

Impact Of Demographic Factors On Quality Of Life Among Hypertensive Patients Aged 50 Years And Older In Saudi Arabia

Abdullah Alghamdi* Abdullah Alaryni* Ahad Marei Alenazi** Lama Shaya Alhosaini** Shahad Hameed AlShammari** Najd Khalid Aljarba** Abdulmalak Abdullah Alsaleh** Omar Abdulaziz Alfozan** Bassam Abdulaziz Alhusaini** Saad Abdullah Alzmamy** Fadhah Saud Alhudayris** Lama khalid Alshuaibi** Rayan A Qutob* Abdullah Bukhari* Enad Alsolami*** Abdulrahman M Alanazi*

ABSTRACT

Background: Hypertension has earned the moniker "the silent killer" because to its unique characteristic of often remaining asymptomatic for extended periods, in contrast to numerous other ailments.

Aim: To determine the Quality of Life (QoL) among 50 years and older hypertensive patients in Saudi Arabia.

Methods: A cross-sectional quantitative study using structured interviews was conducted among Saudi hypertensive patients aged 50 years and old. The World Health Organization's Quality of Life (WHOQOL)-BREF to measure the quality of life of patients with hypertension. Binary logistic regression analysis was used to identify predictors of better QoL.

Settings: Imam Mohammad ibn Saud Islamic University Medical Center and King Fahad Medical City in Riyadh, Saudi Arabia for the duration between October 2022 and January 2023.

Results: A total of 392 patients with hypertension participated in this study. Overall, the mean QoL score for the participating patients was 67.7 (SD:13.4), which presents a moderate QoL. The highest QoL score was observed for the psychological health domain (83.7 (SD:14.9)) and the lowest QoL score was observed for the physical health domain (42.8 (SD:8.8)). Male patients and those with higher level of education (bachelor's degree or higher) were more likely to have better QoL compared to others ($p < 0.05$).

Conclusion: Overall, patients with hypertension demonstrated moderate QoL. Male patients and those with higher level of education tend to exhibit a better QoL compared to the rest of hypertensive patients. A multi-center study approach is recommended to confirm our study findings and recommend interventions to improve patients QoL.

Keywords: Hypertension, Quality of Life, Saudi Arabia; WHOQoL-BREF

INTRODUCTION

The global prevalence of hypertension, as defined by systolic blood pressure equal to or greater than 140 mmHg and/or diastolic blood pressure equal to or greater than 90 mmHg, has shown a substantial increase, reaching a total of 1.13 billion individuals [1]. It has been shown that around 31.4% of the population of Saudi Arabia has hypertension [2]. Given the exponential growth observed in this context. It is projected that the global incidence of hypertension (HTN) would rise, potentially impacting approximately 1.56 billion individuals by the year 2025 [3]. Globally, it has been determined that 13.5% of premature mortality cases can be ascribed to the presence of high blood pressure, resulting in approximately 7.2 million

fatalities around the world [4]. The aforementioned situation has given rise to an escalating public health issue in the Kingdom of Saudi Arabia (KSA), emerging as a prominent determinant of mortality [5]. Hypertension has earned the moniker "the silent killer" because to its unique characteristic of often remaining asymptomatic for extended periods, in contrast to numerous other ailments. Individuals with elevated blood pressure levels may experience no discernible symptoms for years before to experiencing a severe and potentially life-threatening event, such as a myocardial infarction or stroke [6]. Hypertension is a significant global public health concern due to its high incidence and the associated risks of cardiovascular and renal diseases [7, 8]. In addition to its substantial worldwide medical and

* Department of Internal Medicine
College of Medicine
Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia.

** Faculty of medicine, Imam Mohammad Ibn Saud Islamic University
Riyadh, Saudi Arabia.
E-mail: Lamaalhosaini1@gmail.com

*** Department of Internal Medicine
College of Medicine, University of Jeddah, Jeddah, Saudi Arabia.

economic impact, which renders it a matter of serious concern [8]. Elevated blood pressure has been identified as a significant contributing element in around 54% of stroke incidents and 47% of instances of ischemic heart disease on a global scale [4]. The modern Saudi population is confronted with a significant health concern in the form of cardiovascular problems [2]. According to a recent systematic review encompassing 20 studies, it was observed that individuals with hypertension had a worse quality of life (QOL) in comparison to those without hypertension. This finding holds significance as it serves as a crucial metric for evaluating the efficacy of hypertension treatment [9]. There is a correlation between advancing age and a decrease in quality of life, as seen by diminished bodily and psychological well-being. In addition, the presence of co-morbidity among individuals with hypertension is a noteworthy health issue that has an impact on their level of satisfaction with their physical well-being [10]. The aim of the present study was to assess the QOL among elderly hypertensive individuals in Saudi Arabia.

