had difficulty getting professional help elsewhere (Paper I).

The patients described how the chest pain drained them both physically and mentally. Although they knew that they were in good physical shape, they felt weak when they were experiencing chest pain. When experiencing chest pain and feeling tired, the patients abstained from doing things like going to the cinema, to a café, to a party or inviting friends over for dinner. The chest pain also affected their sexual life. The women claimed that they lost interest in sex and did not want to be near their spouses. They did not feel well, but rather tired and depressed. The patients described disturbances in concentration and memory. At work, this could affect decision-making when the pain absorbed too much of their attention and disturbed their thinking. Many of the patients described how being in pain every day made them irritable and caused them to lose their patience easily, which in turn could affect their relationship with their spouse. Resignation and despair were common among the patients. They described feelings of hopelessness, powerlessness and loss of control (Paper I).

As the pain could appear at exertion, the patients did not know how much they dared to exert themselves. Examples of activities that the patients abstained from included swimming, playing golf, going to the gym and running. Walking was seen as much safer and many walked long distances without problems, though not when they were experiencing pain. Even a short walk to the shop might then be too strenuous (Paper I). This was confirmed in

the quantitative analysis where patients with UCP were found to be more sedentary than controls (p<0.0001) (Paper IV).

The results from the qualitative study (Paper I) regarding limitations in everyday life were corroborated by findings in the quantitative study that the UCP patients had lower scores than controls in all dimensions of SF-36 (p<0.01) (Paper IV). The results from papers I and IV showed that the patients were limited in their physical, emotional, and intellectual functioning and in their ability to participate in activities within the family, in the workplace and social life.

DISCUSSION

General discussion of the findings

The intensity of pain was moderate to severe and the occurrence of ongoing pain was high when the patients sought help at the ED. The pain was mainly described as continuous and as located in the upper mid left and front regions of the body. The findings suggest that UCP is a painful condition, with high pain intensity both at rest and on activity. Nearly three-fourths of the UCP patients had pain at rest. This is in agreement with a study by Karlsson et al. (1997), which showed that 50% of the patients without MI had pain at rest and a study by Cooke et al. (1997), where 83% of chest pain patients with normal coronary angiography had pain at rest.

Comparisons between UCP and IHD patients showed that UCP patients more frequently described their chest pain as dull, sore, annoying and troublesome at pain assessment at ED. Although these words were not the most common ones chosen by the UCP patients, they are the ones that distinguished the UCP from the IHD patients. The same words are frequently used by patients in describing chronic pain (Gustafsson et al., 1999; Mayou et al., 1999; Goodacre et al., 2004), which may indicate that many UCP patients have persistent pain.

Surprisingly, two-thirds of the patients did not take any analgesic to relieve the pain before seeking care at the ED. It may be speculated that these patients abstained from taking pain relievers because they knew from past experience that they were ineffective in relieving their pain. Some patients received analgesics or nitrates after the pain assessment at the ED; however, the number of patients who received them was not investigated.

As the UCP patients experienced their pain as more frightening than did the IHD patients when deciding to seek acute care, it could be expected that many UCP patients seek care at night. However, it was found that the UCP patients did not differ from the other patients with chest pain in this study regarding the times of day that they sought acute care (Figure 3).

Results from both the qualitative and quantitative analyses showed that the UCP patients were often worried about stress at work, experienced stress at home, and experienced negative life events. These findings are in concordance with previous studies (Fisher et al., 1996; Lau et al., 1996; Janson Fagring et al., 2005). As discussed by Theorell (2006), changes in the

