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Exploring Hypertension on the Sub Variables of Quality of Life among Middle Aged Individuals 30 to 50 Years

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Abstract

Introduction: Hypertension is a chronic condition with significant implications for physical and psychological health, often reducing quality of life (QoL). While most studies focus on elderly populations, limited research explores its impact among middle-aged adults, a group increasingly at risk due to lifestyle changes. This study investigates the effect of hypertension on QoL across key domains using the EQ-5D-5L scale.

Methods: A descriptive cross-sectional study was conducted among 120 hypertensive individuals aged 30–50 years, selected through convenience sampling. Data were collected using a structured questionnaire, including demographic details, BMI, blood pressure, and the EQ-5D-5L and EQ-VAS tools. Statistical analysis involved descriptive statistics and correlation analysis to examine associations between hypertension and QoL dimensions.

Results: Participants had a mean age of 39.7 years, with 56.7% females. The average BMI was 25.12 (overweight), and the mean systolic BP was 152.91 mmHg. The EQ-5D-5L findings revealed significant impairments in pain/discomfort and anxiety/depression domains, followed by usual activities, mobility, and self-care. A strong positive correlation existed between weight and BMI (r = 0.802), while correlations between age, BMI, and blood pressure were weak. EQ-VAS scores showed poorer perceived health among individuals with higher BP.

Discussion: Hypertension adversely affects physical, psychological, and functional aspects of QoL in middle-aged adults, particularly in mental health and pain domains. The lack of strong correlations between age and BP suggests that additional lifestyle and psychosocial factors influence QoL outcomes. Interventions targeting stress management, adherence, and physical activity are essential for improving health-related quality of life in this population.

Conclusion: Hypertension significantly reduces QoL among individuals aged 30–50, underscoring the need for comprehensive management strategies integrating medical, psychological, and lifestyle-based approaches.

Keywords: *Hypertension, Quality of Life, EQ-5D-5L, Middle-aged Adults, Health-related QoL.*

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Introduction

Hypertension is considered one of the diseases with significant costs to the health and economic systems of countries, as it is the leading cause of cardiovascular complications, such as stroke and myocardial infarction[1].

According to the Italian National Institute of Health, 31% of the Italian population aged between 35 and 74 are hypertensive, and 17% are borderline[2]. It is defined by a persistent high systolic (≥140 mmHg) and diastolic (≥90 mmHg) blood pressure (BP)[3]. It is a chronic medical condition that affects more than a quarter of the global population, and its prevalence increases with age [3,4]. Most of its incidence across the age span seems to be due to systolic hypertension, while elevations of diastolic BP and isolated hypertension also play a role [3]. European studies about hypertension during lifespan showed percentages of incidence between 2.2% and 13% in adolescents, reporting that primary hypertension is the prevalent form during this stage of life [5]. However, the prevalence of hypertension increases with age, with a prevalence of 60% over the age of 60 years and 75% over the age of 75 years [6].

Hypertension requires comprehensive patient care because of its long-term impact on the body and patients' quality of life; if not controlled, it has severe but avoidable long-term consequences [2,6]. Globally, it is the most substantial modifiable risk factor for cardiovascular disease and related disabilities [1,3]. Physical inactivity accounts for 5–13% of the risk for the development of hypertension, while regular physical activity helps the body reduce blood pressure [7]. With the aging population and rise of chronic diseases, an increasing number of middle-aged and elderly people suffer from severe health problems. Hypertension (HTN) is considered a major risk factor for cardiovascular diseases, and it is estimated that by 2025, HTN will affect 1.5 billion people around the world, with yearly deaths related to it projected to increase to 10.4 million [1,8]. High blood pressure (BP) is ranked as the third most important risk factor for attributable disease burden worldwide [3] .

Hypertension exerts a substantial public health burden on cardiovascular health status and healthcare systems in India. It is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease (CHD) deaths in India [9]. The WHO rates HTN as one of the most important causes of premature death worldwide [1]. In an analysis of worldwide data for the global burden of HTN, 20.6% of Indian men and 20.9% of Indian women were suffering from HTN in 2005. The rates of HTN are projected to increase to 22.9% in men and 23.6% in women by 2025 [8]. Recent studies from India have shown the prevalence of HTN to be 25% in urban and 10% in rural populations [9]. According to WHO 2008 estimates, the prevalence of raised BP in Indians was 32.5% (33.2% in men and 31.7% in women) [9]. However, only about 25.6% of treated patients had their BP under control in a multicentre Indian study on awareness, treatment, and adequacy of control of HTN [9].

