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**Anxiety and Sense of Coherence in Roma and non-Roma coronary heart
disease patients**

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Abstract

Aims: Morbidity and mortality among Roma due to CHD is high, but evidence on potential psychosocial pathways is lacking. This study aimed to assess 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.

Methods: We examined 607 CHD patients (mean age 58.0 ± 7.4 , 28.7% female) scheduled for CAG, 98 (16.1%) of whom were Roma. Anxiety symptoms were measured using the HADS and SOC using the 13-item OLQ. Data were analysed using hierarchical regression.

Results: Roma ethnicity was associated with more severe anxiety ($B=1.89$; [95%-CI=0.79; 2.98]) adjusted for age, sex, functional status and SES. Roma ethnicity was also associated with lower SOC ($B=-4.77$; [95%-CI=-7.85; -1.68]) adjusted for age, sex and functional status. The latter association lost statistical significance after adjustment for SES.

Conclusion: Roma ethnicity is associated with more anxiety symptoms and lower SOC among CHD patients. Our findings indicate that Roma CHD patients have a worse position regarding psychosocial factors that increase mortality and thus require additional attention.

Keywords:

anxiety, coronary heart disease, sense of coherence, Roma ethnicity

Introduction

CHD remains the leading cause of premature morbidity and mortality in most industrialised countries (Lichtman et al., 2008). Besides traditional risk factors, such as older age, male sex, smoking and abnormal lipids (Albus, 2010), psychological factors have also been shown to predict adverse CHD outcomes (Smith & Blumenthal, 2011). Regarding CHD, Roma seem to be at increased risk and have a poorer prognosis (Nozdrovicky, 1991; Vozarova de Courten et al., 2003), but evidence on possible psychosocial pathways explaining why is very limited (Kosa et al., 2007; Skodova et al., 2010). Roma form the largest ethnic minority in the EU (McKee et al., 2004) and represent a vulnerable group regarding CHD due to their low SES and unfavourable health-related behaviours (Kosa et al., 2007).

Anxiety has been shown to be an important risk factor for myocardial infarction (Janszky et al., 2010; Scherrer et al., 2010), CHD morbidity and mortality (Roest et al., 2010a, 2010b) and worsening of CHD (Herring et al., 2010); it may also explain some of the ethnic differences in CHD prognosis. 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., 2010b). 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).

SOC is another factor that may explain some of the increased CHD risk and poorer prognosis among Roma. A pronounced SOC enables a person to react to demands with flexibility and to activate the appropriate resources for specific situations (Antonovsky, 1979, 1987). Previous research has shown a link between a strong SOC and reduced CHD mortality (Surtees et al., 2003; Wainwright et al., 2008). Additionally, a stronger SOC has been shown to be associated with better HRQoL in various populations of CHD patients (Motzer & Stewart 1996; Guldvog, 1999; Karlsson et al., 2000; Kattainen et al., 2006; Silarova et al., 2012), with better functional status (Silarova et al., 2011) and with favourable health-related behaviours (Gerber et al., 2011). Evidence regarding SOC in Roma is lacking, but SOC is known to vary between ethnic groups (Glanz et al., 2005; Bayard-Burfield et al., 2001).

Since evidence on the levels of anxiety and SOC is lacking for Roma CHD patients, the aim of the present study was to assess differences in anxiety and SOC between Roma and non-Roma patients. We hypothesised that Roma patients would have higher levels of anxiety and lower levels of SOC when compared with non-Roma CHD patients, crude and adjusted for potentially confounding sociodemographic and medical variables, such as gender, sex, functional status and SES (Skodova et al., 2010; Smith & Blumenthal, 2011).

Methods

Sample and procedure

The study sample consisted of patients who had been referred by their cardiologist for CAG in accordance with the European Society of Cardiology guidelines (The Task Force on the Management of Stable Angina Pectoris of the European Society of Cardiology, 2006), and who had an abnormal CAG. The study was conducted at the East Slovakian Institute for Cardiac and Vascular Diseases in Kosice, Slovakia, where patients from the whole East Slovakian region (about 1.5 million inhabitants) are referred to for diagnosis and treatment. Patients were enrolled in the study between November 2004 and December 2012. The inclusion criteria were being referred for CAG and age less than 75 years. Exclusion criteria were a diagnosis of severe cognitive impairments in the medical history, diagnosed psychiatric disorders in the medical history, cardiovascular problems other than CHD (e. g. valve disease), normal CAG and a serious co-morbidity (such as malign tumours and nervous system diseases) (Silarova et al., 2012). Data collection consisted of an interview conducted by a psychologist or trained research assistant with each participant during hospitalisation for the CAG in order to obtain information about sociodemographic characteristics. Medical data were retrieved from medical records, and the day before the CAG patients also completed self-administered questionnaires on anxiety and SOC.