work environment and employment situation in Sweden during the last decades have contributed to increased mental health problems nationwide.
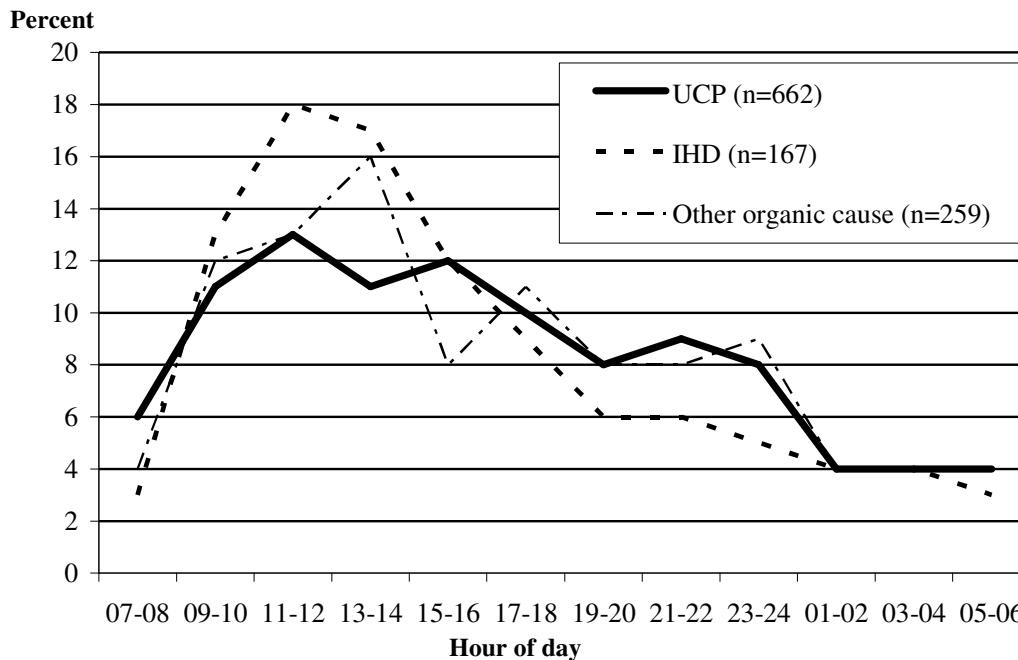
Figure 3. Percentages of UCP, IHD and other organic cause patients seeking care at the ED for chest pain by time of day.

Factors leading to greater stress at work are greater requirements for profitability, fewer employment opportunities for people with low education, less chance of influencing the work situation, increased working hours and higher work tempo. Of the three coping strategies assessed (confrontive, palliative and emotive), the patients most often used confrontive coping strategies in stressful situations, which is in accordance with previous research (Cheng et al., 2003). Emotive strategies seemed to increase the chest pain intensity. This is in line with results from a study of women with headache, where it was found that emotive coping was more common among those who reported headache than in those not reporting headache. (Raak & Wahren, 2005). Lindqvist et al. (2000) found in a population-based study that, of the three coping styles, confrontive coping was the most frequently used and emotive and palliative coping the least. In the present thesis, our patients were found to use all three coping strategies. Lazarus (2000) has proposed that it is impossible to separate problem-focused and emotion-focused coping because they are interdependent and work together, one supplementing the other in the overall coping process.

In comparison with controls, the UCP patients reported impaired HRQOL. This finding is consistent with a previous study showing that patients with NCCP have poor quality of life (Eslick et al., 2002). Comparisons with studies of other chronic pain patient groups may help to interpret the impact of UCP on HRQOL. Figure 4 shows mean SF-36 scores from five groups, namely, controls and UCP patients from our study, patients with unstable angina, individuals with fibromyalgia and whiplash injury. Unstable angina and UCP are similar regarding pattern of pain, that is, the chest pain is unpredictable, intense and occurs often at rest. In a study by Kim et al. (2005b), HRQOL was assessed in 915 patients with unstable angina at four months follow-up after discharge from hospital. Twenty-eight percent of the patients with unstable angina had undergone a revascularisation procedure (dilation of coronary vessels) during the last year. Other chronic pain conditions are musculoskeletal diseases, such as fibromyalgia and whiplash injury. Picavet and Hoeymans (2004) investigated HRQOL in a Dutch population (n=3664) with musculoskeletal diseases. Seventy-nine individuals with whiplash injury and 43 individuals with fibromyalgia participated. As shown in Figure 4, our UCP patients have lower mean values in the dimension Bodily Pain than do patients with unstable angina. This suggests that UCP affects everyday life to greater extent than unstable angina. Of the four pain conditions, individuals with whiplash and unstable angina have higher mean scores in the dimension Mental Health than both the UCP patients and individuals with fibromyalgia. Although all four chronic pain groups have severe pain, their mental health does not appear to be as impaired as the other HRQOL dimensions.

