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Unraveling the role of sense of coherence in coronary heart disease patients

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Chapter 1
Introduction

The aim of this study was to explore the role of sense of coherence (SOC) in coronary heart disease (CHD) patients. The study provides evidence on the potential utility of SOC in cardiovascular research, prevention and rehabilitation. Additionally, it examines whether SOC and other psychological factors are part of the pathways that explain ethnic differences in the recurrence of CHD. Possible explanatory factors and confounding variables, such as sex, age, socioeconomic status (SES) and the severity of disease, were taken into account. This introductory chapter covers the theoretical background of the study, describes its aim and the theoretical model used and presents the research questions and the structure of this thesis.

1.1 Coronary heart disease: definition, epidemiology, prevention and quality of life

In 2009, the World Health Organization (Schunemann et al., 2008) stated that ‘CHD is the leading cause of death worldwide and has become a true pandemic that respects no borders.’ Although there has been a decrease in mortality rates for CHD in Europe, mainly due to the advances in diagnosis, treatment and prevention, CHD remains the leading cause of death in the European Union, especially in several Eastern European countries (Allender et al., 2008; Levi et al., 2009; Piepoli et al., 2010). At present, CHD is seen as a “man-made” disease influenced by the choices humans make, especially regarding lifestyle factors. Thus, both primary and secondary prevention of CHD still remain among the top public health priorities (Gaziano et al., 2012).

CHD (also called ischemic heart disease) refers to a set of conditions resulting from coronary artery disease (CAD). CAD is a condition characterised by the development of atherosclerotic plaques (fibrofatty deposits) in the coronary arteries. The accumulation of atherosclerotic plaques in the coronary arteries leads to an inadequate supply of oxygen-rich blood being delivered to the heart muscle (myocardium). If the heart is deprived of oxygen, chest pain or pressure, called angina, may occur. When the blockage cuts off the flow of blood, the result is a heart attack (myocardial infarction) (Satish, 2005). Based on the severity and magnitude of ischemia (restriction of the blood supply to the heart muscle) clinicians consider whether the management of CHD should be a pharmaceutical treatment alone or if coronary revascularization, in which both percutaneous coronary intervention (PCI) and coronary-artery bypass grafting (CABG) are potential options, should also be performed (Williams et al., 2010).

CHD is generally a result of multiple risk factors. The four most important risk factors are dyslipidemia (raised LDL cholesterol, low HDL-C, and raised triglycerides), hypertension, cigarette smoking and increasing age (Satish, 2005). Additionally, obesity, family history of premature CHD and physical inactivity are at present considered to be major risk factors (Satish, 2005). Other predictors of

CHD are gender, family history, ethnic origin and low birth weight as non-modifiable risk factors, and diet, alcohol consumption, diabetes, obesity, high-sensitivity C-reactive protein and psychosocial factors as modifiable risk factors (Satish, 2005; Gaziano et al., 2012).

Identification and assessment of risk factors for CHD serve as a basis for primary and secondary preventions of CHD. While primary prevention includes specific practices for the prevention of the disease among those without overt CHD, secondary prevention relies on early detection and diagnosis of CHD and application of interventions to prevent its further progression. Several methods have been developed to assess the risk of CHD. Often for use in daily practice, these methods use graphical displays like charts for the assessment of risks because of easily observable characteristics like age, gender, tension, etc. These methods are part of general practitioner guidelines (for such example see Gaziano et al., 2012, p. 1031). Other more burdensome methods for risk assessment are non-invasive tests, such as the exercise treadmill test or magnetic resonance coronary angiography (Satish, 2005).

According to Gaziano et al. (2012, p.1013) three complementary preventive approaches may reduce the population burden of CHD: therapeutic interventions as part of secondary prevention in patients with known CHD; identification of and targeting on high-risk individuals through mass screening or case finding; and primary prevention aiming at the general population. The latter two approaches are built on the general idea of population-based prevention as developed by Rose (1985). Additionally, Gaziano et al. (2012, p. 1014) proposed three classes of interventions for major risk factors based on the height of the risks imposed by these factors and on the strength of the evidence regarding the benefits of the interventions as well as on their cost-efficacy (Table 1.1). To be more specific, Class 1 interventions (smoking cessation, blood pressure management, lipid profile management) have a clear relationship with CHD. The data confirms the magnitude of an intervention's benefit as well as its risk and cost in both primary and secondary prevention of CHD. Other beneficial and cost-effective pharmacological approaches include aspirin, beta blockers and angiotensin-converting enzyme inhibitors. Class 2 includes interventions (weight management, physical exercise) for which the available data strongly indicate a causal relationship and suggest that the intervention will probably reduce the incidence of events, but with less abundant data on the benefits, risks, and cost of interventions. Finally, Class 3 includes interventions which are currently under active investigation. Examples include various strategies to raise HDL levels, interventions that target psychological factors and several novel biochemical and genetic markers.