RESEARCH METHODS AND DESIGN

Study design

A cross-sectional quantitative study that was conducted among Saudi hypertensive patients aged 50 years and older at Imam Mohammad ibn Saud Islamic University Medical Center and King Fahad Medical City in Riyadh, Saudi Arabia between October 2022 to January 2023. This study utilized structured interviews as the primary method of data collection.

Participants and Procedures

This research included a sample of hypertensive individuals aged 50 years and above, comprising both males and females, residing in Riyadh, Saudi Arabia. The participants provided their informed consent by signing a document that clearly outlined the aims of the study and emphasized the voluntary nature of their participation. They also noted that complete anonymity was ensured and that they were allowed to withdraw from the study at any time. Data were collected by personally approaching participants in Imam Mohammad ibn Saud Islamic University Medical Center and King Fahad Medical City in Riyadh, Saudi Arabia.

Measures

The survey employed in this research comprised socio-demographic information such as age, gender, employment status, marital status, education level, nationality, and duration of disease. Additionally, the World Health Organization's Quality of Life (WHOQOL)-BREF was utilized to assess the quality of life of individuals with hypertension. This questionnaire is a condensed version of the WHOQOL 100 and has previously undergone validation in Arabic [11]. The WHOQOL-BREF scale is utilized to assess QOL in respect to four distinct dimensions, namely physical health, psychological well-being, social relationships, and environment [12].

Questionnaire piloting and reliability

A preliminary investigation was undertaken employing a representative sample of individuals diagnosed with hypertension. The results of this study encompass the verification of the clarity and comprehensibility of the survey items, their alignment and fit with the research objectives, the adequacy of the questionnaire's length and completion time, and the appropriateness of the response alternatives and scale employed. Cronbach's alpha measure for our study sample was 0.894, which was used to examine the internal consistency of the items of the questionnaire. This reflects good internal consistency.

Ethical considerations

Ethical approval for this study's conduction and data collection were reviewed and approved by the Institutional Review Board (IRB) committee of Al-Imam Muhammad ibn Saud Islamic University (Project number 309/2022). Oral informed consent was obtained from all subjects involved in the study. The ethical principles to which this study adhered included justice, informed consent, autonomy, beneficence and non-maleficence.

Statistical Analysis

The data were analyzed using the software program Statistical Packages for Software Sciences (SPSS) version 29 (Armonk, New York, IBM Corporation, USA). For the descriptive analysis, the mean \pm SD was used for metric variables as the data were normally distributed. Normality of the data was checked using histogram and skewness and kurtosis measures. Frequency and percentage were used to present categorical variables. The differences in the score of WHOQoL-BREF domains in relation to the socio-demographic characteristics and the perceived quality of life and satisfaction with health were conducted using student t-test and ANOVA test. Normalized score was estimated using the following formula (Actual Domain Score - Minimum Possible Score) / (Maximum Possible Score - Minimum Possible Score) * 100. Binary logistic regression analysis was used to identify predictors of better QoL. The dummy variable for the regression analysis was defined as the mean QoL score for the study sample, which is 67.7 (SD: 13.4). Values were considered significant with a p-value of less than 0.05.

RESULTS

This study enrolled 392 patients with hypertension. Table 1 describes the socio-demographic characteristics of the patients. The most common age group was 50 to 60 years old, which accounted for 59.7%. Male hypertensive patients constitute 51.0% of the sample, and approximately one-third (32.4%) were retired employees. Saudi patients formed the vast majority of the study sample (97.1%). Around 39.0% of the patients were bachelor's degree holders. More than half of the patients (76.3%) were married. In addition, 30.9% had been diagnosed with hypertension since one to five years.