Thirty-two percent of our patients were immigrants. Results have shown that immigrants all over the world experience more stressful life events and psychological distress than the native population and therefore are at higher risk for somatisation (Ritsner et al., 2000). Findings from a study by Ritsner et al. (2000) showed that chest pain is the most common somatic symptom among immigrants. This may be a factor that explains the high percentage of immigrants among the participants.

The patients had difficulties to fall asleep and woke up feeling tired and worn out. Shaver and Paulsen (1993) showed that poor sleep quality increases somatic symptoms. Results from a survey of women showed that all types of sleep disturbances, such as difficulty in falling asleep and early awakening, increase the risk of cardiac symptoms, such as spasmodic chest pain (Asplund & Åberg, 1998). Number of hours sleep per night may also arouse chest pain symptoms. Less than 5 hours sleep has a twofold increased risk for spasmodic chest pain (Asplund & Åberg, 1998). Good sleep
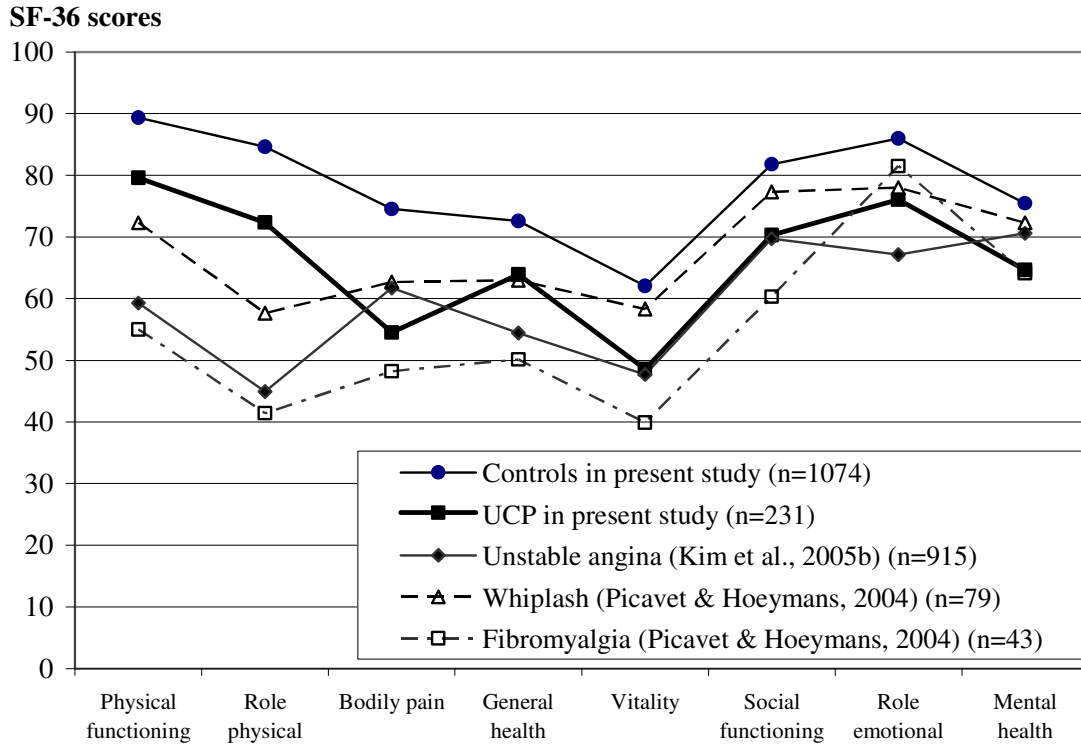
SF-36 scores

