



## Investigating the Effect of Hypertension on Happiness and Quality of Life in a Population from Shiraz

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### ABSTRACT

**Background:** People's lives have become full of risk factors of cardiovascular diseases in the recent years. This situation mainly originates from life style changes, which affect individuals' health particularly in developing countries. Nutritional transition in terms of high consumption of fast foods and low intake of fruits and vegetables beside insufficient physical activity and sedentary jobs are the potent factors that facilitate the occurrence of diverse disorders. Hypertension is among the most concerning disorders, which affects both physical and mental aspects of health.

**Objectives:** The present study aimed to assess the effects of hypertension, as one of the growing risk factors for diverse disorders, on quality of life.

**Patients and Methods:** In this study, 200 individuals who had referred to Shiraz Healthy Heart House and Imam Reza clinic were selected by convenient sampling. Based on their history of hypertension, relevant therapies, and measurement of blood pressure at the time of enrollment, the participants were allocated to case and control groups. In addition to a general demographic questionnaire, Oxford Happiness Questionnaire was utilized in order to estimate the participants' happiness status and quality of life. Different statistical methods were used to check the normal distribution of the data and compare the means.

**Results:** The mean score of happiness showed that hypertensive individuals suffered from lower happiness levels compared to those with normal blood pressure ( $P < 0.05$ ).

**Conclusions:** Not only hypertension imposes serious side effects on different body systems, but it also decreases the quality of life. As many underlying causes of impaired blood pressure are related to lifestyle, it could be easily prevented by addressing the modifiable risk factors.

### 1. Background

Cardiovascular diseases have the first rank among all-cause mortality throughout the world. Indeed, the rate of the relevant morbidity and mortality has become a global concern. This situation is critical, particularly in developing countries (1). Hypertension has been known as the chief underlying reason for cardiovascular events since 2003 (global burden of disease study) (2). This abnormality has become a universal health problem with devastating

consequences (3). According to the report by World Health Organization (WHO), 7.5 million deaths (12.8%) were associated with hypertension (1). Unbelievably, the prevalence of hypertension is expected to reach 80% in developing countries by 2025 (4).

Upcoming negative effects pertinent to hypertension lead to diverse malfunctions, including renal impairment, retinal hemorrhage, and peripheral vascular disease, as well as some life-threatening conditions, such as coronary artery disease and stroke. It is also noteworthy that dyslipidemia and type II diabetes occur more commonly in hypertensive individuals (5, 6). Moreover, hypertension has been reported to be responsible for about half of coronary heart

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disease and cerebral vascular disease cases throughout the world (7). Unfortunately, hypertension is an asymptomatic disorder that has no alarming outcomes until the affected part starts to malfunction (8).

It seems that life style changes, such as low physical activity due to sedentary jobs and considerable uptake of fast foods collectively known as nutritional transition, are among undeniable reasons for occurrence of hypertension. Unfortunately, these unfavorable factors exist in Shiraz (9-12). Although the rate of morbidity and mortality followed by hypertension could be decreased via using different medications or changing lifestyle, some issues like late diagnosis or poor adherence to treatment plans affect patients' lives. Moreover, hypertensive patients complain about general and vague symptoms. The majority of such symptoms, including dizziness, headache, and mood alterations, are also expressed by healthy individuals (13). This postpones early diagnosis and treatment of the disorder, resulting in disturbed quality of life.

Quality of life has become one of the prominent aspects of clinical research in the recent years. Any physical, emotional, and social distress related to the disease and its subsequent treatment that is distinct from the disease's own physiological definition is known as quality of life (14). Quality of life is affected by a wide variety of diseases, such as coronary heart disease (15, 16), cerebral vascular disease (17, 18), pulmonary diseases (19, 20), malignancies (21, 22), and allergic disorders (23, 24). In this regard, hypertensive patients' dissatisfaction ranges from biological systems malfunction to adverse effects of therapeutics and emotional disorders like anxiety and depression (25, 26). It should also be mentioned that individuals' awareness about their impaired blood pressure inherently affects their perception of health and quality of life (27). Previous studies have also reported a decrease in mental and physical quality of life in hypertensive individuals compared to normotensive ones (28-32). However, some other studies have shown no differences between these two groups with respect to life quality (27).