Table 1. Socio-demographic characteristics of the hypertensive patients

Demographic variable	Frequency (%)
Age group	
• 50 – 60 years	234 (59.7%)
• 61 – 70 years	107 (27.3%)
• 71 – 80 years	47 (12.0%)
• >80 years	4 (01.0%)
Gender	
• Male	192 (49.0%)
• Female	200 (51.0%)
Nationality	
• Non-Saudi	11 (2.9%)
• Saudi	381 (97.1%)
Employment status	
• Government employee	121 (30.9%)
• Non-governmental employee	28 (7.1%)
• Unemployed	115 (29.3%)
• Retired	127 (32.4%)
Educational level	
• Elementary or lower	68 (17.4%)
• Intermediate	50 (13.1%)
• Secondary	109 (27.8%)
• Bachelor’s degree	151(38.5%)
• Higher education	14 (3.6%)
Marital status	
• Married	300 (76.3%)
• Divorced	31 (7.9%)
• Widowed	60 (15.3%)
• Single	1 (0.3%)
Duration of hypertension since diagnosed	
• <1 year	44 (11.3%)
• 1 - 5 years	121 (30.9%)
• 6 - 10 years	110 (28.1%)
• >10 years	117 (29.8%)

Patients’ quality of life

Table 2 presents the mean QoL score stratified by WHOQoL-BREF scale. Overall, the mean QoL score for the participating patients was 67.7 (SD: 13.4), which presents a moderate QoL. The highest QoL score was observed for the psychological health domain (83.7 (SD: 14.9)) and the lowest QoL score was observed for the physical health domain (42.8 (SD: 8.8)).

Table 2. The mean quality of life score stratified by WHOQoL-BREF scale

WHOQoL-BREF domains	Mean	SD
Physical health score	42.8	8.8
Psychological health score	83.7	14.9
Social relations score	72.4	18.9
Environment score	58.5	13.5
Total Qol score	67.7	13.4

Table 3 shows the mean score of WHOQoL-BREF domains in relation to the Socio-demographic characteristics. The mean QoL score showed statistically significant different between HTN patients based on their age, gender, employment status, education level, marital status, and duration of disease (p<0.05).

Table 3. The mean score of WHOQoL-BREF domains in relation to the socio-demographic characteristics

Demographic variable	Mean (SD)	P-value
Age group		
• 50 – 60 years	69.9 (12.3)	0.001
• 61 – 70 years	65.4 (14.1)	
• 71 – 80 years	62.9 (14.8)	
• >80 years	65.4 (21.9)	
Gender		
• Male	69.2 (12.9)	0.031
• Female	66.2 (13.9)	
Nationality		
• Non-Saudi	64.3 (11.8)	0.411
• Saudi	67.8 (13.5)	
Employment status		
• Government employee	71.9 (11.1)	<0.001
• Non-governmental employee	69.5 (12.3)	
• Unemployed	65.2 (14.3)	
• Retired	65.9 (14.0)	
Educational level		
• Elementary or lower	63.1 (15.1)	<0.001
• Intermediate	63.7 (14.5)	
• Secondary	66.9 (12.3)	
• Bachelor’s degree	70.7 (12.0)	
• Higher education	79.0 (10.4)	
Marital status		
• Married	69.0 (12.9)	0.004
• Divorced	65.3 (13.0)	
• Widowed	62.5 (15.2)	
• Single	76.0 (-)	
Duration of hypertension since diagnosed		
• <1 year	72.2 (10.4)	<0.001
• 1 - 5 years	70.9 (11.5)	
• 6 - 10 years	68.5 (11.7)	
• >10 years	62.1 (15.8)	

Predictors of better quality of life

Table 4 below presents the findings of binary logistic regression analysis. Male patients and those with higher level of education (bachelor’s degree or higher) were more likely to have better QoL compared to others (p<0.05). On the other hand, patients aged 61-70 years, those who are unemployed or retired, those who are divorced or widowed, and those who have been diagnosed since more than 10 years with HTN were less likely to have better QoL compared to others (p<0.05).

Table 4. Predictors of better quality of life

Demographic variable	Odds ratio (95% confidence interval)	P-value
Age group		
• 50 – 60 years (Reference category)	1.00	
• 61 – 70 years	0.54 (0.34-0.86)	0.009*
• 71 – 80 years	0.54 (0.29-1.01)	0.053
• >80 years	0.66 (0.09-4.80)	0.685
Gender		