Figure 4. SF-36 scores (mean values) in different populations. A higher score indicates better HRQOL.

quality is associated with physical health and psychological well-being (Shaver & Paulsen, 1993) and has a protective effect against stress (Edell-Gustafsson, 2002). Sutton et al. (2001) found in a Canadian population that a very stressful life, severe pain and dissatisfaction with one's health demonstrated the highest odds ratios associated with insomnia, but increasing age did not predict insomnia. Similar results were found in a study by Dahlgren (2005), where high workload and much stress increased sleeplessness. Sleep problems can contribute to the onset and amplification of pain, but in patients with severe pain as UCP, sleep problems can also be an outcome (Ohayon, 2005). Roehrs and Roth (2005) discuss these relationships and propose that the relationship between stress and sleep disturbance is bidirectional.

The patients experienced the pain as worrying and frightening and were preoccupied with their pain. Even during pain-free periods, they thought about the pain and their attention was focused on pain signals from the chest. In the interview study, the patients stated that they had no hope of being cured. They thought that they would have to live with their chest pain forever

because no one could offer an explanation for it. In the long term, resignation and despair are dysfunctional and may result in increased chronicity of pain (Hallberg & Carlsson, 2000). Many patients with chronic pain develop hypervigilance, in which they scan their bodies for signs of pain (Johansson et al., 1999; Hallberg & Carlsson, 2000; Paulson et al., 2001; Cheng et al., 2003). When signs of pain are observed, the patient may then catastrophise and think of the worst-case scenario. When people interpret their perceptions of pain as catastrophic they become very anxious and fearful, which leads to avoidance of anything that may provoke or increase chest pain. In our interview study, we found that the UCP patients in fact stated that they avoided many activities. According to Asmundson et al. (2004) and Morley and Eccleston (2004) most individuals with pain take appropriate behavioural restrictions followed by graduated increases in activity (confrontation) until they have recovered. Other individuals catastrophise the chest pain experience, which leads to pain-related fear and thereafter spiralling into a vicious and self-perpetuating fear-avoidance cycle. According to Linton and Boersma (2004), fear-avoidance beliefs are predictors of future disability problems and persistent pain. Based on the findings from this thesis, a fear-avoidance model inspired by Asmundson et al. (2004) and Morley and Eccleston (2004) was developed as an aid to understand the UCP patients (Figure 5).
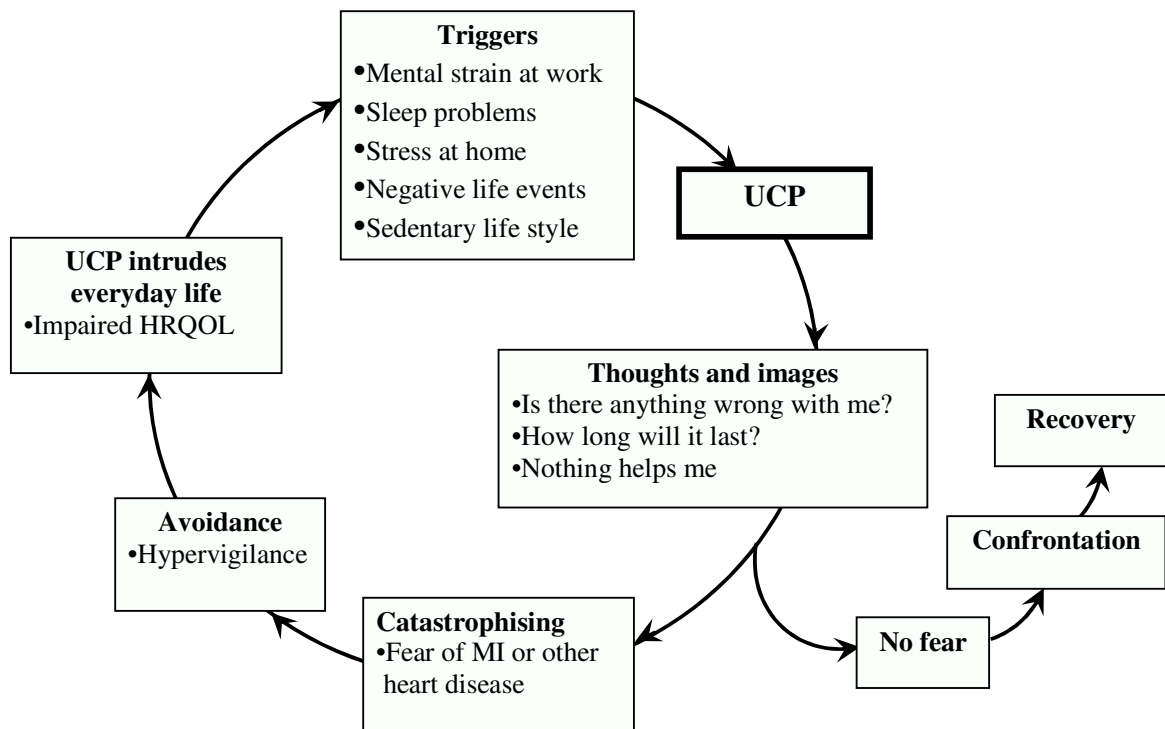
Figure 5. Perpetuating fear-avoidance cycle that promotes and maintains activity limitations, disability and persistent pain. The model is inspired by Asmundson et al. (2004) and Morley & Eccleston (2004).

