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DIFFERENCES IN LIFE-SATISFACTION, OPTIMISM AND PESSIMISM BETWEEN HYPERTENSIVE AND NON-HYPERTENSIVE ADULTS

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Abstract: Cross-national epidemiological research reveals that life satisfaction is related to blood pressure status. While no studies have yet distinguished hypertensive and normotensive individuals in terms of life satisfaction, limited evidence suggests that the former might differ in optimism and pessimism from the latter. The objective of this cross-sectional study was to test the hypothesis that hypertensive adults differ in life satisfaction, optimism and pessimism from the non-hypertensives. Individuals presenting themselves for a voluntary cardiovascular screening test ($N = 128$) were asked to complete three questionnaires assessing their satisfaction with life, optimism and pessimism. Based on their blood pressure readings, using the commonly accepted cut-off value of 140/90 mm Hg, participants were categorized as hypertensives and non-hypertensives and were compared on the dependent measures. A bootstrapped multivariate analysis of covariance, using gender, body mass index, smoking status and age as covariates, indicated that hypertensive participants reported lower life satisfaction and optimism than non-hypertensives. However, there was no difference in pessimism between the groups. These findings support the earlier epidemiological reports connecting life satisfaction and blood pressure status and expand those by showing that hypertensives differ from non-hypertensives in the subjective perception of their quality of life.

Key words: Blood pressure, Hypertension, Optimism, Pessimism, Satisfaction with life

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INTRODUCTION

The ‘response-shift and quality of life model’ (Sprangers & Schwartz, 1999) states that a shift in health status changes perception of one’s quality of life. The model has five major components: (1) a catalyst, reflected in the shift in one’s health status; (2) antecedents, stable and/or dispositional characteristics of the person, such as gender, education, socioeconomic status, optimism and pessimism; (3) mechanisms, coping strategies for dealing with the shift in health status, which also include optimism and pessimism; (4) response shift, reflecting a change in the interpretation of quality of life, and (5) perceived quality of life, which, among others, is also reflected in the satisfaction with physical, psychological and social aspects of one’s life. Acute and chronic changes in a person’s health status may trigger behavioural, cognitive and affective processes necessary for facing a chronic illness. These processes could change a person’s norms, values and the conceptualization of the subjective quality of life, affecting largely the appraisal of the satisfaction with life.

High blood pressure is the leading cause of cardiovascular disease and kills nearly ten million people every year, accounting for nearly half of deaths stemming from cardiovascular morbidity (Frieden & Jaffe, 2018). An important aspect in the treatment of hypertension is the acceptance of the disease by the patient, which has substantial impact on the self-appraisal of one’s quality of life and general life satisfaction (Baczewska et al., 2015) as proposed by the ‘response-shift and quality of life model’. In fact, life satisfaction is an index of the subjective assessment of one’s quality of life (Theofilou, 2013). In accord with the model, there is cross-national research evidence from two large investigations for a statistically significant inverse relationship between blood pressure status and life satisfaction (Blanchflower & Oswald, 2008; Mojon-Azzi & Sousa-Poza, 2011). However, currently there is no empirical evidence for difference in life satisfaction between hypertensive and non-hypertensive individuals.

The connection between life satisfaction and blood pressure was studied in a work with adolescents (Martinez, Silva, & Villasmil, 2010). The authors showed that being male, having low satisfaction with life, and being older in age could all predict high blood pressure. However, these findings cannot be generalized to adults’ life satisfaction that may be even more closely related to blood pressure status than in adolescents, due to the significantly greater responsibilities of adult life.