## 2. Objectives

Considering the importance of hypertension and its effects on health, this study aims to investigate the impact of hypertension on happiness in an Iranian population from Shiraz.

## 3. Patients and Methods

### 3.1. Sampling Method

The study subjects ( $n = 200$ ) were divided into case and control groups. Hypertensive patients who referred to Shiraz Healthy Heart House and Imam Reza clinic for consultation or follow-up were allocated to the case group until reaching the required sample size ( $n = 100$ ). Similarly, companions of hypertensive patients or those of other patients who were present in both clinics were invited to participate in the research as the control group ( $n = 100$ ). It is noteworthy that this method of enrollment caused the participants to be matched with each other regarding sex and age. The exclusion criteria of the study were suffering from diabetes mellitus, having the history of positive myocardial infarction

and stroke, smoking, using any opioids or ecstasy drugs, and having the history of hospitalization in psychological centers due to schizophrenia, bipolar disorder, and major depressive disorder.

At first, all participants' blood pressure was measured and accordingly, their allocation to the case or control groups was confirmed. Then, written informed consents for taking part in the research were signed by all participants. The study protocol conformed to the ethical guidelines of the 1975 Declaration of Helsinki as reflected in a prior approval by the institution's human research committee.

### 3.2. Data Collection

The study data were collected using a general demographic questionnaire, including information about age, sex, marital status, education level, occupation, history of hypertension and/or relevant therapy, history of psychological problems, and history of smoking or drug abuse. Besides, quality of life was evaluated using Oxford Happiness Inventory (OHI). This inventory was introduced by Argyle et al. at Oxford University (33). Later, a 29-item questionnaire was developed and modified as Oxford Happiness Questionnaire (OHQ) (34). Each item was ranked on a 4-point Likert scale ranging from 1 to 4. Accordingly, the highest score could be 116.

### 3.3. Statistical Analysis

The study data were analyzed using the SPSS statistical software, version 16 (SPSS for Windows, version 16.0. Chicago, SPSS Inc.). At first, normal distribution of the data was checked by Kolmogorov-Simonov test. Independent sample t-test was used to compare the means of two different groups. In case the data did not follow normal distribution, Mann-Whitney non-parametric test was employed to compare the means.  $P < 0.05$  was considered to be statistically significant.

## 4. Results

All participants aged 30 - 60 years. The score of OHQ was calculated for each study subject and was defined as the happiness score. The total mean  $\pm$  SD score of happiness was  $72 \pm 17.35$ . Considering the highest score (116), it seems that the participants were moderately happy. Additionally, the happiness score was  $63.02 \pm 14.95$  for hypertensive participants and  $81.60 \pm 12.67$  for normotensive ones, and the difference was statistically significant ( $P < 0.05$ ). Then, the study subjects in each group were divided based on sex and each subgroup was compared to their counterparts. Based on the results, males and females with normal blood pressure had a higher score compared to those with hypertension. This categorization was done based on marital status, too. The findings revealed that both single and married hypertensive subjects had a lower degree of happiness. Considering education level, the participants were categorized into below high school diploma, high school diploma, associate degree, bachelor's degree, master's degree, and PhD degrees. Based on the results, hypertensive and normotensive study subjects in below high school diploma and PhD groups were similar with respect to the happiness score. However, a significant difference was found between the hypertensive and normotensive

**Table 1.** Hypertensive and Normotensive Participants' Happiness Scores Categorized by Gender, Marital Status, Education Level, and Age

