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The Links between Cardiovascular Risk and Psychological Wellbeing in Elderly

Laura Sapranaviciute-Zabazlajeva, Abdonas Tamosiunas, Dalia Luksiene, Dalia Virviciute

Abstract**—**The cardiovascular diseases (CVD) is the leading cause of death in the EU, especially in the middle aged and elderly population. Psychological wellbeing (PWB) has been linked with better cardiovascular health and survival in the elderly. The aim of the study is to evaluate associations between CVD risk and PWB in middle-aged and elderly population. 10,940 middle aged and older Lithuanians of age 45-74 years, were invited to participate in the study. A study sample was a random and stratified by gender and age. In 2006-2008 7,087 responders participated in the survey, so the response rate was 64.8%. A follow-up study was conducted from 2006 till 2015. New CVD cases and deaths from CVD were evaluated using the Kaunas population-based CVD register and death register of Kaunas. Study results revealed that good PWB predicts longer life in female participants (Log Rank = 13.7, $p < 0.001$). In the fully adjusted model for socio-demographic, social and CVD risk factors, hazard ratio for CVD mortality risk was lower amongst women with good PWB (HR = 0.28, 95% CI 0.11-0.72), but not significantly for men. Our study concludes, that lower CVD mortality rates is being associated with better PWB in female aged 45-74 years.

Keywords**—**Psychological wellbeing, cardiovascular disease, elderly.

I. Introduction

CVD is the leading cause of death amongst the people aged 45-74 years in Europe overall, with Lithuania being one of the highest amongst European countries [1], [2]. That the prevalence of CVD is increasing despite great advances in medical technology and treatment is paradoxical, and therefore it is necessary to find an alternative way to promote cardiovascular health and to prevent CVD [3].

Only a biopsychosocial approach to CVD and mortality may lead to changes in the current situation. Particular attention should be focused on the wellbeing of the middle-aged and elderly population. PWB and its influence on health is a novel and important scientific area. Scientists agree that maintenance of PWB is one of the most important factors in successful aging [4]. Moreover, PWB has a proven effect on CVD and mortality [5]. However, various components of PWB are differently associated with the prevalence of CVD and CVD mortality rates. It is as yet unclear how CVD risk factors are connected to PWB and how those connections are moderated by socio-demographic and social factors in the middle-aged and elderly population. So, the aim of the study is to evaluate associations between CVD risk and PWB in middle-aged and elderly population.

Laura Sapranaviciute-Zabazlajeva is with Health Psychology Department, Lithuanian University of Health Sciences, Mickeviciaus str. 9, LT44307, Kaunas, Lithuania (phone: +37037395807; fax +37037220733; email: laura.sapranaviciute@lsmuni.lt).

Abdonas Tamosiunas, Dalia Luksiene, and Dalia Virviciute are with Institute of Cardiology, Lithuanian University of Health Sciences, Sukileliu str. 15, Kaunas, Lithuania (e-mail: abdonas.tamosiunas@lsmuni.lt, dalia.luksiene@lsmuni.lt, dalia.virviciute@lsmuni.lt).

II. Methods

A. Participants

Our study presents data from the survey collected within the framework of the international project HAPIEE (Health, Alcohol and Psychosocial Factors in Eastern Europe) [6]. A random sample of 10,940 male and female citizens of the city of Kaunas, Lithuania, aged 45-74 years, and stratified by gender and age, were randomly selected from Lithuanian population register. The response rate was 64.8%, so 7,087 responders (3,218 male and 3,869 female) participated in the survey between 2006 and 2008. The study was approved by the Ethics Committee at University College London, UK, and by the Kaunas Regional Research Ethics Committee. Follow up with the study participants was conducted for the next 8 years to evaluate CVD incidence.

B. Measures

PWB was evaluated by a CASP-12 questionnaire – Control Autonomy Self-realization and Pleasure [7]. It is composed of 12 statements. Participants indicate how often (often, sometimes, not often, never) each statement applies to them. The total score ranges from 12 to 48, where a higher score represents better PWB. Participants are labeled as having a good wellbeing if theirs CASP-12 score is higher than median.

Depressive symptoms were measured using the 10-item Center for Epidemiologic Studies Depression Scale (CESD-10) [8]. Subjects were asked to evaluate the presence of 10 depressive symptoms during the past week on a two-point scale: yes or no. Each symptom was scored from 1 (yes) to 0 (no), resulting in a total score between 0 and 10. Based on prior recommendations, subjects with CESD-10 scores of 4 or more were classified as having depressive symptoms, and participants with a CESD-10 score lower than 4 as without depressive symptoms [9], [10].