Optimism is a general tendency for anticipating positive future outcomes while pessimism is its reverse (Carver, Scheier, & Segerstrom, 2010). In an earlier study, it was shown that pessimistic adults, aged between 30-45 years, had higher blood pressure than optimistic individuals (Räikkönen, Matthews, Flory, Owens, &

Gump, 1999). These findings were later supported by the results of a study with grandmothers in which, pessimism, but not optimism, was associated with hypertension (Conway, Magai, Springer, & Jones, 2008). In another investigation assessing optimism, but not pessimism, it was found that in nurses and clinicians optimism was negatively related to the diastolic, but not systolic blood pressure (Begley, Lee, & Czajka, 2000). In contrast to the above studies, a more recent one found that optimism was unrelated to hypertension (Trudel-Fitzgerald, Boehm, Kivimaki, & Kubzansky, 2014). However, the authors assessed optimism with a single item Likert scale instead of using one of the available psychometrically validated instruments. This is a shortcoming of the work, as also acknowledged by its authors. Therefore, only a tentative relationship between blood pressure and optimism/pessimism exists in the literature. However, based on the 'response-shift and quality of life model' (Sprangers & Schwartz, 1999), high blood pressure may not only trigger lower life satisfaction, but also lower optimism and higher pessimism.

The aim of the present research, considering the 'response-shift and quality of life model' (Sprangers & Schwartz, 1999), was to examine the hypothesis that life satisfaction and optimism will be lower, while pessimism will be higher in hypertensive compared to non-hypertensive adults. The answer to this hypothesis will expand the correlational results stemming from multi-national works linking blood pressure status and life satisfaction.

METHOD

Participants

A convenience sample of adults showing up for a promotional (discounted) cardiovascular screening at a private medical centre in Budapest, Hungary was invited to complete two questionnaires before their physical examination. The study was conducted in accord with the Helsinki Declaration (World Medical Association, 2008). Ethical permission for the study was granted by the Ethics Committee of the Faculty of Education and Psychology at Eötvös Loránd University. The participants ($N = 128$) were Hungarians, white (Caucasians), 42% males, 88% non-smokers, 97% working, 90% living in a relationship. Their mean age was 43.17 ($SD = 12.45$, range 20-75) years, height 172.79 ($SD = 9.84$) cm, weight 76.36 ($SD = 15.44$) kg, and body mass index 25.41 ($SD = 3.87$). All participants signed an informed consent form and were free to deny consent for participation at any time.

Measures

Blood pressure

Blood pressure was double checked at rest with a Microlife BP A100 Plus automatic blood pressure monitor (Microlife AG Swiss Corporation) that uses identical technology to model BP 3BTO-A which was tested in accord with the British Hypertension Society (BHS) protocol (Cuckson, Reinders, Shabeeh, & Shennan, 2002); it was rated grade 'A' for both systolic and diastolic pressure. The used instrument fulfills the criteria of the Association for the Advancement of Medical Instrumentation (Cuckson et al., 2002).

Satisfaction with life

The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) was adopted to measure general life satisfaction. The original SWLS has five items, such as '*In most ways my life is close to my ideal*', which are rated on a 7-point Likert scale ranging from *strongly disagree* to *strongly agree*. Higher scores indicate greater satisfaction with life. The internal reliability of the SWLS scale ranged from (Cronbach's α) .79 to .89; its test-retest reliability, examined in several periods from one month to four years, ranged between .50 and .84 (Pavot & Diener, 2008). In the present study we used the psychometrically validated Hungarian version of the scale, the SWLS-HU (Martos, Sallay, Désfalvi, Szabó, & Ittzés, 2014). The internal reliability of the SWLS-HU is .84.

Optimism and pessimism

The revised Life Orientation Test (LOT-R) was used to measure optimism and pessimism (Scheier, Carver, & Bridges, 1994). The scale consists of ten items. Three items assess optimism (e.g., '*In uncertain times, I usually expect the best*'), another three items measure pessimism (e.g., '*I hardly ever expect things to go my way*') and there are four filler items. High scores indicate high optimism or high pessimism, respectively. It was shown that the optimism and pessimism items represent independent constructs (Herzberg, Glaesmer, & Hoyer, 2006). The psychometric properties of LOT-R are robust (Herzberg et al., 2006). Its reported internal reliability is .71 for optimism and .68 for pessimism (Herzberg et al., 2006). In the current work the psychometrically validated Hungarian scale, the LOT-HU, was used (Bérđi & Köteles, 2010). Its reported internal reliability ranges between .77 to .81.