Table 1.1 Risk factors and preventive interventions for coronary heart disease

Class	Risk factor	Intervention
Class 1	Smoking, dyslipidemia, high blood pressure, preventive medications	smoking cessation, lipid management, blood pressure management, aspirin, beta blockers, angiotensine-converting enzyme inhibitors
Class 2	diabetes, pre-diabetes, physical inactivity, overweight, obesity, unhealthy diet, alcohol, inflammation	diabetes management, activity management, weight management, improved diet
Class 3	menopause, hormone replacement therapy, micronutrients, psychological factors, novel biochemical and genetic markers	

Source: Gaziano et al. (2012)

Along with the increased importance of prevention, health-related quality of life (HRQoL) has gained attention and become an important outcome in patients with CHD (Spertus et al., 2002; Dantas et al., 2008; Weintraub et al., 2008). HRQoL is often interpreted as the effect of illness and its treatment as perceived by the patient on his or her quality of life (National Heart Foundation of Australia, 2006). At present, HRQoL is increasingly assessed in CHD research and is considered to be both an outcome indicator as well as a risk factor among patients with CHD (Mathisen et al., 2007). For example, disease-specific conditions (e.g. hypertension, heart failure) and sociodemographic factors (e.g. sex, SES, and ethnicity) have been associated with poorer HRQoL (Bell et al., 2007; Xie et al., 2008). On the other hand, studies have shown that poor HRQoL is independently associated with a higher risk of CHD (Myint et al., 2006), higher cardiac and total mortality (Schenkeveld et al., 2010), more frequent hospitalization among cardiac patients (Konstam et al., 1996) and a higher occurrence of chronic disabling conditions such as stroke (Myint et al., 2006). Thus, HRQoL is at present recognised as a clinically relevant construct useful for assessment of the impact of CHD on patient, the effectiveness of interventions (Skodova, 2009) and the risk for future CHD.

1.2 Relationship of psychosocial factors to coronary heart disease: focus on sense of coherence

Regarding psychosocial factors, a substantial amount of evidence exists on their role in CHD as both triggers of CHD-events and as promoters of the atherosclerotic process (Vaccarino & Bremner, 2012). Several potential biological mechanisms have been identified linking psychological factors and CHD, including an increase in blood pressure and heart rate, the effects on insulin resistance, autonomic

dysfunction, plaque instability and immune dysregulation (Bierhaus, 2003; Steptoe & Brydon, 2009). Among psychological factors, stress, depression, anxiety and hostility have received the most attention for their influences on CHD onset and progression (Vacarino & Bremner, 2012).

Evidence based on experimental studies (both in animals and in humans) has shown a clear link between the adverse effects of stress (acute and chronic) and CHD outcomes. The examples of chronic stress are general stress, work stress, low SES, early life stress, social isolation and lack of social support (Vacarino & Bremner, 2012). Antonovsky (1979, 1987) theorised that stressors are not objective realities but perceived experiences. Because stressors are everywhere, it is unlikely they are the cause of illness. Instead, Antonovsky suggested that a failure to manage these stressors leads to illness. Moreover, he considered health to be a movement in a continuum between total ill health (dis-ease) and total health (ease). He introduced two concepts – SOC and generalised resistance resources (GRRs) – to explain how an individual keeps his or her position on this ease–disease continuum.

The concept of SOC is central to explaining health-maintaining or health-promoting processes. A pronounced SOC enables a person to react flexibly to demands: he or she can activate the appropriate resources for specific situations. In contrast, a person with a weakly developed SOC would react to demands in a strong and rigid manner, since he or she perceives himself or herself as having fewer coping resources. SOC is defined as a global orientation that expresses the extent to –“...*which one has a pervasive, enduring though dynamic feeling of confidence that (1) the stimuli deriving from one’s internal and external environments in the course of living are structured, predictable and explicable; (2) the resources are available to one to meet the demands posed by these stimuli; and (3) these demands are challenges worthy of investment and engagement*” (Antonovsky, 1987, p.19). SOC is thus postulated to have three components: (1) comprehensibility – an individual with strong comprehensibility finds logic in the various external and internal stimuli encountered (represents a cognitive processing pattern); (2) manageability – having resources at one’s disposal may refer to either direct or indirect control of such resources (represents a cognitive-emotional processing pattern); and (3) meaningfulness – an emotional investment in life. An individual with a strong sense of meaningfulness characterises events as positive challenges that are worth the emotional investment and commitment required (Antonovsky, 1987, 1996).