The standard questionnaire included questions regarding the respondent's socio-demographic factors as age, marital status and family status, socioeconomic factors as education, working status, deprivation. Education was classified into five education levels: primary, vocational, secondary, college and university. Marital status of all study participants was divided into five groups: single, married, cohabiting, divorced and widowed. Parenthood of participants were classified as not having children, having one, two or three and more children. Working status was revealed by classifying participants into

employee, retired, retired but working, disabled, disabled but working and unemployed. Also, social indicators were classified between social activity and social participation. Social activity was evaluated by statements about participating in clubs, going to church, restaurants, theatres, sports clubs, etc. Social participation divides participants into being a member of a social organization or not being. Also questionnaire evaluated behavioral factors related to CVD health as smoking status, alcohol consumption, and physical activity, among others. Smoking habits were assessed according to the current smoking status, with respondents being classified into three groups: smokers, former smokers and never smokers. Alcohol consumption was measured by asking participants how often they drink alcohol: Every day, 2-4 times per week, once per week, 1-3 times per month, less than once per month, never. Physical activity was determined by measuring the mean time spent per week during leisure time in winter and summer for walking, moderate and hard work, gardening and other physical activities. The respondents were categorized into being physically active or not being physically active according to their physical activity in leisure time, more or less than 10 hours per week.

Objective measurements. Blood pressure was measured three times, using an oscillometric device (Omron M5-I) after two minutes' rest. The mean of three systolic and diastolic blood pressures was used. Body mass index (BMI) was calculated as weight (kg) divided by the square meters of height. Biochemical analyses were conducted for participants on an empty stomach. The concentration of glucose in capillary blood was determined by an individual glucometer "Glucotrend". Serum samples were analyzed centrally in one batch in the WHO Regional Lipid Reference Centre, Institute of Clinical and Experimental Medicine, Prague (Czech Republic). Lipid concentrations in serum were measured, using a conventional enzymatic method [11]. *Hypertension* was defined as systolic blood pressure $\geq$ 140 mm Hg and/or diastolic blood pressure $\geq$ 90 mm Hg, or normal blood pressure (< 140/90 mm Hg) if the person had taken antihypertensive drugs within the previous two weeks.

Prevalence of CVD. Coronary heart disease (CHD) was determined by: 1) documented history of myocardial infarction (MI) and (or) ischemic changes on an ECG coded by the Minnesota codes (MC) 1-1 or 1-2; 2) angina pectoris was defined by the G. Rose Questionnaire (without MI and/or MC 1-1 or 1-2; 3); ECG findings by MC 1-3, 4-1, 4-2, 4-3, 5-1, 5-2, 5-3, 6-1, 6-2, 7-1, 8-3 (without MI and/or MC 1-1, 1-2 and without angina pectoris) [12], [13]. *Stroke* was determined using the question "Has a doctor ever told you that you had a stroke?"

New CVD cases and deaths from CVD. The participants were followed up from the beginning of each baseline examination. Fatal CVD, first nonfatal MI, first definite angina, and first fatal or nonfatal stroke were tracked from 2006 to 2014 using Kaunas population based CVD register [14], [15]. Deaths of current cohort were analyzed according to the methodology of Kaunas death register [16], [17].

III. Results

From 2006 till 2014, 456 new cases of CVD were established in analyzed cohort: 81 cases of fatal CVD, 266 first nonfatal MI and definite angina, and 109 first nonfatal stroke. Till 2015, 137 deaths from CVD were established. Hazard ratios (HR) and 95% confidence intervals were calculated using *Cox* models to forecast risk of new CVD cases. Only new CVD cases were analyzed. In fully adjusted model socio-demographic factors (age, education, marital status, parenthood), socioeconomic factors (socioeconomic status, deprivation), social factors (social activity, participation in social organization), factors associated with CVD risk (BMI, low density lipoprotein cholesterol and high density lipoprotein cholesterol, glucose, smoking, alcohol consumption, physical activity) and depressive symptoms were controlled. PWB did not predict risk for new CVD cases after seven years. In full adjusted model good PWB was not associated with risk of CVD in men (HR = 0.94, 95% confidence interval (CI) 0.74-1.34) and women (HR = 0.98, 95% CI 0.72-1.34).

Till 2015, 137 deaths from CVD were established in analyzed cohort. Only persons without CVD at the baseline survey were included into analysis. Kaplan-Meier curves were used to construct probability of survival for CVD. Survival curves ascertained that survival over eight years is influenced by different PWB factors among the middle aged and elderly population according to their gender. Good PWB predicted better survival in female participants (Log Rank = 13.7, $p < 0.001$). However, PWB was not associated with better survival in male participants (Log Rank = 1.9, $p < 0.17$).

