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

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**Differences in health-related quality of life between Roma and non-Roma
coronary heart disease patients: the role of hostility**

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Abstract

Aims: The aim of this study was to assess differences in HRQoL between Roma and non-Roma CHD patients, and whether differences in hostility contribute to this association.

Methods: We examined 570 CHD patients (mean age 57.8, 28.1 % female) scheduled for CAG, 88 (15.4 %) of whom were Roma. Hostility was measured using the 27-item CMHS and HRQoL using the SF-36, from which MCS and PCS were calculated. The relationship between ethnicity, hostility and HRQoL was examined using regression analyses.

Results: Roma ethnicity was associated with poorer MCS (B =-3.44; [95 % CI =-6.76; -0.13] and poorer PCS (B =-4.16; [95 % CI =-7.55; -0.78]) when controlled for age, gender and SES. Adding hostility to the model weakened the strength of the association between Roma ethnicity and MCS (B =-1.87; [95 % CI =-5.08; 1.35]) but not between Roma ethnicity and PCS (B =-4.07; [95 % CI =-7.50; -0.64]).

Conclusion: Roma ethnicity is associated with poorer MCS and PCS. Hostility may mediate the association between Roma ethnicity and MCS. The poorer HRQoL of Roma CHD patients requires attention in both care and research, with special attention on the role of hostility.

Keywords:

coronary heart disease, ethnic groups, health-related quality of life, hostility, Roma

Introduction

Ethnic inequalities in health and their reduction are among the continuing priorities in public health policy and research. Regarding ethnic groups, Roma—mostly living in Romania, Bulgaria, Hungary and the Czech and Slovak Republics—form the largest ethnic minority in the EU (McKee et al. 2004). An estimated 5 to 10 million Roma currently live in the EU (European Parliament Resolution of 31 January 2008). Roma represent a vulnerable group due to their low SES in regard to low levels of both education and employment; furthermore, they suffer from poor living conditions, discrimination, exclusion, as well as difficulties in accessing health care services (UNDP, 2005). All of the above factors contribute to the poor health of Roma (Kosa et al., 2007), yet recent evidence shows that the poor health of Roma cannot be fully explained by socioeconomic factors (Rosicova et al., 2011).

In recent years, research on Roma has shifted from communicable diseases (Hajioff & McKee, 2000) to noncommunicable diseases and the associated risk factors (Sudzina et al., 2013). The few studies conducted in this area showed that CHD may be the most common cause of mortality and morbidity among Roma (Babinska et al., 2013) and that this may be related to unfavorable health-related behaviors such as high consumption of animal fat, low consumption of fruit and vegetables, obesity and the high prevalence of smoking (Kosa et al., 2007).

In CHD research, HRQoL is an important outcome in both research and clinical practice (Weintraub et al., 2008). However, only a few studies have assessed the impact of ethnicity on HRQoL in CHD (Kosa et al., 2007; Skodova et al., 2010), and these indicate that Roma ethnicity is associated with lower mental as well as physical HRQoL. However, based on evidence related to other patient groups it seems that this association could be explained via hostility.

Hostility, among many psychosocial factors, has been widely studied regarding its role in the etiology and prognosis of CHD (Tindle et al., 2010; Albus, 2010; Low et al., 2010; Chida & Steptoe, 2009). Intervention studies have demonstrated that reducing hostility among CHD patients increases HRQoL (Ornish et al., 1998). Furthermore, it has been hypothesized that hostility may be influenced by ethnic origin and can be seen as an adaptive coping response to the experiencing of discrimination (Skodova et al., 2010; Anderson & Armstead, 1995).

Since evidence on HRQoL and its determinants is scarce for Roma CHD patients, the aims of the present study were to assess differences in HRQoL between Roma and non-Roma patients and to determine whether differences in hostility contribute to this association. To be more specific, we hypothesized that the relationship between Roma ethnicity and HRQoL would be mediated by hostility, crude and adjusted for potentially confounding sociodemographic variables such as gender, age and SES.

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 June 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 tumors and nervous system diseases).

Data collection consisted of an interview conducted by a psychologist or trained research assistant with each participant during hospitalization for the CAG to obtain information about sociodemographic characteristics. Medical data were retrieved from the medical records, and the day before the CAG patients also completed self-administered questionnaires on hostility and HRQoL. The type of therapeutic intervention following the CAG—PCI, CABG or pharmaceutical treatment—was determined by cardiologists based on the results of CAG independently of participation in this study.