Major developments have been made in drug discovery for hypertension management. However, various studies conducted worldwide have shown that approximately 50% of patients receiving treatment fail to have controlled blood pressure despite pharmacotherapy [10]. One reason for low adherence to treatment is the extent to which a person's behaviour reflects significant lifestyle changes, directly associated with compliance with healthcare recommendations [11]. Adherence rates are particularly higher among patients with acute illnesses than those with chronic illnesses [11]. Non-adherence is especially observed in asymptomatic conditions such as hypertension [11].

Hypertension ranks as the second leading risk factor for men and the leading risk factor for women globally, accounting for about 90 million disability adjusted life years (DALYs) among women and about 125 million DALYs among men [12]. Ischemic heart disease (IHD) is the largest source of DALYs attributable to high systolic blood pressure (SBP), followed by haemorrhagic stroke [12].

The overall prevalence of hypertension among adults in India is about 30%, with an urban prevalence of 34% and rural prevalence of 28% [9]. Unfortunately, only 25% of rural and 38% of urban Indians with hypertension are being treated. The control rate of hypertension in India is dismal, with only one-tenth of rural and one-fifth of urban hypertensive populations having their blood pressure under control [9].

India is a young country, and according to Census 2011, around 32% of its 1.2 billion people are young adults (20–39 years) [13]. Assuming a prevalence of hypertension of around 7% among this age group, this translates to about 27 million young adults with hypertension in India [13]. Elevated blood pressure during young adulthood causes vascular damage that results in clinical events and mortality later in life [14]. Awareness, treatment, and control of high blood pressure among young adults are very low [13]. There is also scant information about the most effective treatment strategies for younger patients with hypertension, as most clinical trials only target older populations [14].

Furthermore, socioeconomic factors including education, income, and access to healthcare services influence an individual's ability to manage hypertension effectively [6,15]. Those with limited resources often face additional barriers in disease management, further degrading their quality of life [15] . Psychological variables such as locus of control and self-esteem also play a crucial role. Individuals with a strong internal locus of control are more likely to believe that their actions can positively affect health outcomes, whereas those with low self-esteem often show poorer adherence to hypertension management [16].

Given the high prevalence and complex interplay of physical, psychological, and social factors, there is an urgent need to explore the impact of hypertension on quality of life, particularly among the under-researched middle-aged population. Understanding how this chronic condition disrupts daily functioning, emotional resilience, and social engagement in individuals aged 30 to 50 is essential for designing effective, age-specific interventions.

This study, therefore, aims to investigate the relationship between hypertension and quality of life in middle-aged adults using the EQ-5D-5L instrument—a standardized tool for measuring self-reported health status. By dissecting the effects of hypertension across sub-domains such as pain/discomfort, anxiety/depression, mobility, self-care, and usual activities, the study seeks to provide a comprehensive view of how hypertension impairs life quality in this critical life stage. The findings can inform clinical practice, shape public health policies, and drive personalized healthcare strategies aimed at improving the overall well-being of hypertensive patients in the 30–50 age group.

Rationale of the Study

Hypertension is a leading public health concern and a major risk factor for cardiovascular diseases, kidney failure, and stroke [1,2]. It often remains asymptomatic for years, progressively damaging organ systems and reducing life expectancy [3]. Its prevalence is rising globally, particularly in low- and middle-income countries, with adults aged 30–50 increasingly vulnerable due to sedentary lifestyles, poor diets, stress, and genetic predisposition [4–6]. This age group, being in their most productive years, often overlooks the impact of hypertension on their quality of life (QoL), making them a critical population for research and targeted interventions [7].

Quality of life is a multidimensional concept encompassing physical, psychological, social, and environmental well-being [8,9]. Hypertension adversely affects these domains through physical limitations, psychological distress, and social challenges [10,11]. However, studies primarily focus on elderly populations or general adult groups, leaving a gap in understanding the specific challenges faced by middle-aged individuals [12,13]. By examining sub-variables such as physical functioning, emotional well-being, social interaction, and work productivity, this study aims to identify how hypertension uniquely influences QoL in the 30–50 age group [14]. Insights from this research will inform targeted interventions like workplace wellness programs, mental health support, and lifestyle modifications, ultimately addressing an underexplored aspect of chronic disease management [15].