Next, HR and 95% confidence intervals using Cox model were calculated to predict CVD mortality risk. Two models were performed: first adjusted for age and the second adjusted for age, education, marital status, parenthood, working status, deprivation, social activity, participation in the social organization, smoking status, alcohol intake, physical activity, BMI, arterial hypertension, lipids and glucose level. Firstly, age adjusted HR and CI were calculated for CVD mortality risk. HR for CVD mortality risk are reduced by good PWB (HR = 0.34, 95% CI 0.17-0.69) in middle aged and elderly women controlling for age. However, it is not significant for men (HR = 0.75, 95% CI 0.49-1.14) Later, multivariate analysis was done adjusting for socio-demographic, social and CVD risk factors. In the fully adjusted model, HR for CVD mortality risk was lower amongst women with good PWB (HR = 0.28, 95% CI 0.11-0.72), but not significantly lower for men (HR = 0.66, 95% CI 0.24-1.80).

IV. Discussion

Even PWB has a proven effect on CVD and mortality, however various components of PWB are differently associated with the prevalence of CVD and CVD mortality rates [5]. Our study has also provided different PWB associations with CVD and CVD mortality.

In this study PWB did not predict risk for new CVD cases after seven years follow up. Some previous studies confirm no

links between CVD risk and PWB also [18]-[20]. However, some of the studies provide results that good PWB lowers the risk of CVD [21, 22, 23]. Links between CVD and PWB in our study might be not significant, because many factors connected with CVD was controlled. Moreover, only new CVD cases were added into analysis, which lets to forecast very specific and precise links.

Previous studies established positive PWB influence to survival [5], [24], [25]. Our survival analysis established PWB influence to CVD survival dependent on gender. Good PWB predicted better survival in female participants, but the link was not significant in male.

Similar results were ascertained in mortality analysis. Controlling for socio-demographic, social and CVD risk factors, hazard ratios for CVD mortality risk were reduced by good PWB in women, but not in men. According to our results, older women who feel happy, autonomic and fulfilling their purposes, have a lower risk to die from CVD, independently from their socio-demographic factors, health condition or depressive symptoms. ELSA study ascertained very similar findings as in our study. According to them, it cannot be stated, that PWB determines lower mortality risk, as other factors, which were not controlled in the study might affect this link [26]. However, in our study mainly factors associated with CVD mortality was controlled and some data spread cannot be explained by those factors. So we conclude that positive PWB is associated with better survival in older women. Middle aged and elderly women and their PWB should be taken into account trying to secure good CVD health.

V. Conclusion

PWB in middle aged and elderly women did not predict risk for new CVD cases. However, hazard ratios for CVD mortality risk are reduced by good PWB in women. According to results of this research, it is recommended to create preventive programs oriented to the maintenance of PWB in the middle aged and elderly population in order to reduce the CVD mortality risk. Further research should focus on the effectiveness of PWB maintenance programs. It is also important to take gender as a factor mediating the relationship between PWB and CVD.