Between November 2004 and June 2012 approximately 4,000 patients scheduled to undergo CAG, mostly living in eastern Slovakia, satisfied the inclusion criteria for this study. Out of these, we randomly selected 793 potential participants after pre-stratification by SES (measured by educational level: low, medium, high) to obtain equal numbers of these categories per stratum. Subsequently, 213 (26.9 %) patients were excluded due to having normal CAG, and 10 (1.2 %) patients refused to participate in the examination. Thus, the sample consisted of 570 patients (98.8 % response rate): 410 males (71.9 %) and 160 females (28.1 %), with ages ranging from 32 to 75 years (mean = 57.8; SD = 7.4).

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 him- or herself and by a member of research team. In the case of a mismatch (2 % of 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 against the Slovak law.

Hostility was assessed using the 27-item version of the CMHS (Cook & Medley, 1954). The questionnaire consists of three sub-dimensions: cynicism, hostile affect and aggressive responding. Cynicism items reflect beliefs; hostile affect items reflect emotional experiences; and aggressive responding items tap behavior. Each item was rated on a dichotomized scale (1 = “true”, 0 = “false”). The total sum score was calculated, with a higher score indicating a higher level of hostility. In the present study, Cronbach’s alpha was 0.71.

HRQoL was measured with the SF-36. The SF-36 scale is used internationally as a generic measure of self-reported physical and mental HRQoL (Ware et al., 1994). It consists of 36 items covering eight primary dimensions of subjective health perceptions. These include physical functioning, role limitations due to physical problems, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems and mental health. Subscale scores and summary scores (the MCS, and the PCS) were calculated using published algorithms (Ware et al., 1994), in which higher scores indicate better functioning. The algorithms included the following standardized three-step procedure. First, all eight subscale scores (range 0–100) were standardized using means and standard deviations from the general US population. Second, they were aggregated using weights from the general US population. Finally, aggregate PCS and MCS scores were standardized using a linear T-score transformation (mean 50, SD = 10). The SF-36 scale has been well tested and has been proven to have satisfactory psychometric properties and international comparability, including among cardiac patients (Failde & Ramos, 2000).

The severity of CHD was defined by functional status and the type of therapeutic intervention. Functional status was assessed by a cardiologist based on two scales: the NYHA—four classifications according to the New York Heart Association classification of dyspnea symptoms (Criteria Committee of the New York Heart Association, 1994), and the CCS—four classifications identifying the severity of chest pain according to the Canadian Cardiovascular Society (Campeau, 1976). In both scales, a higher score represents worse functional status.

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 financial situation which is adjusted for the

income of all family members according to the Slovak Ministry of Social Affairs, Act No. 252/2009 Governmental Regulation of Minimum Wage (Slovak Ministry of Social Affairs. Act No. 252/2009).

Age was divided in this study into two groups, using the median age (58.0 years) as the cut-off point: 39–58 and 59–75.

Statistical analysis

All the statistical analyses were performed using the statistical software IBM SPSS 18.0 for Windows. As a first step, we computed baseline statistics (prevalence rates and means) for the background characteristics, and the CMHS, MCS and PCS scores. Next, three hierarchical regression analyses were performed to test whether the level of hostility mediates the relationship between Roma ethnicity and MCS and PCS. Model 1 tested the crude effect of Roma ethnicity on MCS and PCS, and Model 2 tested the effect of Roma ethnicity when controlling for gender, age and SES. In Model 3 hostility was added as a mediator. In addition, the association between Roma ethnicity and hostility was tested using hierarchical regression analyses. According to Baron and Kenny (1986), the following conditions must be met to establish mediation: the independent variable (Roma ethnicity) must be shown to affect the dependent variable (MCS, PCS); secondly, the independent variable must affect the mediator (hostility); and lastly the mediator must affect the dependent variable. When these conditions were met, the indirect effect of Roma ethnicity on the MCS and PCS via hostility was tested using the Sobel test (Aroian version) (Baron & Kenny, 1986).

Results

The study sample concerned 88 Roma (15.4 %) and 482 non-Roma (84.6 %). The majority of CHD patients was treated either with PCI (212; 37.2 %) or pharmacotherapy (183; 32.1 %). Other background characteristics and scores on CMHS, MCS and PCS are presented in Table 6. 1.