Between November 2004 and December 2012 approximately 5000 patients scheduled to undergo CAG satisfied the inclusion criteria for this study. We randomly selected 876 of them as potential participants after pre-stratification by SES (measured by educational level: low, medium, high) to obtain equal numbers of these categories per stratum. Subsequently, 35 patients refused to participate (4%), and 234 (27.8%) patients were excluded due to having normal CAG. Thus, the sample consisted of 607 patients: 433 males (71.3%) and 174 females (28.7%), with ages ranging from 32 to 75 years (mean=58.0; SD=7.4) (Table 7. 1).

The study was approved by the Ethics Committee of the East Slovakian Institute for Cardiac and Vascular Disease in Kosice in November 2004. All participants were provided with information about the study and signed an informed consent statement prior to the study. Participation in the study was fully voluntary and anonymous, with no incentives provided for participation.

Measures

Roma ethnicity was determined based on identification by the interviewed patient and by a member of research team. In the case of a mismatch (2% of the cases) the opinion of a third person (the head nurse) was decisive. No alternative was available, since recording information about ethnicity in personal documentation (e.g. passport, ID card) is not permitted in Slovakia.

Anxiety was assessed using the anxiety subscale of the 14-item HADS (Zigmond & Snaith, 1983). The HADS is a self-assessment instrument for detecting clinically significant depression and anxiety in patients attending outpatient medical clinics. The time frame refers to the patient's mood during the past week. The HADS contains 14 items, 7 of which are related to depression and 7 to anxiety. All items have 4 response categories, ranging from 0 (not at all) to 3 (very often indeed). Negatively worded items were reverse-coded. The score ranges from 0 to 21, with a higher score representing more distress in each scale. In the present study, Cronbach's alpha for the anxiety subscale was 0.75. In previous research, the HADS anxiety subscale was used to compare, e.g. Gypsies and Travellers with the African Caribbean population, Pakistani Muslims and White residents (Peters et al., 2009; Parry et al., 2007). In the present study, all participants filled in the questionnaire in the Slovak language. If needed, assistance with filling in the questionnaire was provided to each participant by a member of the research team, independent of ethnic origin.

SOC was assessed using the 13-item OLQ (Antonovsky, 1987). The questionnaire consists of three sub-dimensions: meaningfulness (e.g., Do you have the feeling that you don't really care about what goes on around you?), comprehensibility (e.g., Do you have the feeling that you are in an unfamiliar situation and don't know what to do?) and manageability (e.g., How often do you have feelings that you're not sure you can keep under control?). Each item was rated on a 7-point scale (1=never, 7=always). Negatively-worded items were reverse-coded. The total sum score was calculated, with a higher score indicating a stronger SOC. The validity and internal consistency of the OLQ are high (Antonovsky, 1993; Eriksson & Lindstrom, 2005). In the present study, Cronbach's alpha was 0.76. The SOC questionnaire has been previously used in 33 languages in 32 countries (both Western countries and, e.g. in Thailand, China, Japan and South Africa) (Lindstrom & Eriksson, 2005). Similarly as for the HADS, all participants in the present study filled in the questionnaire in the Slovak language. If needed, assistance with filling in the questionnaire was provided to each participant by a member of the research team, independent of ethnic origin.

Severity of CHD was defined by functional status. Functional status was assessed by a cardiologist based on 2 scales: the NYHA – 4 classifications according to the New York Heart Association classification of dyspnea symptoms (Criteria Committee of the New York Heart Association, 1994), and the CCS – 4 classifications identifying the severity of chest pain according to the Canadian Cardiovascular Society (Campeau, 1976). In both scales, a higher score represents a worse functional status. In this study functional status was calculated using both scales in such a way that the worst score on either of these two scales was used to define the severity of CHD.