In the interviews, the patients stated that they wanted to talk about their chest pain more in depth with a healthcare professional. In a study by Farmer et al. (2006), the results showed that healthcare professionals at ED pursue a narrow biomedical focus without exploring the patient's point of view. They also found that healthcare professionals ask close-ended and leading questions in order to arrive at a diagnosis. A holistic health perspective and open communication between the patient and health care professional about the patient's pain are necessary to manage the experience of pain. From a biomedical perspective, individuals who suffer from UCP present no signs confirming disease at the ED and are therefore judged to not be in need of medical help, despite the fact that UCP significantly interferes with the individual's everyday life. Accordingly, the illness problem is reduced to a narrow medical issue (Eriksson, 1994). The current medical model of acute care needs to broaden its narrow disease perspective to one that encompasses the care of the patient's suffering from illness (Toombs, 1993).

Pain assessment of patients with chest pain (with Pain-O-Meter or VAS) is generally not included in standard ED routines. However, such assessments could represent a good point of departure for a dialogue between the patient and health care professional about the patient's experience of chest pain. If the patient does not get an opportunity to communicate his/her pain, then it is not likely to be confirmed. Not receiving confirmation is a form of abuse and is related to suffering (Öhlén, 2004). Open and effective communication about the pain may help to bridge the gap between the patient's perception and report of the pain and the nurse's evaluation of it (Gaston-Johansson, 1996; Caldwell, 2000).

Methodological considerations

The knowledge emanating from this thesis was obtained by using different research methods and designs. The questions one asks determines the research methods one uses (Sackett & Wennberg, 1997) and therefore both qualitative and quantitative studies were used. In quantitative research, measurement instruments are often used and probability sampling is often required to permit statistical inferences to be made. Qualitative research involves inductive reasoning and is concerned with elucidation of subjects' perspectives (Sandelowski, 2000). The findings from the qualitative and quantitative studies showed a high degree of concordance. Combining qualitative and quantitative methods in this thesis yielded more comprehensive and richer information about the UCP and how the symptom affects everyday life than would have been possible by means of one method alone.