• Female (Reference category)	1.00	
• Male	1.52 (1.02-2.26)	0.041*
Nationality		
• Non-Saudi (Reference category)	1.00	
• Saudi	1.78 (0.50-6.43)	0.376
Employment status		
• Government employee (Reference category)	1.00	
• Non-governmental employee	1.18 (0.49-2.83)	0.713
• Unemployed	0.43 (0.25-0.73)	0.002**
• Retired	0.59 (0.35-0.98)	0.040*
Educational level		
• Elementary or lower (Reference category)	1.00	
• Intermediate	1.09 (0.52-2.29)	0.811
• Secondary	1.23 (0.66-2.26)	0.518
• Bachelor's degree	2.50 (1.39-4.51)	0.002**
• Higher education	18.11 (2.24-146.55)	0.007**
Marital status		
• Married (Reference category)	1.00	
• Divorced	0.39 (0.18-0.84)	0.017*
• Widowed	0.47 (0.27-0.83)	0.009**
• Single	-	-
Duration of hypertension since diagnosed		
• <1 year (Reference category)	1.00	
• 1 - 5 years	0.62 (0.29-1.30)	0.201
• 6 - 10 years	0.68 (0.32-1.44)	0.308
• >10 years	0.25 (0.12-0.53)	<0.001

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

DISCUSSION

This study evaluated the QoL among hypertensive patients aged 50 or older and determined the associated demographic factors. The primary findings of our research are as follows: In general, the average QoL score among the patients who took part in the study was found to be 67.7 (standard deviation: 13.4), indicating a moderate level of QoL. The psychological health domain exhibited the highest QoL score, with a mean of 83.7 (SD: 14.9). Conversely, the physical health domain displayed the lowest QoL score, with a mean of 42.8 (SD: 8.8). The study findings indicate that male patients and individuals with a higher level of education, specifically a bachelor's degree or higher, exhibited a greater likelihood of experiencing a better QoL in comparison to other participants (p<0.05). These findings are consistent with the study carried out among hypertensive patients attending Primary Health Care Centers in Makkah, Saudi Arabia [13]. Based on the reports, 73% of the patients with hypertension were estimated to have a good QoL. On the contrary, a study done in Indonesia found that 76% of the patients reported having poor QoL [14], which was concurred by the survey conducted in Iran [15]. Adherence to hypertensive medication and a good understanding of the disease could be the reason why Saudi patients may have a better QoL than the other regions. In addition, the QoL experienced by individuals with hypertension can be impacted by various factors, encompassing healthcare accessibility and socio-

economic standing [16-18]. Saudi Arabia has made substantial investments in its healthcare system, ensuring that government-funded healthcare services are accessible to its residents [16]. The Saudi government has demonstrated a proactive approach in promoting awareness regarding chronic disorders such as hypertension [16]. Public health campaigns and initiatives have effectively disseminated information to the general population regarding the potential hazards associated with hypertension, as well as the significance of consistent blood pressure monitoring and lifestyle adjustments. The oil-dependent economy of Saudi Arabia has contributed to a certain degree of economic stability, hence potentially yielding indirect advantages for healthcare and quality of life. The presence of economic stability has the potential to mitigate stressors that could potentially worsen hypertension.

Regarding WHOQoL-BREF domains, we noticed that the psychological health domain achieved the highest score (83.7 (SD: 14.9)), while the physical health domain displayed the lowest QoL score, with a mean of 42.8 (SD: 8.8). In addition, our study findings suggest that socio-demographic variables greatly influenced the QoL of our patients. Male patients and those with higher level of education (bachelor's degree or higher) were more likely to have better QoL compared to others (p<0.05). On the other hand, patients aged 61-70 years, those who are unemployed or retired, those who are divorced or widowed, and those who have been diagnosed since more than 10 years with HTN were less likely to have better QoL compared to others (p<0.05).

Consistent with prior research [10, 19-23], the present study confirms the presence of a statistically significant variation in the QoL among individuals diagnosed with hypertension, with gender and educational attainment serving as influential factors. A higher QoL score was reported in male patients across all aspects of QoL [10]. Individuals who possess higher levels of education frequently indicate experiencing a higher quality of life [10, 22, 24]. Individuals who have pursued further education exhibited a notably better average QoL score. This observation implies the impact of education on the perception of safety and security among individuals with hypertension [10]. Besides, Azar et al. found out that educational levels, occupation, and the duration of hypertension were the demographic variables influencing patients' QoL [15, 17, 18]. Similarly, Ha et al. revealed that being male, married, attainment of higher education, having moderate physical activities, and having treatment compliance were positively associated with QoL [10]. However, according to the survey done by Adamu et al., poor health-related QoL was correlated with age, duration of antihypertensive treatment, physical inactivity, low social support, comorbidity, being a widow, and being single, which did not coincide with previous reports [25].