The *SES* of participants was measured by family income, which was evaluated at three levels: 1 - low income (lower than the 'minimum wage', i.e. under the poverty line), 2 - middle income (at least 'minimum wage' but less than double the minimum wage), and 3 - high income (twice the 'minimum

wage' or higher). 'Minimum wage' is an indicator of the financial situation which is adjusted for the income of all family members according to the Slovak Ministry of Social Affairs, Act No. 181/2012 Governmental Regulation of Minimum Wage (Slovak Ministry of Social Affairs, 2012). For example, in 2012 'minimum wage' was €194.58 per month in the case of a single adult person, €135.74 per month in case of another adult person living in the same household; and €88.82 per month in the case of a child. Thus, the cut-off for 'minimum wage' was calculated for each participant depending on the number and age of the family members.

Age was divided in this study into two groups, using the median age (58.0 years) as the cut-off point: 32-58 and 59-75.

Statistical Analysis

All of the statistical analyses were performed using the statistical software IBM SPSS 20.0 for Windows (IBM company, Chicago, Illinois, USA). As a first step, we computed baseline statistics (prevalence rates and means) for the background characteristics, and the anxiety and SOC scores regarding subjects with Roma and non-Roma ethnicity. We tested the statistical significance of differences between them by calculating χ^2 tests for categorical variables and Student's t-tests (or Mann-Whitney U-tests) for continuous variables. Next, hierarchical linear regression analyses (the enter method) were employed to examine the association between Roma ethnicity (Roma ethnicity vs. non-Roma ethnicity [reference group]; independent variable) and anxiety/SOC (both dependent variables). We used three models to explore the association between Roma ethnicity and anxiety or SOC, yielding unstandardised regression coefficients (B) and 95% CI. Model 1 tested the crude association of Roma ethnicity and the dependent variables, and Model 2 tested these associations when controlling for age, sex and functional status. Model 3 contained all variables from Model 2 plus SES.

Results

Characteristics of the sample

The sociodemographic characteristics, functional status and anxiety and SOC scores of the sample are shown by ethnicity in Table 7. 1. Roma CHD patients differed significantly from non-Roma CHD patients regarding age, family income, CCS classification, anxiety and SOC scores.

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Table 7.1 Background characteristics of the sample, overall and by ethnicity

	Total sample	Roma patients	non-Roma patients	p value^β
Total number	607 (100%)	98 (16.1%)	509 (83.9%)	
Age				
32-58	310 (51.1%)	73 (74.5%)	237 (46.6)	p=0.000
59-75	297 (48.9%)	25 (25.5%)	272 (53.4%)	
Sex				
Male	433 (71.3%)	73 (74.5%)	360 (70.7%)	p=0.54
Female	174 (28.7%)	25 (25.5%)	149 (29.3%)	
Family income				
Low	76 (12.5%)	46 (46.9%)	30 (5.9%)	p=0.000
Middle	313 (51.6%)	46 (46.9%)	267 (52.5%)	
High	187 (30.8%)	5 (5.1%)	182 (35.8%)	
NYHA classification				
Class I	161 (26.5%)	32 (32.7%)	129 (25.3%)	p=0.53
Class II	114 (18.8%)	20 (20.4%)	94 (18.5%)	
Class III	125 (20.6%)	21 (21.4%)	104 (20.4%)	
Class IV	16 (2.6%)	5 (5.1%)	11 (2.2%)	
CCS classification				
Class I	101 (16.6%)	24 (24.5%)	77 (15.1%)	p=0.02
Class II	167 (27.5%)	27 (27.6%)	140 (27.5%)	
Class III	188 (31.0%)	22 (22.4%)	166 (32.6%)	
Class IV	63 (10.4%)	16 (16.3%)	47 (9.2%)	
Functional status ^a				
Class I	66 (10.9%)	10 (10.2%)	56 (11.0%)	p=0.10
Class II	195 (32.1%)	31 (31.6%)	164 (32.2%)	
Class III	244 (40.2%)	34 (34.7%)	210 (41.3%)	
Class IV	73 (12.0%)	19 (19.4%)	54 (10.6%)	
Anxiety				
Mean (±SD)	7.56 (±3.86)	9.4 (±3.94)	7.29 (±3.77)	p=0.000
Range	0.0-20.0	0-20	0-18	
Sense of Coherence				
Mean (±SD)	64.32 (±11.33)	59.93 (±12.73)	64.96 (±10.99)	p=0.001
Range	30-91	38-91	30-91	

NYHA- New York Heart Association classification, CCS – Canadian Cardiovascular Society classification

Note: The percentage of missing values for each variable were: sex 0%; age 0%; Family income 5.1%; NYHA 31.5%; CCS 14.5%; functional status 4.8%; Anxiety 16.14%; Sense of Coherence 20.4%

^aFunctional status is calculated using the NYHA and CCS classifications in such a way that the worst score on either of these two scales was used to define the severity of coronary heart disease.