In Paper I, data were collected by interviews. The readiness with which our patients spoke about their pain suggests that they had a need to talk about their chest pain and how it affected their everyday lives. The interviews gave us an opportunity to gather knowledge about their experience of illness: how it arose and how they controlled and coped with it and how they perceived and monitored their own bodies. According to Frank (1995), the ill person needs to verbalise the experience of the illness that biomedicine cannot describe. Trustworthiness is partly indicated by the choice of quotations to represent the atmosphere during the interview, and by the fact that the results closely align with the patients' descriptions. To avoid the risk of investigator bias, which may occur in interpreting qualitative data, precise rules for coding were established and the texts were independently analysed by more than one researcher (Polit & Hungler, 1999). The patients´ pain was assessed at the ED using the POM, in which the patient is as asked to describe the sensory and affective aspects of his/her pain using a limited set of descriptors. It is possible that this method might have influenced the patients' choice of words when they were asked to freely describe the experience of pain in the interviews.

In Papers II-IV, quantitative methods were used. To avoid bias favouring the UCP patients, only those patients who were under the age of 70 were included since IHD is more common in the elderly. To strengthen the external validity of the studies, all data collections were standardised and carried out by the same two investigators. They also informed all patients about the studies and performed all pain assessments in all patients. The studies were carried out at an ED with a varying flow of visiting patients. At times, the ED was overcrowded and it was impossible to talk with the patient in private. Some patients were therefore not possible to include. On the other hand, few of the invited patients refused to participate, giving a participation rate of about 73%. The sample was drawn from those patients seeking emergency care during daytime hours Monday through Friday at a single hospital. Although extending data collections to the evening and night hours would have increased the sample size, this was prohibited by lack of sufficient resources available for the project. Of the patients seeking care for chest pain at the ED during the daytime, 61% (n=291) were men and 39% (n=186) were women. At evenings, nights and weekends, 57% (n= 394) were men and 43% (n=292) were women. Hence, no obvious gender differences were apparent regarding daytime/ weekday versus night-time and weekend admissions (Figure 2). Furthermore, the proportions of patients diagnosed with UCP who sought care daytime versus evening/ night/ weekend did not differ (60% vs. 55%) (Table 4, Figure 3).

The patient sample included comparatively few patients with IHD. A possible explanation for this could be that acute IHD patients are more often transported to another hospital facility of the Sahlgrenska University Hospital (Sahlgrenska) than to the facility where these studies were conducted (Östra).

Table 4. Diagnosis in patients seeking care at daytime and at evenings, nights or week-ends at Sahlgrenska University Hospital/ Östra from December 2002 to September 2003

	Daytime 8 a.m to 4 p.m			Evenings, nights and week-ends		
Diagnosis	Total n=477 n (%)	Men n=291 n (%)	Women n=186 n (%)	Total n=686 n (%)	Men n=394 n (%)	Women n=292 n (%)
UCP	285 (60)	166 (58)	119 (42)	377 (55)	200 (51)	177 (61)
IHD	76 (16)	50 (17)	26 (14)	91 (13)	67 (17)	24 (8)
Other organic cause	99 (21)	62 (21)	37 (20)	160 (23)	96 (24)	64 (22)
Not judged by a physician	17 (4)	13 (4)	4 (2)	58 (9)	31 (8)	27 (9)

In small samples, there is a risk of drawing conclusions that no relationships exist when in fact they do (Altman, 1999). This form of inference error, commonly known as Type II error, has to be considered when evaluating the results in Paper II. Although the sample was small, the findings are in concordance with other studies, which strengthens the view that the results are valid. A number of statistical comparisons were also performed and, as is known, the statistical probability of finding a significant relationship also increases as the number of such comparisons increases (Altman, 1999). Even though the statistical significance was set at $p<0.05$ many of the comparisons showed significance at $p<0.01$.