	Hypertensive, Mean $\pm$ SD (n = 99)	Normotensive: Mean $\pm$ SD (n = 100)	P value
<b>Gender</b>			
Female	63.04 $\pm$ 15.50	82.66 $\pm$ 12.17	< 0.001
Male	63.00 $\pm$ 14.56	80.54 $\pm$ 13.19	< 0.001
<b>Marital Status</b>			
Married	62.44 $\pm$ 14.23	84.24 $\pm$ 11.89	< 0.001
<b>Education Level</b>			
Below High School Diploma	64.42 $\pm$ 15.88	78.40 $\pm$ 13.80	< 0.001
Associate Degree	54.82 $\pm$ 9.40	82.06 $\pm$ 13.48	< 0.001
BSc	58.21 $\pm$ 16.63	80.13 $\pm$ 11.47	< 0.001
MSc	56.44 $\pm$ 7.06	88.23 $\pm$ 7.73	< 0.001
<b>Age Range (years)</b>			
30 - 40	57.54 $\pm$ 12.87	79.98 $\pm$ 12.89	< 0.001
40 - 50	63.38 $\pm$ 15.90	82.19 $\pm$ 13.60	< 0.001
50 - 60	66.19 $\pm$ 14.99	88.85 $\pm$ 6.58	< 0.001

\* Kolmogorov-Smirnov, independent sample t-test, and Mann-Whitney tests were used as appropriated.

participants with other education levels in this respect. Regarding age, hypertension imposed some levels of unhappiness on the lives of people with hypertension in comparison to those with normal blood pressure in the three age groups (Table 1).

## 5. Discussion

The results showed that the participants with hypertension suffered from lower levels of happiness compared to normotensive ones. This condition was approximately maintained when the case and control groups were compared with respect to sex, marital status, education level, and age. The only exception was related to the participants with PhD degrees, demonstrating a non-significant difference between the case and control groups. This might be attributed to the very small number of individuals in both groups, which prevented statistical analysis. Moreover, normotensive individuals with high school diplomas had a better happiness status in comparison to those suffering from hypertension. However, considering the participants' age in this study (30 - 60 years), the effect of aging on hypertension should be kept in mind as a probable limiting factor.

The study results indicated that women with normal blood pressure obtained higher happiness scores compared to normotensive men. Although the difference was not statistically significant, it was in accordance with similar studies. Generally, female gender has been supposed to be a reason for happiness. This is in part derived from the fact that women are more receptive of negative and positive emotions and express these feelings more easily compared to men. Nonetheless, studies have shown that women are at a higher risk of experiencing chronic and clinical pain in comparison to men. This inequality might be contributed to different sex hormones, endogenous opioids functions, genetic elements, and gender roles (35). Overall, it seems that any health impairment influences men more severely compared to women, because men tend to express unhealthy conditions much less (8). In contrast, some experiments showed that males experienced higher degrees of happiness in comparison to females (2, 36). They argued that men tolerated difficulties more efficiently

compared to women (26). A previous study indicated that hypertensive women had a lower general health perception compared to hypertensive men. They also stated that women complained more about their illnesses than did men (8, 37). Meanwhile, that study revealed hypertensive men to be in a higher social functioning status compared to their counterparts. Hypertensive men also had better social functions in comparison to normotensive ones, but the underlying reason was not clearly understood (8). This may be related to personality; people with friendly characteristics and optimistic attitude have higher blood pressure levels (8).

An interesting point about marital status in this study was that single individuals with normal blood pressure obtained higher scores compared to married ones. This situation possibly reveals that happiness is more affected by impaired blood pressure than marital status. Moreover, increase in age was accompanied with increase in the happiness score in both hypertensive and normotensive groups. Although the difference was not statistically significant, it seems that elder participants coped with hypertension more easily compared to younger ones. In other words, it seems that high blood pressure affected the youth more severely.