Procedure

Participants answered demographic questions and completed the SWLS and the LOT-R in a quiet waiting room. Subsequently, they underwent a cardiovascular screening test, including the double-recording of blood pressure at total rest. Based on the readings, using the criterion also adopted by Mills and colleagues (2016) while examining nearly one million adults in 90 countries, hypertension was defined as an average systolic blood pressure ≥ 140 mm Hg, and an average diastolic blood pressure ≥ 90 mm Hg. These cut-off values served for a-posteriori grouping into hypertensive ($n = 95$) and non-hypertensive ($n = 33$) groups.

Data analyses

The main analysis consisted of a multivariate analysis of covariance (MANCOVA). To test whether there is linear relationship between blood pressure readings and positive / negative emotions, Pearson's product-moment correlations were calculated.

RESULTS

Employing a bootstrapped (1000 samples, 95% confidence interval) MANCOVA by using age, body mass index, gender and smoking status as covariates, the hypertensive group was compared with its non-hypertensive counterpart on scores of life satisfaction, optimism and pessimism. Neither the test of equality of covariance matrices, nor the Levene's test of equality of error variances (testing the homogeneity of variance assumption) were statistically significant; hence the prerequisites for running a MANCOVA were met¹. Due to missing data from four participants, this test was performed on 124 participants. The MANCOVA yielded a statistically significant multivariate effect (Wilks' $\lambda = .907$, $F(3, 116) = 3.95$, $p = .01$, $\eta_p^2 = .093$, power $(1 - \beta) = .822$). The covariates were statistically nonsignificant. The univariate tests revealed that life satisfaction and optimism, but not pessimism, differed statistically significantly (Table 1) between the groups. Life satisfaction yielded a medium-to-large effect size, while optimism resulted in a small-to-medium effect size after considering the sample sizes. These results are summarized in Table 1.

¹ To account for the relatively large sample size differences between the two groups (33 vs. 95), the hypothesis testing was repeated with the Mann-Whitney U test for independent samples, which is a non-parametric test that is less sensitive to group-size differences than the parametric tests. The results confirmed the group differences found with the MANCOVA in life satisfaction ($Z = -2.95$, $p = .003$) and optimism ($Z = -1.97$, $p = .049$), while pessimism did not differ between the two groups ($p > .05$).

Table 1. Means and standard deviations (in parenthesis) of three dependent measures in hypertensive and non-hypertensive participants, the *F* and *p* values of the univariate tests, and sample size-dependent effect sizes. Statistically significant group differences were noted in the reported life satisfaction and optimism

	Bootstrap for Parameter Estimates										
										95% confidence interval	
										Lower	Upper
	Hypertensives	Non- hypertensives	<i>F</i>	<i>p</i>	Effect size* Hedges' <i>g</i>	β	Bias	Standard error			
Life satisfaction	24.58 (5.59)	28.00 (4.51)	10.853	.001	-0.64	3.930	0.061	1.014	1.856	5.992	
Optimism	11.36 (2.43)	12.25 (2.50)	4.059	.042	-0.36	1.106	0.033	0.529	0.116	2.167	
Pessimism	6.52 (2.69)	5.59 (2.11)	1.425	.169	0.16	-0.682	-0.027	0.508	-1.776	0.283	

Note: Corrected for multi-group sample size

The correlation analyses showed that none of the three dependent measures were statistically significantly related ($p > .05$) with either systolic blood pressure or diastolic blood pressure. However, when performing point-biserial correlations between the dependent measures and hypertension-status groups, there was a statistically significant inverse correlation, $r = -.252$, $p = .004$, between hypertension groups and life satisfaction, but the correlation was statistically nonsignificant for optimism and pessimism.

DISCUSSION

Based on earlier epidemiological reports, the present study tested the hypothesis that hypertensive individuals exhibit lower life satisfaction than non-hypertensive people. For the first time in the relevant literature, this cross-sectional study revealed statistically significant differences in self-reported life satisfaction between hypertensive and non-hypertensive individuals. These findings agree with past correlational results (Blanchflower & Oswald, 2008; Mojon-Azzi & Sousa-Poza, 2011) stemming from large multi-national studies. They also agree with the results of an earlier study with adolescents (Martinez et al., 2010), which revealed that having low life satisfaction could predict high blood pressure. Finally, these results fully agree with the 'response-shift and quality of life model' (Sprangers & Schwartz, 1999), in that optimism – as an antecedent and coping component of the model – was also lower in hypertensive than non-hypertensive individuals.