In the development of SOC, an individual’s perception that sufficient GRRs are available reinforces one’s SOC. In a state of facing stressors, a strong SOC will enable a person to mobilise GRRs, which promote the further development and reinforcement of a strong SOC (Antonovsky, 1987). Examples of GRRs are e.g. knowledge/intelligence, a coping strategy, social support, cultural stability and a preventive health orientation (Antonovsky, 1979, 1987; Lindstrom & Eriksson, 2005).

According to Antonovsky (1987) people develop their SOC throughout the whole life span but mainly in the first decades of life, when they learn how to deal with life in general. Thus, SOC does not represent a personality trait but a major life orientation always focusing on problem solving. Furthermore, several empirical studies have concluded that SOC can be altered (long-lasting improved) by evidence-based psychosocial interventions (Wiessbecker et al., 2002; Forsberg et al., 2010).

As a person with a strong SOC can manage different stressors adequately, the link between high SOC and better CHD outcomes seems highly plausible. Indeed, recent studies have shown a link between a strong SOC and reduced CHD mortality (Surtees et al., 2003; Wainwright et al., 2008), better HRQoL (Kattainen et al., 2006; Karlsson et al., 2000), favourable health-related behaviours (Gerber et al., 2011), lower mental fatigue, less maladaptive strategies, lower negative affectivity and better self-management in patients with CHD and heart failure (as discussed by Apers et al., 2012).

The SOC construct is measured by means of the Orientation to Life Questionnaire (Antonovsky, 1987) which is commonly referred to as the Sense of Coherence scale (SOCs). Antonovsky (1987) developed two forms of the SOCS: the original 29-item scale and the shortened 13-item version. Besides the two original scales there are at least 15 modified versions in existence. These versions of the SOCS differ in scoring alternatives as well as in the number of items in the scale (Lindstrom & Eriksson, 2005).

1.3 The role of anxiety and hostility in coronary heart disease

Hostility and anxiety, among many psychosocial factors, have been studied regarding their role in the etiology and prognosis of CHD (Albus, 2010; Janszky et al., 2010; Tindle et al., 2010). Evidence regarding the link between hostility and anxiety and CHD outcomes is less clear (Vacarino & Bremner, 2012). However, it has been speculated that anxiety may be an even stronger predictor of CHD (both regarding etiology and prognosis) than depression (Lavie & Milani, 2006); furthermore, coping strategies (hostility may be seen as destructive coping strategy) are even more important for CHD than anxiety and depression (Chiavarino et al., 2012). Thus, further research is needed to identify the exact role of hostility and anxiety in the further development of CHD as well as the possible pathways linking hostility and anxiety with CHD outcomes.

Hostility

In general, hostility is a multidimensional concept and may be characterised as a negative orientation toward interpersonal transactions; it includes traits such as cynicism, anger, mistrust and aggression (Barefoot et al., 1989). Recent meta-analyses have shown that the summary combined estimate for anger

and hostility indicated a modest but significant 19% increase in CHD incidence in initially healthy populations (25 studies) and a 24% increase in recurrent CHD events in patients with pre-existing CHD (19 studies) (Chida & Steptoe, 2009). Intervention studies have shown that a decrease in levels of hostility leads to an increase in HRQoL among individuals after an acute heart attack and after cardiac surgery (Shen et al., 2006). However, the mechanisms that link hostility and HRQoL, or more in general, health in CHD patients are not clear (Ormish et al., 1998). Such a possible mechanism linking hostility and CHD outcomes may be psychosocial characteristics related to coping (Shen et al., 2006). Other possible links between hostility and CHD outcomes are poor health-related behaviours and the sympathetic nervous system (Whooley & Wong, 2011).