In our study, the least QoL score was observed for the physical QoL domain. Consistent with these findings, a study conducted by Zheng et al. found that elderly hypertensive patients reported a greater impact in physical aspects as compared to other

domains, and the major problem being mentioned was pain/discomfort (57%), while issues with personal self-care being the least (17.2%) [26]. This scenario may have been different among patients in the medium age levels. For example, a survey carried out among Polish hypertensive patients documented that the physical domain rated the highest, whereas the social domain rated the least, but the overall QoL combining all aspects of the WHOQoL-BREF questionnaire was estimated to be at moderate levels which were consistent by the study done in Vietnam [27]. In contrast, previous research conducted in Vietnam explored the QoL among older individuals diagnosed with HTN [10]. The study revealed that social interaction category exhibited the greatest average satisfaction rating. In contrast, the psychological health score that exhibited the lowest value. In the same way, a separate study conducted in Brazil observed the highest average level of satisfaction pertaining to social domain [28]. Individuals diagnosed with hypertension may encounter a diminished QoL score within the physical domain due to many factors, such as the presence of symptoms and adverse effects associated with the condition and its corresponding treatments [29]. Hypertension is recognized as a significant risk factor for a range of cardiovascular and other health consequences, including but not limited to heart disease, stroke, renal dysfunction, and peripheral vascular disease. Moreover, patients may experience a significant burden due to the intricate nature of treatment regimens, which sometimes involve the administration of many medicines and the possibility of interactions with other prescriptions. Non-compliance or challenges in sticking to the prescribed treatment may arise, so impacting their physical well-being. Besides, the level of education one attains can potentially impact their acquisition of knowledge regarding suitable health practices, thereby affecting their capacity to effectively maintain optimal physical function [29, 30].

CONCLUSION

The QoL experienced by patients diagnosed with hypertension was frequently assessed to be moderate. The QoL of hypertension patients aged 50 years or above is significantly influenced by demographic characteristics, including age, gender, employment status, education, and marital status. The implementation of ongoing health education initiatives within the community pertaining to fundamental aspects of hypertension has the potential to enhance the overall management of this medical condition. Therefore, the dissemination of health education to the general population has a crucial role in augmenting awareness about hypertension, promoting the adoption of a healthy lifestyle, engaging in regular physical activity, scheduling routine medical examinations, and enhancing the effective management of underlying health disorders. These efforts are essential for enhancing the overall well-being and quality of life of patients.

Authorship Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception

and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes

Ethics Approval and Informed Consent: Ethical approval for this study's conduction and data collection were reviewed and approved by the Institutional Review Board (IRB) committee of Al-Imam Muhammad ibn Saud Islamic University (Project number 309/2022). The study was designed and conducted in accordance with the ethical principles that have their origin and comply with in the Declaration of Helsinki.

Potential Conflicts of Interest: None

Competing Interest: None

Acceptance Date: 27-01-2024

REFERENCES

1. World Health Organization. Hypertension. 2023 September 06, 2023]; Available from: <https://www.who.int/health-topics/hypertension/>.
2. Ahmed AM, Hersi A, Mashhoud W, et al. Al Rowaily, M. A., & Al-Mallah, M. H., Cardiovascular risk factors burden in Saudi Arabia: The Africa Middle East Cardiovascular Epidemiological (ACE) study. *J Saudi Heart Assoc*, 2017. **29**(4): 235-43.
3. Saudi Hypertension Management Society, Saudi Hypertension Guidelines 2018. 2018. 1-88.
4. Lawes CM, Vander Hoorn S, Rodgers A. Global burden of blood-pressure-related disease, 2001. *Lancet (London, England)*, 2008. **371**(9623): 1513-8.
5. Memish ZA, Jaber S, Mokdad AH, et al. Burden of disease, injuries, and risk factors in the Kingdom of Saudi Arabia, 1990-2010. *Prev Chronic Dis*, 2014. **11**(E169): 1-12.
6. Stein JD, Brown GC, Brown MM, et al. The quality of life of patients with hypertension. *J. Clin. Hypertens*, 2002. **4**(3): 181-8.
7. Kearney PM, Whelton M, Reynolds K, et al. Global burden of hypertension: analysis of worldwide data. *Lancet (London, England)*, 2005. **365**(9455): 217-23.
8. Whelton PK. Epidemiology of hypertension. *Lancet (London, England)*, 1994. **344**(8915): 101-6.
9. Trevisol DJ, Moreira LB, Kerkhoff A, et al. Health-related quality of life and hypertension: a systematic review and meta-analysis of observational studies. *J Hypertens*, 2011. **29**(2): 179-88.
10. Ha NT, Duy HT, Le NH, et al. Quality of life among people living with hypertension in a rural Vietnam community. *BMC public health*, 2014. **14**(1): 1-9.
11. Banegas JR, López-García E, Graciani A, et al. Relationship between obesity, hypertension and diabetes, and health-related quality of life among the elderly. *Eur J Cardiovasc Prev Rehabil*, 2007. **14**(3): 456-62.
12. The WHOQOL Group. Development of the World Health Organization WHOQOL-BREF quality of life assessment. *Psychol Med*, 1998. **28**(3): 551-8.