Pain was assessed using the Pain-O-Meter. The visual analogue scale (VAS) has several disadvantages: differences exist in people's preferences for horizontal versus vertical formats and some people have difficulty to conceptualise a sensory phenomenon such as pain intensity in a straight-line-continuum (McGuire, 1994). The VAS is a subjective assessment and is of most value for assessing intraindividual change (Altman, 1999). A problem that occurs in assessing pain is the limited number of available instruments that are quantifiable, reliable and valid (McGuire, 1994). In order to compare and evaluate our results with those of other studies, we computed means and standard deviations.

Paper III examined coping strategies used by our UCP patients. The main limitation of the study is its cross-sectional design. Thus, coping strategies were assessed at only one point in time and hence inferences regarding causality cannot be drawn. A prospective design would have permitted us to identify changes in psychological reactions over time and in diverse conditions (Lazarus, 2000). In order to explore the influence of coping strategies on UCP, comparisons with a control group would have been needed. However, our controls were selected from another study (the InterGene study), which did not assess coping.

The control group consisted of people examined in the InterGene study, a population-based, longitudinal study. During 2003, only about 40% of the eligible people participated. This low participation rate could have biased the results as the controls in our study represent only people who came to the screening appointment. A case-control design entails different conditions for the UCP patients and control participants. In this study, the control participants had no chest pain and they also chose to go to the screening appointment, while the UCP patients were forced by their chest pain and experience of illness to seek care at the ED. They also filled in the questionnaire at the ED.

IMPLICATIONS

Although assessing patients with chest pain is a challenging endeavour, it is of vital importance if pain is to be adequately treated. Most of the patients with UCP in the present thesis did not feel that their pain had been confirmed by the health care professionals when seeking acute care and that they were given few opportunities to communicate their chest pain experience. To assess pain with the POM takes a only few minutes and can serve as a point of departure for a dialogue between the patient and health care professional about the patient's pain.

Psychosocial factors seem to be associated with UCP and ought to be taken into consideration when the patient seeks care. Linton and Boersma (2004) suggest the use of a screening questionnaire to complement medical examinations as a platform for early identification of patients at risk for developing chronic disability. Their questionnaire, the Örebro Musculoskeletal Pain Screening Questionnaire (Linton & Boersma, 2004), consists of 25 items focusing on pain experience, beliefs about future, stress, sleep, work and coping. This questionnaire seems to have good face validity as the items seem to reflect issues relevant to UCP. The screening may be a

starting point for a mini behavioural analysis. In patients identified to be at risk for developing persistent pain or those currently suffering persistent pain, a psychological intervention using a problem-solving approach regarding lifestyle, stress and ongoing life problems has been shown to be effective in reducing the frequency, severity and associated distress of symptoms and limitation of activities (Mayou et al., 1997; Esler et al., 2003). Esler and Bock (2004) suggest that treatment must focus on educating patients to manage their chest pain symptoms, cardiac risk factors and stress. Aiarzguena et al. (2007) conducted a randomised controlled trial to assess the effect of specific communication techniques. Patients with medically unexplained symptoms were offered treatment comprising six 30-minute sessions. In one group, physical explanations for the pain were emphasised, whilst communication about the pain experience was stressed in the other group. HRQOL as assessed with the SF-36 was used as the outcome measure. After 12 months follow up, both groups improved in all dimensions of the SF-36, but the scores in the dimension Bodily Pain improved more in the treatment group focusing on the communication of the pain experience. This finding indicates that communication about the pain experience might represent an important part of pain relief treatment and improve HRQOL in patients with UCP.

In the caring process, the illness narrative may constitute a bridge connecting the body, the self and the life world. The use of illness narratives in nursing care could give the nurse an opportunity to gather knowledge of the individual's life situation, as well as how the patient perceives bodily symptoms (Kleinman, 1988; Skott, 2001).