The lack of correlation between blood pressure readings and dependent measures shows that there is no linear relationship between these variables and that a certain level, such as the hypertensive status, should be reached to observe such differences. The necessity of threshold-bound (diagnosis level) evaluation was supported by the statistically significant correlation between hypertension-status group and life satisfaction in which the higher group membership (i.e., Group 2 = hypertensives) was associated with lower life satisfaction.

Collectively, these findings match well the 'response-shift and quality of life model' (Sprangers & Schwartz, 1999), and the lower life satisfaction reported by the hypertensive participants may be ascribed to a 'response shift' probably triggered by hypertension, which in turn generates a different subjective perspective on the quality of life and optimism.

The meaningfulness of the difference in life satisfaction between hypertensive and non-hypertensive individuals is justified by the moderate-to-high effect size. In accord with the 'response-shift and quality of life model', the link might be explained in terms of a possible vicious circle through which life events, and especially their interpretation, trigger negative psychological states (i.e., anxiety, negative mood, etc.) generating dissatisfaction with life and psychosomatic symptoms, one of them being elevated blood pressure. This explanation might be partially supported by the finding that hypertensives also exhibited lower optimism than non-hypertensives. However, the two groups did not differ in pessimism. This finding, in terms of 'response-shift and quality of life model' suggests that optimism, as a component of the coping aspect of the model, could decrease in hypertensives, but that is not necessarily accompanied by an increase in pessimism.

These findings agree in part with the results emerging from two past studies (Begley et al., 2000; Rääkkönen et al., 1999), in that non-hypertensives reported higher optimism than hypertensives. However, in contrast to the results of two other studies (Conway et al., 2008; Rääkkönen & Matthews, 2008), in the present investigation pessimism did not differ between hypertensives and non-hypertensives. The lack of concordance between the present and earlier research could be attributed to the incomparable samples studied in these studies. Our sample comprised a wide-age spectrum white males and females in contrast to Afro-American and Latino grandmothers studied by Conway et al. and adolescents examined by Rääkkönen and Matthews (2008). Further, the results are also in contrast with the more recent inquiry by Trudel-Fitzgerald et al. (2014) who found no connection between optimism and hypertension. However, the latter study used a single item Likert scale to assess optimism in contrast to the present study in which a widely used psychometrically validated instrument was used. Summing up, the

current findings' only partial agreement with past results and the small-to-moderate effect size associated with the difference in optimism between the groups, suggests that at this time the results should be considered as tentative, but deserving further empirical scrutiny, especially in the context of the relatively robust difference noted in life satisfaction between hypertensive and non-hypertensive individuals.

Limitations

This study has certain limitations that call for cautious interpretation of the results, one of them being the non-random nature and the cultural homogeneity (Hungarians) of the studied convenience sample, which may not be representative of the general population. Further, the participants were not screened for other than cardiovascular health indices, which involves the risk of other parallel health ailments, such as mental or psychological dysfunction, affecting the results. Participants' type of work was also unrecorded even though that could have an influence on the blood pressure status. Therefore, the study should be replicated with a more representative sample, which should be selected, if possible, by using ambulatory blood pressure recording for at least 24 hours. The general health status and type of occupation of the participants should be assessed too. Further, since perceived stress is linked to blood pressure, the mediatory role of the perceived stress should also be tested in future research for the better understanding of the connection between blood pressure status and life satisfaction.

CONCLUSION

Our results provided preliminary tentative evidence for considerable difference (as suggested by the moderate to large effect size) in life satisfaction, and for more modest difference in optimism, but not pessimism, between hypertensive and non-hypertensive people. Although preliminary, these findings may have important relevance for clinical practice and medical professionals in that after diagnosis, the treatment of hypertension should not be limited to medication, but also include psychological help to avoid further deterioration in health (and even blood pressure) due to response shift in the subjective evaluation of the affected person's quality of life.

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