^βp values represent the statistical significance of differences between Roma and non-Roma by calculating χ^2 tests for categorical variables and Student's t-test (or Mann-Whitney U-tests) for continuous variables.

Associations of Roma ethnicity with anxiety and SOC

Table 7. 2 shows that Roma ethnicity was associated with the anxiety scores when not adjusted for possible confounding sociodemographic variables and functional status (Model 1) and explained 18% of the variance in anxiety. Adding sex, age, functional status (Model 2) and family income (Model 3) did not affect the association between Roma ethnicity and anxiety. After these adjustments, Roma ethnicity explained 16% of the variance in anxiety.

Regarding SOC, Roma ethnicity was associated with lower SOC, crude (Model 1) and when adjusted for sex, age and functional status (Model 2), and in both models Roma ethnicity explained 14% of the variance in SOC. This association lost statistical significance ($p=0.059$) when additionally adjusted for SES, though differences by ethnicity remained relatively large. After these adjustments, Roma ethnicity explained 9% of the variance in SOC (Model 3).

Table 7.2 Associations of Roma ethnicity with anxiety symptoms and Sense of Coherence: unstandardised regression coefficients (B) and 95% confidence intervals (CI), crude and after inclusion of covariates

	Model 1	Model 2	Model 3
Anxiety^a (n=509)	B (95% CI)	B (95% CI)	B (95% CI)
Ethnicity (Roma vs. non-Roma)	2.11 (1.12, 3.10)**	2.09 (1.09, 3.09)**	1.89 (0.79, 2.98)**
Sex (female vs. male)		1.52 (0.77, 2.28)***	1.51 (0.75, 2.26)***
Age (59-73 vs. 32-58)		-0.42 (-1.10, 0.26)	-0.37 (-1.06, 0.33)
Functional status			
class I (vs. IV)		-0.81 (-2.08, 0.47)	-0.82 (-2.10, 0.46)
class II (vs. IV)		-0.15 (-1.10, 0.90)	-0.15 (-1.16, 0.86)
class III (vs. IV)		0.59 (-0.38, 1.60)	0.56 (-0.42, 1.53)
Family income			
low (vs. high)			0.56 (-0.69, 1.81)
middle (vs. high)			0.18 (-0.54, 0.89)
R ² anxiety	0.03	0.08	0.08
Significance of model change	***	***	ns
Sense of Coherence^a (n=483)	B (95% CI)	B (95% CI)	B (95% CI)
Ethnicity (Roma vs. non-Roma)	-5.03 (-8.05, -2.01)**	-4.77 (-7.85, -1.68)**	-3.19 (-6.51, 0.12)
Sex (female vs. male)		-2.74 (-5.05, -0.42)*	-2.19 (-4.48, 0.11)
Age (59-73 vs. 32-58)		1.18 (-0.90, 3.26)	1.08 (-1.01, 3.17)
Functional status			
class I (vs. IV)		3.28 (-0.74, 7.30)	3.18 (-0.78, 7.14)
class II (vs. IV)		0.66 (-2.35, 3.67)	1.37 (-1.61, 4.35)
class III (vs. IV)		-0.45 (-3.38, 2.47)	0.29 (-2.62, 3.20)
Family income			
low (vs. high)			-4.68 (-8.45, -0.91)*
middle (vs. high)			-4.44 (-6.60, -2.27)***
R ² anxiety	0.02	0.04	0.07
Significance of model change	**	*	***

R² change in anxiety: Model 1:0.03; Model 2: 0.05; Model 3: 0.001; R² change in SOC: Model 1:0.02; Model 2: 0.02; Model 3: 0.03
^ap<0.05, ^bp<0.01, ^cp<0.001, ns – not significant. α- higher scores indicate more anxiety and better SOC

Discussion

The aim of this study was to assess differences in anxiety and SOC between Roma and non-Roma CHD patients. The most important finding was that Roma CHD patients had more anxiety symptoms and lower SOC than non-Roma CHD patients, crude and when adjusted for age, sex and functional status. Additionally, we found that part of the ethnic differences can be explained by SES, in particular regarding SOC.