FUTURE DIRECTIONS

Psychological and behavioural components of treatment need to be as precise and evidence-based as physical treatments (Mayou, 2005). This thesis focuses on variables related to stress, coping and sleep. Research concerning other psychosocial variables as depression, anxiety, and social interactions and their relationships with UCP is needed to achieve a more comprehensive picture of the origin and maintanance of the symptom. Longitudinal studies aimed at examining the relationship between coping strategies and UCP would be useful to further our knowledge of how these patients handle stressful events in everyday life.

There is also a need for the development and testing of different models of care for patients with UCP in order to find out what works. This will enable successful, evidence-based practice to be incorporated at different points

along the patient pathway. More research aspiring to develop a standardised classification of chest pain characteristics in UCP patients that would accurately distinguish UCP patients from IHD patients is required.

CONCLUSIONS

- UCP impacts negatively on everyday life and gives rise to feelings of fear and anxiety, uncertainty, stress and loss of strength.

- UCP is a more painful condition than IHD, and is more complex in nature as evidenced by the need for more sensory and affective words to describe the pain.

- Patients with UCP more frequently described their chest pain as dull, sore, annoying and troublesome than did patients with IHD.

- Two-thirds of the patients with UCP did not take any analgesic to relieve the pain prior to seeking acute care.

- The more intense the pain the greater the extension of pain in the chest.

- There was no obvious distinction between the experience of ischemic chest pain and UCP regarding pain location.

- The intensity of UCP was related to emotive coping.

- Mental strain at work was nearly four times as common among men with UCP compared to controls.

- Stress at home was nearly three times as common in women with UCP compared to controls.

- Men with UCP had more negative life events during the last year than controls. The most common negative life event was worry about a close relative. This event was more common among both men and women with UCP than in controls.

- UCP patients had more sleep problems than controls: men with UCP had problems to stay asleep and women had problems to fall asleep. Men and women with UCP slept fewer hours per night than controls.

- UCP patients had impaired HRQOL with lower scores than controls in all dimensions of the SF-36.

- Both men and women with UCP were markedly more sedentary than controls.

- A greater proportion of UCP patients compared to controls were immigrants.

- Women with UCP had a higher prevalence of cardiovascular risk factors (obesity, smoking, diabetes, and hypertension) than controls.

ACKNOWLEDGEMENTS

I wish to express my sincere gratitude to everyone who has contributed to this thesis. In particular, I would like to thank the following persons:

All patients who took part in the studies, for your willingness to participate and for generously sharing experiences and thoughts with me.

All staff members at the Department of Internal Medicine, Sahlgrenska University Hospital/ Östra for your collaboration and friendly support during the data collection.

Associate professor, Karin Kjellgren, my main supervisor, for your engagement and support, for your critical review of my texts and for your constructive criticism and comments.

My supervisor and co-author throughout my work with this thesis, Senior Lecturer Catharina Welin, for all your great support. I am grateful for all constructive discussions about statistics and findings and for all good advice and help during the analyses.

Professor Fannie Gaston Johansson, for admitting me to the PhD program, for being my main supervisor at the beginning of my doctoral studies and for believing in my capacity.

Professor Ella Danielson, for your guidance, support and encouragement in the qualitative study.

My companion in the project, Annika Janson Fagring, for sharing many experiences during these years, and for all the laughter and friendship.

My fellow doctoral students at the Institute of Health and Care Sciences, Sahlgrenska Academy at Göteborg University, for all your friendship, support, stimulating discussions and joy during the years.

The staff at the Institute of Health and Care Sciences, Sahlgrenska Academy at Göteborg University, in particular Eva Deutsch for assisting with administrative duties.

My dear family Stig, Carin and David for your love, support and patience with me during my work on this thesis, and for reminding me that there is more to life than doctoral studies.

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