Anxiety

Anxiety includes a large spectrum of conditions varying from psychiatric diagnoses (e.g. generalised anxiety disorder, social phobia and obsessive compulsive disorder) to sub-threshold symptoms prevalent in the general population. In most studies on the association between anxiety and CHD, anxiety symptom scales were used rather than a psychiatric diagnosis of anxiety disorder (Vacarino & Bremner, 2012). In a 37-years follow-up, the presence of anxiety according to the International Classification of Diseases was associated with more than twice the risk of CHD and of acute heart infarction (Janszky et al., 2010). Several mechanisms have been hypothesised to explain the association between anxiety and CHD. Anxiety has been shown to be associated with the progression of atherosclerosis, decreased heart variability and an increased risk of ventricular arrhythmias (for a review; see Roest et al., 2010).

1.4 Roma ethnicity and coronary heart disease

Roma form the largest ethnic minority in the European Union (EU), and it is estimated that 5 to 10 million Roma currently live in the EU (McKee et al., 2004; European Parliament resolution, 2008). The highest concentrations of Roma in Europe are in Romania, Bulgaria, Hungary and the Czech and Slovak Republics. In the Slovak Republic Roma are considered as being the second largest minority group and represent 8% of the total population of the country (Marcincin & Marcincinova, 2009). Previous studies found that Roma ethnicity is associated with worse health, including CHD, when compared with non-Roma (Nozdrovicky, 1991; Vozarova de Courten et al., 2010; Sudzinova et al., 2013; Babinska et al., 2013), but evidence on possible pathways is very limited.

One of the possible pathways linking Roma ethnicity and poor CHD outcomes may be the low SES of Roma in regard to low levels of education, employment and high levels of poor living conditions

(UNDP, 2005). Yet, recent evidence shows that the poor health of Roma cannot be fully explained by socioeconomic factors (Babinska et al., 2013) and that ethnicity also constitutes more than just SES (Reijneveld, 2010). Another possible explanation for the higher prevalence of CHD in the Roma population may be the higher prevalence of unfavourable health-related behaviours in this population, such as the high consumption of animal fat, low consumption of fruits and vegetables, obesity and the high prevalence of smoking (Kosa et al., 2007; Sudzinova et al., 2013; Babinska et al., 2013). Lastly, the increased risk and poorer prognosis of CHD in Roma may be explained by psychological pathways (Kosa et al., 2007; Skodova et al., 2010). Only a few studies have assessed psychological factors in Roma CHD patients, but these studies indicate that Roma ethnicity is associated with lower mental as well as physical HRQoL (Kosa et al., 2007; Skodova et al., 2010) and higher hostility (Skodova et al., 2010). Furthermore, there is evidence that Roma are more frequently anxious or have more severe symptoms of anxiety than non-Roma (Parry et al., 2007; Peters et al., 2009; Carrasco-Garrido et al., 2010). Evidence regarding SOC in Roma is lacking, but SOC is known to vary between ethnic groups (Bayard-Burfield et al., 2001; Glanz et al., 2005). Based on the evidence that difficult life circumstances may decrease one's SOC (Geyer, 1997) it is plausible to expect that Roma ethnicity may be associated with lower SOC, since Roma are often exposed to environmental stress factors, such as racism and discrimination, poor SES and limited employment opportunities.

1. 5 Aims of the study and research questions

The general aim of this study was to explore the specific role of SOC in CHD patients. A further aim of this thesis was to examine whether SOC and other psychological factors are other possible psychosocial pathways explaining ethnic differences in the recurrence of CHD. The model of the relationships examined within this thesis is presented in Figure 1.1.

Based on previous literature and the theoretical background five main research questions were formulated.

Research question 1:

Is SOC prospectively associated with health-related behaviours among patients with CHD? (Chapter 3)

Research question 2:

Is SOC prospectively associated with mental and physical HRQoL among patients with CHD? (Chapter 4)

Research question 3:

Does SOC affect the association between hostility and mental and physical HRQoL among patients with CHD? (Chapter 5)

Research question 4:

Is there an association between Roma ethnicity and mental and physical HRQoL among patients with CHD? Does hostility affect this association? (Chapter 6)

Research question 5:

Is Roma ethnicity associated with lower SOC and higher levels of anxiety among patients with CHD? (Chapter 7)

1.6 Outline of the thesis

This thesis is divided into eight chapters.

Chapter 1 provides a general introduction to the associations between the key theoretical constructs of the thesis: SOC, health-related behaviours (smoking, diet, alcohol consumption, and exercise), HRQoL, hostility, anxiety and ethnicity (Roma/non-Roma). It also introduces the conceptual framework and research questions.