Our finding that Roma cardiac patients have more anxiety symptoms than non-Roma CHD patients complements previous findings on ethnic differences (Parry et al., 2007; Peters et al., 2009; Carrasco-Garrido et al., 2010; Vorvolakos et al., 2012), but now with a particular focus on CHD patients. Furthermore, as our study indicates, the association of Roma ethnicity with more anxiety symptoms was still present after adjustment for potential confounding factors, including SES. Thus, Roma patients having more anxiety symptoms cannot be explained by socioeconomic factors. Other factors that contribute may be the experiencing of higher levels of stress due to poor living conditions, unemployment, discrimination and exclusion, as well as the cultural distance that Roma experience towards the society they live in (UNDP, 2005; Kouivula et al., 2010).

Another interesting and novel finding of this study is that Roma ethnicity is associated with lower SOC when adjusted for age, sex and functional status among CHD patients. Some studies (Bayard-Burfield et al., 2001; Glanz et al., 2005) previously found that the levels of SOC are lower among ethnic minorities, but none has focused on Roma. According to Geyer (1997), difficult life circumstances may decrease one's SOC. Indeed, chronic exposure to environmental stress factors, such as racism and discrimination, poor SES and limited employment opportunities, negatively influence one's coping responses (Anderson & Armstead, 1995). These phenomena are all observed among Roma rather frequently. As SOC represents the basis for successful coping with stressors, our study indicates that ethnic differences in coping styles may be understood using a conceptual model, such as SOC. To be more specific, as advocated by Antonovsky (1987), individuals with high SOC should have more adaptive and appropriate reactions to situations, more successful coping efforts and experience less affective impairment of their coping behaviour. Thus, if SOC is strongly developed, successful coping can be expected as its consequence.

In our study, family income explained 19% of the variance in SOC and partly explained the association between Roma ethnicity and SOC. Thus, the association of income with SOC may explain a part of the SES inequalities in CHD prognosis (Skodova et al., 2008). In previous studies, the relationship between SOC and SES has been shown to vary by measure of SES (Dudek & Makowska,

1993; Hood et al., 1996; Larsson & Kallenberg, 1996; Lundberg, 1997), with low income showing a rather strong relationship with weak SOC.

Strengths and limitations

Our study has several strengths, i.e. a sample covering the full range of CHD patients referred for CAG and a high response rate (95.7%), with a significant share of Roma (16.1% of our sample). However, in interpreting our data one has to consider certain limitations. First, we obtained data from just one center. However, this center is the only one that provides cardiac care in the East Slovakian region, a region that is home to most Slovakian Roma. A second limitation may be information bias due to a lack of cross-cultural validity of our questions. However, we used cross-culturally valid measures for the central variables (Lindstrom & Eriksson, 2005; Peters et al., 2009), making information bias less likely. Lastly, the more anxiety symptoms and lower SOC in the Roma population may be due to other factors not measured in this study. We cannot exclude this, but we controlled for age, sex, functional status and SES as the most important predictors of both anxiety and SOC.

Implications

We found that Roma ethnicity was associated with more anxiety symptoms and lower SOC in CHD patients, crude and also after adjustment for age, sex and functional status. Our study is the first in this regard, implying that our findings should be confirmed by future research. If such research does confirm our findings in different Roma cardiac populations, then studies should focus on pathways that explain the higher frequency of anxiety symptoms and lower SOC in Roma CHD patients and the role of SES in both pathways. Pathways may concern mediation or moderation by behavioural characteristics such as physical inactivity or non-adherence to prescribed medication. Lastly, as we are the first to report on the levels of SOC in a Roma population, further research should focus on the validity of the SOC questionnaire in this ethnic group.

Our study provides two routes for improving the prognosis of Roma CHD patients, i.e. by decreasing anxiety and increasing SOC. A significant decrease in anxiety may be achieved by cognitive-behavioral therapy (Janeway, 2009), exercise programmes (Herring et al., 2010; Sardinha et al., 2012) and the use of anti-anxiety medication (Albus, 2010). SOC may be increased by improving one or more of the three core components of SOC – i.e. comprehension, manageability and meaningfulness – using evidence-based psychosocial interventions (Wiessbecker et al., 2002; Lee & Garvin, 2003; Kattainen et al., 2006; Langeland et al., 2006; Forsberg et al., 2010).

Conclusion

Our study shows that Roma ethnicity is associated with more severe anxiety and lower SOC in CHD patients compared with non-Roma. Furthermore, the results of the present study indicate that the lower levels of SOC in Roma cardiac patients can be substantially explained by the low SES of the Roma participants.

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