13. Mzjaji J, Alqurashi AM, Dawaji TA, et al. Assessment of Knowledge of Health-Related Quality of Life among Hypertensive Patients Attending Primary Health Care Centers in Makkah-Al Mokarramah, Saudi Arabia 2021. *Annals of R.S.C.B*, 2021. **25**(7): 2047-65.
14. Husain F. Quality of life in patients with hypertension in public health center Sipatana Gorontalo city using Whoqol-bREFE Questionnaire. in *In Proceedings of International Interdisciplinary Conference on Sustainable Development Goals (IICSDGs)*. 2019.
15. Azar FEF, Solhi M, Chabaksvar F., Investigation of the quality of life of patients with hypertension in health centers. *J Educ Health Promot*, 2020. **9**: 1-6.
16. Gurajala S. Healthcare System in the Kingdom of Saudi Arabia: An Expat Doctor's Perspective. *Cureus*, 2023. **15**(5): 1-3.
17. Chantakeeree C, Sormunen M, Estola M, et al. Factors Affecting Quality of Life among Older Adults with Hypertension in Urban and Rural Areas in Thailand: A Cross-Sectional Study. *Int J Aging Hum Dev*, 2022. **95**(2): 222-44.
18. Saini M. Understanding Health Related Quality of Life in Hypertensive Patients: Interrogating Effect of Psychological and Environmental Factors. *J YOUNG PHARM*, 2022. **14**: 100-105.
19. Tran BX, Ohinmaa A, Nguyen L T, et al. Gender differences in quality of life outcomes of HIV/AIDS treatment in the latent feminization of HIV epidemics in Vietnam. *AIDS care*, 2012. **24**(10): 1187-96.
20. Van Minh H, Byass P, Chuc N T, et al. Patterns of health status and quality of life among older people in rural Viet Nam. *Glob Health Action*, 2010. **3**: 64-9.
21. Zygmuntowicz M, Owczarek A, Elibol A, et al. Comorbidities and the quality of life in hypertensive patients. *Pol Arch Med Wewn*, 2012. **122**(7-8): 333-40.
22. Gholami A, Jahromi L M, Zarei E, et al. Application of WHOQOL-BREF in Measuring Quality of Life in Health-Care Staff. *Int J Prev Med*, 2013. **4**(7): 809-17.
23. Hoi I, Chuc NT, Lindholm L. Health-related quality of life, and its determinants, among older people in rural Vietnam. *BMC public health*, 2010. **10**: 1-10.
24. Ng N, Hakimi M, Byass P, et al. Health and quality of life among older rural people in Purworejo District, Indonesia. *Glob health action*, 2010. **3**: 78-87.
25. Adamu K, Feleke A, Mucbe A, et al. Health related quality of life among adult hypertensive patients on treatment in Dessie City, Northeast Ethiopia. *PloS one*, 2022. **17**(9): 1-14.
26. Zheng E, Xu J, Xu J, et al. Health-Related Quality of Life and Its Influencing Factors for Elderly Patients With Hypertension: Evidence From Heilongjiang Province, China. *Front Public Health.*, 2021. **9**: 1-8.
27. Snarska K, Chorąży M, Szczepański M, et al. Quality of Life of Patients with Arterial Hypertension. *Medicina (Kaunas, Lithuania)*, 2020. **56**(9): 1-11.
28. Melchioris AC, Correr CJ, Pontarolo R, et al. Quality of life in hypertensive patients and concurrent validity of Minichal-Brazil. *Arq Bras Cardiol*, 2010. **94**(3): 337-64.
29. Xu X, Rao Y, Shi Z, et al. Hypertension Impact on Health-Related Quality of Life: A Cross-Sectional Survey among Middle-Aged Adults in Chongqing, China. *Int J Hypertens*, 2016. **2016**: 1-7.
30. Brennan SL, Turrell G. Neighborhood disadvantage, individual-level socioeconomic position, and self-reported chronic arthritis: a cross-sectional multilevel study. *Arthritis Care Res (Hoboken)*, 2012. **64**(5): 721-8.