Furthermore, increase in education level resulted in an approximately ascending trend in the happiness scores. This is quite rational because the perception of healthcare usually comes with higher levels of knowledge.

Up to now, numerous studies have demonstrated an association between hypertension and low quality of life (28-30). An international investigation was performed on 15000 individuals in 16 European countries. The results showed that citizens of Denmark, Ireland, and the Netherlands with higher levels of happiness had normal blood pressure compared to those of Italy, Portugal, and Germany (38). However, some other studies have found no relationships between hypertension and happiness (27). This contradiction could be explained by several factors, including study design, different methods for measuring happiness and quality of life, definitions of high and normal blood pressure, study participants, and possible confounding variables. It is worth noting that hypertension



itself is the encouraging factor for performing bad habits, such as physical inactivity, unhealthy diets, smoking, and obesity (39, 40). Additionally, low health-related quality of life is followed by bad sleeping, low physical activity, smoking, alcohol consumption, and obesity (8).

Despite different therapies, up to 50% of hypertensive patients are not responsive. This condition may intensify the subsequent adverse effects of hypertension and worsen the happiness status and quality of life (13). In addition to hypertension as the leading cause of complicated events, another noticeable phenomenon has been emerged. Resistant hypertension has been defined as the condition in which blood pressure is not controlled by using three or more antihypertensive drugs or the condition of being under four drugs regardless of the blood pressure status. The number of individuals with resistant hypertension has reached more than doubled during about 15 years. This challenging type of hypertension should exclusively be the point of attention when we realize that the relevant subsequent diseases are more catastrophic compared to non-resistant hypertension (41). Obviously, this condition exerts greater effects on quality of life in comparison to curable hypertension. In this respect, three mechanisms may be involved in the relationship between resistant hypertension and upcoming catastrophic consequences, such as stroke and coronary artery disease. Evidence has emphasized that the simultaneous occurrence of resistant hypertension and other vascular disorders resulted in a drastic decrease in quality of life. Awareness about hypertension comprise the second mechanism of decreasing quality of life. Some researchers have declared that hypertensive individuals' low quality of life was not the direct reflection of the disorder; rather, it was the consequence of being informed about the presence of such an unhealthy condition (8). Studies have also indicated that individuals' awareness about existence of a chronic disorder affected their quality of life negatively (13). Similarly, a previous study showed that in comparison to asymptomatic patients (with respect to blood pressure impairment), symptomatic ones had a lower quality of life (42, 43). Moreover, consumption of one antihypertensive drug was associated with lower quality of life compared to not receiving medications despite the presence of impaired blood pressure (41). In a population-based study on 3368 participants over 60 years of age, antihypertensive drugs had no positive effects on the happiness level and quality of life among patients with hypertension (44). Thus, the impact of hypertension on health and quality of life are irreversible in some cases. Furthermore, resistant hypertension imposed more side effects on the physical aspects of quality of life among the elders compared to responsive hypertension (45).

In conclusion, changing lifestyle towards industrialization has caused the predisposing factors for hypertension to become available. Not only hypertension induces malfunction or even dysfunction of different bodily organs overtime, but it also influences individuals' quality of life and steals their life satisfaction and happiness. As different therapies and medications for hypertension are not as efficient as intended, it seems that prevention of blood pressure disorder by working on modifiable risk factors is

the best and practical way in order to keep the quality of life status at its optimized level.

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### Authors' Contribution

Study concept and design: Zibaeenezhad and Moghimi. Acquisition of data: Fouladivanda. Analysis and interpretation of data: Fouladivanda and Razeghian-Jahromi. Drafting of the manuscript: Razeghian-Jahromi. Critical revision of the manuscript for important intellectual content: Fouladivanda, Zibaeenezhad, Moghimi, and Razeghian-Jahromi. Statistical analysis: Fouladivanda. Administrative, technical, and material support: Zibaeenezhad and Moghimi. Study supervision: Zibaeenezhad and Moghimi.

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