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Table 6.1 Background characteristics of the sample

Variable	Total sample	Roma	non-Roma
Total number	570 (100%)	88 (15.4%)	482 (84.6%)
Gender			
Male	410 (71.9%)	64 (72.7%)	346 (71.8%)
Female	160 (28.1%)	24 (27.3%)	136 (28.2%)
Age			
32-58	296 (51.9%)	64 (72.7%)	232 (48.1%)
59-75	274 (48.1%)	24 (27.3%)	250 (51.9%)
SES			
Low	69 (12.1%)	40 (45.5%)	29 (6.0%)
Middle	300 (52.6%)	42 (47.7%)	258 (53.5%)
High	172 (30.2%)	5 (5.7%)	167 (34.6%)
NYHA			
Class I	146 (25.6%)	26 (29.5%)	120 (24.9%)
Class II	107 (18.8%)	16 (18.2%)	91 (18.9%)
Class III	110 (19.3%)	20 (22.7%)	90 (18.7%)
Class IV	14 (2.5%)	4 (4.5%)	10 (2.1%)
CCS			
Class I	94 (16.5%)	21 (23.9%)	73 (15.1%)
Class II	158 (27.7%)	24 (27.3%)	134 (27.8%)
Class III	180 (31.6%)	21 (23.9%)	159 (33.0%)
Class IV	49 (8.6%)	12 (13.6%)	37 (7.7%)
Type of intervention			
Pharmacotherapy	183 (32.1%)	34 (38.6%)	149 (30.9%)
PCI	212 (37.2%)	29 (33.0%)	183 (38.0%)
CABG	175 (30.7%)	25 (28.4%)	150 (31.1%)
Hostility (CMHS)	14.8 (4-26)	16.7 (10-23)	14.5 (4-26)
HRQoL at baseline			
Mental Component Summary (SF36)	46.8 (16.7-92.4)	42.1 (25.5-60.3)	47.4 (16.7-92.4)
Physical Component Summary (SF36)	35.8 (0.7-60.4)	31.9 (16.8-52.4)	36.4 (0.7-60.4)

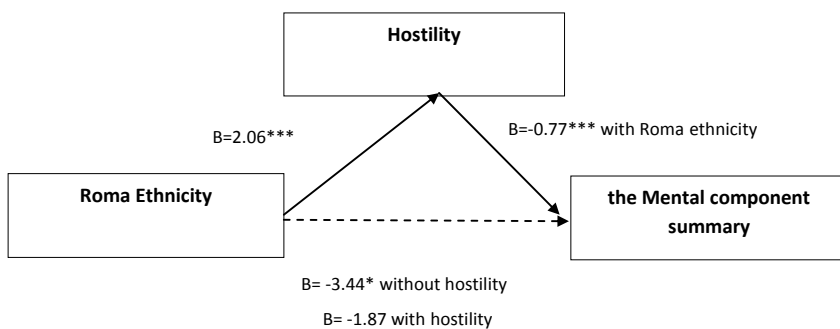
NYHA- New York Heart Association classification, CCS – Canadian Cardiovascular Society classification, PCI – percutaneous coronary intervention, CABG – coronary-artery bypass grafting

Note: The missing cases for each variable are as follows: ethnicity 0%; gender 0%; age 0%; SES 5.1%; NYHA 33.9%; CCS 15.6%; Type of intervention 0%; Hostility 28.6%; mental and physical component summary of SF36 15.6%

Figure 6. 1 and Table 6. 2 show that Roma ethnicity was a significant predictor of lower MCS and PCS scores crude (Model 1) and adjusted for age, gender and SES (Model 2) when compared with non-Roma. Roma ethnicity was significantly associated with higher levels of hostility, crude ($B = 2.17$; [95 % CI = 1.03; 3.31]) and adjusted for gender, age and SES ($B = 2.06$; [95 % CI = 0.81; 3.32]) when compared with non-Roma. In addition, hostility was a significant predictor of lower MCS and weakened the relationship between Roma ethnicity and MCS (Model 3). Hostility was not a significant predictor of PCS scores (Model 3).

The Sobel test (2.37 ; $p < 0.05$) confirmed a statistically significant indirect effect of Roma ethnicity on MCS via hostility. The proportion-mediated method showed that the effect of Roma ethnicity on MCS was explained for 46 % via hostility and for 54 % by Roma ethnicity itself.