Chapter 2 provides information about the design of the study. It describes data collection and the study samples used in the thesis. Furthermore, it provides a short description of the measures and analysis used.

Chapter 3 explores the association between SOC at baseline and the health-related behaviours (smoking status, nutrition behaviour, physical exercise and alcohol consumption) of CHD patients 12-28 months after they had undergone different cardiac treatments.

Chapter 4 determines whether SOC at baseline predicts HRQoL at 12-28 months follow-up among patients with CHD when controlled for sociodemographic and medical variables.

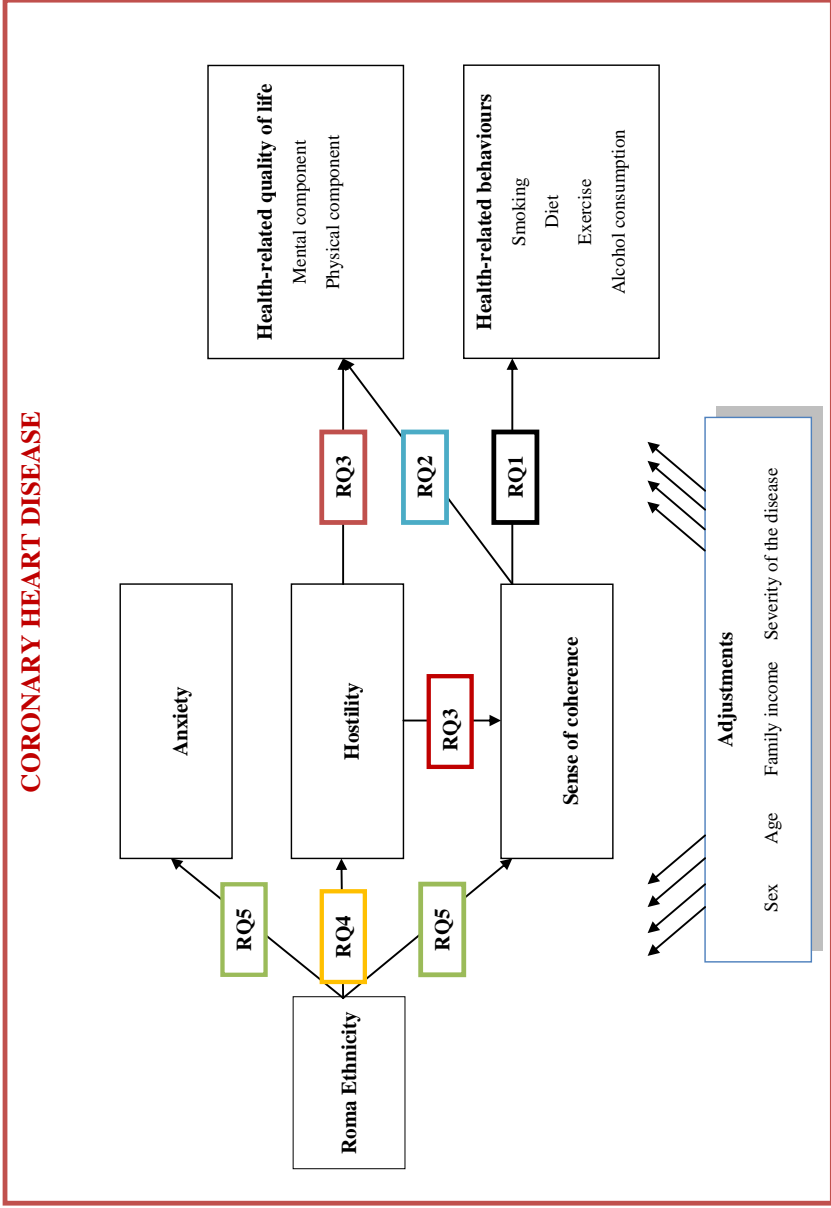
Chapter 5 explores the association between hostility and mental and physical HRQoL among CHD patients, and whether these associations are mediated by SOC.

Chapter 6 provides differences in HRQoL between Roma and non-Roma CHD patients, and whether differences in hostility contribute to this association.

Chapter 7 explores differences in the severity of anxiety symptoms and in SOC between Roma and non-Roma CHD patients, crude and adjusted for age, sex, functional status and SES.

Chapter 8 presents the main findings of this thesis as well as its strengths and limitations and its implications for practice and further.

Figure 1.1 Model of the relationships examined in the thesis



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