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References

[1] Health Information Centre. Health in the Baltic Countries 2012 (21th edition). Vilnius: Sveikatos Apsaugos Ministerija; 2014.
[2] Murauskiene L, Janoniene R, Veniute M, Ginneken E, Karanikolas M. Lithuania: health system review. Health Syst Transit. 2013;15:1-150.
[3] Fuster V, Mearns BM. The CVD paradox: mortality vs prevalence. Nat Rev Cardiol. 2009; 6:669.
[4] Kending H, Browning CJ, Thomas SA, Wells Y. Health, lifestyle, and gender infuences on aging well: An Australian longitudinal analysis to guide health promotion. Front Public Health. 2014; 2:70.
[5] Chida Y, Steptoe A. Positive psychological well-being and mortality: a quantitavive review of prospective observational studies. Psychosom Med. 2008;70:741-756.
[6] Peasey A, Bobak M, Kubinova R, Malyutina S, Pajak A, Tamosiunas A, Pikhart H, Nicholson A, Marmot M. Determinants of cardiovascular disease and other non-communicable diseases in Central and Eastern Europe: rationale and design of the HAPIEE study. BMC Publ Health. 2006;6:255.
[7] Hyde M, Wiggins RD, Blane D, Higgs P. A measure of quality of life in early old age: The theory, development and properties of a needs satisfaction model. Aging Ment Health. 2003;7:86–94.
[8] Carpenter JS, Andrykowski MA, Hall L, Rayens MK, Sachs B, Cunningham LLC. Psychometrics for two short forms of the Center for Epidemiologic Studies – Depression Scale. Issues Ment Health Nurs. 1998;19:481-494.
[9] Sapranavičiūtė-Zabazlajeva L, Rėklaitienė R, Tamošiūnas A, Bacevičienė M, Virvičiūtė D, Peasey A. Correlates of depressive symptoms in urban middle-aged and elderly Lithuanians. Soc Psychiatry Psychiatr Epidemiol. 2014;49:1199-1207.
[10] Rėklaitienė R, Gražulevičienė R, Dėdelė A, Virvičiūtė D, Venslovienė J, Tamošiūnas A, Bacevičienė M, Lukšienė D, Sapranavičiūtė-Zabazlajeva L, Radišauskas R, Bernotienė G, Bobak M, Nieuwenhuijsen MJ. The relationship of green space, depressive symptoms and perceived general health in urban population. Scand J Public Health. 2014;42:669-676.
[11] Tamošiūnas A, Bacevičienė M, Rėklaitienė O, Radišauskas R, Jurėnienė K, Azarevičienė A, Lukšienė D, Malinauskienė V, Daugėlienė E, Sap¬ranavičiūtė-Zabazlajeva L. Cardiovascular risk factors and cognitive function in middle aged and elderly Lithuanian urban population: results from the HAPIEE study. BMC Neurol. 2012;12:149 doi:10.1186/1471-2377-12-149.
[12] Steel N, Huppert FA, McWilliams B, Melzer D. Physical and cognitive function. In Marmot M, Banks J, Blundell R, Lessof C, Nazroo J, editors. Health, wealth and lifestyles of the older population in England: The 2002 English Longitudinal Study of Ageing. London: Institute of Fiscal Studies; 2003. p. 249-300
[13] Prineas RJ, Crow RS, Blackburn H: The Minnesota code. John Wright, London: Manual of electrocardiographic findings; 1982.
[14] Tunstall-Pedoe H, Kuulasmaa K, Amouyel P, Arveiler D, Rajakangas AM, Pajak A. Myocardial infarction and coronary deaths in the World Health Organization MONICA Project. Registration procedures, event rates, and case-fatality rates in 38 populations from 21 countries in four continents. Circulation. 1994;90:583-612.
[15] Radisauskas R, Petrokiene Z, Rastenyte D. Myocardial infarct morbidity and mortality trends in the Kaunas population aged 25-64 years of age during 1983-1998. Medicina. 2002;38:86-93.
[16] Radisauskas R, Rastenyte D, Bernotiene G, Sopagiene D, Jancaityte L. Morbidity and mortality from the major cardiovascular diseases in Kaunas population from the major cardiovascular diseases in Kaunas population from 1983 to 2002. Medicina. 2003;39:1208-1214.
[17] Rastenyte D, Sopagiene D, Virviciute D, Jureniene K. Diverging trends in the incidence and mortality of stroke register ir Kaunas. Lithuania. Scand J public Health. 2006;34:488-495.
[18] Nabi H, Kivimaki M, Vogli R, Marmot M, Singh-Manoux A. Positive and negative affect and risk of coronary heart disease: Whitehall II prospective cohort study. BMJ. 2008;337:118-125.
[19] Shirai K, Hiroyasu I, Ohira T, Ikeda A, Noda H, Honjo K, Inoue M, Tsugane Sh. Perceived level of life enjoyment and risks of cardio-vascular disease incidence and mortality: the Japan public health center-based study. Circulation. 2009;120:956-963.
[20] Haukkala A, Konttinen H, Uutela A, Kawachi I, Laatikainen T. Gender differences in the associations between depressive symptoms, cardiovascular diseases, and all-cause mortality. Ann Epidemiol. 2009;19:623-629.
[21] Steptoe A, Demakakos P, Oliveira C. The psychological well-being, health and functioning of older people in England. In The Dynamics of Ageing. Evidence from the English Longitudinal Study of Ageing 2002-2010. Banks J, Nazroo J, Steptoe A, editors. London: PurePrint Group; 2012. p. 98-183.
[22] Boehm J, Peterson Ch, Kivimaki M, Kubzansky L. A prospective study of positive psychological well-being and coronary heart disease. Health Psychol. 2011;30:259-267.

[23] Kubzansky LD, Thurston RC. Emotional vitality and incident coronary heart disease: benefits of healthy psychological functioning. Arch Gen Psychiatry. 2007;64:1393-1401.
[24] Ortega FB, Lee D, Sui X, Kubzansky L, Ruiz J, Baruth M, Castillo M, Blair SN. Psychological well-being, cardiorespiratory fitness, and long-term survival. Am J Prev Med. 2010;39:440-448.
[25] Guven C, Saloumidis R. Why is the world getting older? The influence of happiness on mortality. School working paper. Australia: Deakin University. 2009 (cited 2015 September 15). Available from http://www.deakin.edu.au/buslaw/aef/workingpapers/papers/2009_3.pdf
[26] Steptoe A, Demakakos P, Oliveira C, Jane W. Distinctive Biological Correlates of Positive Psychological Well-Being in Older Men and Women. Psychosom Med. 2012;74:501-508.