Figure 6.1 Hostility as a mediator between Roma ethnicity and the Mental component summary



Note: all associations are adjusted for gender, age and socioeconomic status

Table 6.2 Hierarchical multiple regression analyses to examine whether Hostility mediates the relationship between Ethnicity and Mental Component Summary/Physical Component Summary, Slovakia, 2012

	Model 1		Model 2		Model 3	
Mental Component Summary	n= 362, B (95% CI)	snc	n= 362, B (95% CI)	snc	n= 362, B (95% CI)	snc
Ethnicity (Roma vs. non-Roma ^a)	-4.89 (-8.00, -1.79)**	**	-3.44 (-6.76, -0.13)*	**	-1.87 (-5.08, 1.35)	***
Hostility ^b					-0.77 (-1.02, -0.52)***	
Physical Component Summary	n= 362, B (95% CI)	snc	n= 362, B (95% CI)	snc	n= 362, B (95% CI)	snc
Ethnicity (Roma vs. non-Roma ^b)	-4.60 (-7.82, -1.37)**	**	-4.16 (-7.55, -0.78)*	***	-4.07 (-7.50, -0.64)*	
Hostility					-0.05 (-0.31, 0.22)	

Model 1: crude; Model 2 adjusted for age, gender and SES; Model 3 adjusted for age, gender, SES and hostility
R² in Mental Component Summary: Model 1:0.02; Model 2: 0.06; Model 3: 0.15; R² in Physical Component Summary: Model 1:0.02; Model 2: 0.09; Model 3: 0.09;
R² change in Mental Component Summary: Model 1:0.02; Model 2: 0.04; Model 3: 0.08; R² change in Physical Component Summary: Model 1:0.02; Model 2: 0.08; Model 3: 0.00

*p<0.05, **p<0.01, ***p<0.001;

a- reference category; b – Sobel test: 2.37; p<0.05

snc – Significance of model change for the added variable(s); Improvement of fit of the model due to the addition of the variable concerned the F change test

Discussion

The central purpose of this study was to assess differences in HRQoL between Roma and non-Roma CHD patients and whether differences in hostility contribute to these differences. The most important finding was that Roma CHD patients had a worse mental and physical HRQoL, and higher levels of hostility than non-Roma CHD patients, crude and also after adjustment for sociodemographic characteristics. In addition, hostility was associated with a worse MCS but not with the PCS. Lastly, our results indicate that the association between Roma ethnicity and MCS is mediated via hostility. Thus the present study may add knowledge to the understanding of possible pathways leading to ethnic differences in MCS.

Our finding that Roma ethnicity was associated with worse HRQoL is in line with previous studies (Skodova et al., 2010) and indicates that Roma CHD patients are at higher risk of poor HRQoL. In addition, the results of the present study indicate that only a part of the ethnic differences in HRQoL can be explained by SES. To be more specific, when we added SES measured by family income into our models, Roma ethnicity remained a significant predictor of both mental and physical HRQoL. Since poor HRQoL is independently associated with a higher cardiac and total mortality (Schenkeveld et al., 2010) and more frequent hospitalization among cardiac patients (Konstam et al., 1996), our findings may indicate that health inequalities exist between Roma and non-Roma.

Our finding that Roma are at higher risk of having higher levels of hostility is in line with previous research (Skodova et al., 2010) and may reflect their marginal position in society. Brondolo et al. (2005) showed that individuals exposed to ethnicity-based social exclusion confronted others more often and expressed their feelings aggressively more often. Our study shows that mean levels of hostility are indeed higher among Roma. Given the fact that adult levels of hostility are partly shaped by childhood environmental circumstances (Nabi et al., 2010), this may easily be due to experiences of discrimination over the life course (Brondolo et al., 2011).

Interestingly, in our study hostility was a predictor only of worse MCS in Roma and non-Roma patients and not of worse PCS. The association of Roma ethnicity with PCS is thus not mediated by hostility, which leaves the role of other mediating factors to be determined. Candidates for this role may be, e.g., access to health care, living conditions or discrimination experienced by this ethnic group. Further exploration of the determinants of PCS in cardiac patients is needed both among ethnic minorities and among the majority population.

Perhaps the most important finding from this study is that hostility mediated the relationship between Roma ethnicity and MCS. Roma ethnicity was associated with higher levels of hostility, which in turn was associated with lower MCS even when including SES. Similarly, studies by Williams (1998) and Kawachi et al. (1997) indicated that hostility may be linked to health inequalities as a mediator. The possible mechanism explaining the mediation role of hostility between Roma

ethnicity and mental HRQoL may be the experience of racism and discrimination. As reported in EU-MIDIS (2009), Roma (in the Czech Republic), indeed experience the worst discrimination in general out of 45 specific groups surveyed. As already discussed in this study and supported by the evidence, chronic exposure to environmental stress factors such as racism and discrimination may influence one's personality and coping strategies including hostility (Anderson & Armstead, 1995). In addition, the exposure to the racism and discrimination may strengthen the exposure to negative interpersonal interactions and the belief that one's efforts to change one's beliefs are likely to be ineffective (e.g., cynicism, Brondolo et al., 2008). In turn, both negative interpersonal interactions as well as cynicism were associated with cardiovascular response as well as total and cancer-mortality (Brondolo et al., 2005; Albus, 2010; Tindle et al., 2009). This explanatory mechanism is supported by the studies conducted among another ethnic or minority groups. To be more specific, high levels of discrimination in the last 12 months were reported, e.g., by African immigrants in Malta, Sub-Saharan Africans in Ireland and North-Africans in Italy (EU-MIDIS, 2009). The higher levels of hostility when compared to majority population were reported in African-American women (Tindle et al., 2009) and Blacks and Latinos (Broudy et al., 2007). Thus it seems that mediating role of hostility (seen as a response to the experience of discrimination) between ethnicity and health outcomes may be applicable to another minority or ethnic groups. It seems likely that this holds for other groups experiencing discrimination as well, e.g., because of sexual orientation. If so, this would have even larger public health consequences. This apparently deserves further study.

Strengths and limitations

The strengths of this study are its high response rate at baseline (98.8 %), even with a significant share of Roma (15.4 % of our sample). However, in interpreting our data one has to consider certain limitations. One of these may be the information bias regarding self-reported hostility, due to a tendency to provide socially acceptable answers (Davidson & Hall, 1997). Secondly, the cross-sectional nature of this study does not allow conclusions about the causal relationships among Roma ethnicity, hostility and HRQoL.

Implications

The problem of ill health among the Roma was one of the priorities of public health representatives leading to the establishment of the Decade of Roma Inclusion 2005–2015 (European Commission, 2011). Identifying and understanding various predictors of CHD in Roma may strongly contribute to the realization of this priority. We found that Roma ethnicity was associated with worse HRQoL in cardiac patients and that this association was mediated via hostility. Our study is the first in this regard, implying that our findings should be confirmed by future research. Such research could also

explore the effects of high levels of hostility on HRQoL in other ethnic groups of CHD patients and use longitudinal data to identify causal relationships.

Regarding care, more attention should be paid to HRQoL among Roma and on the potential role of hostility as a modifiable target both for primary and secondary prevention of CHD (Tindle et al., 2010). Thus, clinical assessments might include a question about a patient's hostile feelings and may help to identify those with an elevated risk of onset and recurrence of CHD (Albus, 2010; Tindle et al., 2010; Low et al., 2010; Chida & Steptoe, 2009). In addition, group-based hostility-control interventions, behavioral modifications as well as stress management programmes, may be useful in decreasing risk factor levels of CHD in Roma patients and in increasing their HRQoL (Albus, 2010). To be more specific, results of controlled study (Gidron et al., 1999) indicate that eight 90-min weekly group meetings including the behavioral-hostility section, a cognitive-hostility section, an affective-hostility section and relapse prevention lead to the reduction of both self-reported and observed hostility in CHD's men. Similarly, results from randomized controlled trial indicate, that cognitive behavioral treatment of hostility based on 12-weekly individual sessions including psychoeducation, self-monitoring, cognitive therapy, behavioral therapy and relaxation and visualization have lead to the reduction of hostility levels in healthy adults (Sloan et al., 2010). As prospective studies indicate that hostility predicts the decline in the quality of social relationships over time, Roma CHD patients may benefit from the rehabilitation programs which focus on the development of social support as another important predictor of recurrence of CHD (Gallo et al., 2004). Lastly, special training courses for cardiologists exist and help health care professionals to screen and motivate patients for psychosocial treatment (Titscher et al., 2009).

Conclusion

Roma ethnicity is associated with poorer MCS and PCS of HRQoL. Furthermore, this study indicates that hostility could play an important mediating role in the association between Roma ethnicity and MCS; further confirmation is needed, however. Our findings suggest that the poorer HRQoL of Roma CHD patients require attention in both care and research, with special attention on the role of hostility. Further research should explore the effects of high levels of hostility on HRQoL across different ethnic CHD patients and use longitudinal data to identify causal relationships.

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