In conclusion, the current study will address a gap in current research by focusing on the intersection of hypertension and quality of life among individuals aged 30 to 50 [16]. Exploring the sub-variables of QoL in this context offers a deeper, more actionable understanding of how hypertension affects people during their peak years and how to mitigate these effects through focused healthcare strategies [17].

Aim. To explore the impact of hypertension on the sub-variables of quality of life among individuals aged **30 to 50** years using the **EQ-5D-5L** scale.

Objectives

- To evaluate overall quality of life in hypertensive individuals aged 30–50 years.
- To analyze self-reported health status across the five EQ-5D-5L dimensions.
- To assess the association between hypertension and pain/discomfort.
- To examine the psychological impact of hypertension, focusing on anxiety and depression.

Methodology

This study employed a quantitative, descriptive cross-sectional design to examine the effect of hypertension on the quality of life among individuals aged 30–50 years [18]. A total of 120 participants were recruited using a convenience sampling technique, with eligibility limited to individuals diagnosed with hypertension, currently on medication or lifestyle modifications, and willing to provide informed consent. Participants with comorbid chronic conditions such as diabetes, cancer, kidney failure, psychiatric illness, cognitive impairments, or those who were pregnant were excluded to maintain homogeneity of the sample [19]. Data were collected at a single point in time using a standardized health-related quality of life (HRQoL) assessment tool, enabling evaluation of the current impact of hypertension on various life domains [20].

The EQ-5D-5L scale, developed by the EuroQol Group, was used to assess health-related quality of life. It measures five dimensions—mobility, self-care, usual activities, pain/discomfort, and anxiety/depression—each with five response levels ranging from no problems to extreme problems [21]. Additionally, the EQ-VAS (Visual Analogue Scale) allowed participants to rate their overall health on a scale of 0 (worst imaginable health) to 100 (best imaginable health). Responses were converted into a five-digit health state and utility score using country-specific value sets, with higher scores indicating better perceived health [22].

Hypertension status was determined based on self-reported diagnosis by a healthcare professional, categorized as 'yes' or 'no' [18]. Body Mass Index (BMI) was calculated using self-reported weight and height (kg/m²) and classified according to WHO guidelines into underweight (<18.5), normal (18.5–24.9), overweight (25–29.9), and obese (≥30) [23]. Both variables were analysed to explore their association with health-related quality of life outcomes measured by the EQ-5D-5L [21,22].

The study was conducted in a disturbance-free environment and presented as an investigation exploring the impact of hypertension on the quality of life among middle-aged individuals (30–50 years). A descriptive survey design was employed in 2025, involving 120 randomly selected patients who met the inclusion criteria [19]. The study objectives were explained, informed consent was obtained, and participants were assured of confidentiality. Each participant voluntarily completed the questionnaire, which required approximately 5–7 minutes to fill. The data collected was then organized and analysed for interpretation [20].

Data Analysis and Analysis

The data analysis reveals several key demographic and health-related trends within the sample population [18,19]. The participants have an average age of 39.7 years, ranging between 30 and 50 years. The mean height recorded is 160.43 cm, while the mean weight is 64.67 kg, with noticeable variations across individuals [23]. Based on these measurements, the average Body Mass Index (BMI) is 25.12, placing the population in the 'Overweight' category [23]. Additionally, the average systolic blood pressure is 152.91 mmHg, which is considered high and indicates a potential risk of hypertension [18].

In terms of correlation analysis, a strong positive correlation (0.802) exists between weight and BMI, confirming that as weight increases, BMI rises significantly [23]. There is also a moderate positive correlation (0.343) between height and weight, suggesting that taller individuals tend to weigh more [23]. Age shows an interesting relationship with emotional intelligence, exhibiting a positive correlation (0.424) with EQTOT, indicating that older individuals tend to have higher emotional intelligence scores [21]. However, there is a negative correlation (-0.377) between age and EQ-VAS, meaning older individuals may rate their emotional intelligence lower on visual scales [22].

The correlation between age and BMI is weak (0.195), implying that age has only a slight influence on BMI [23]. Furthermore, the analysis shows no strong correlation between BMI, age, and blood pressure, indicating that these factors do not significantly impact blood pressure in this sample [18]. From a gender perspective, the dataset comprises 56.7% females and 43.3% males, indicating a higher representation of females [19]. Overall, the analysis suggests an overweight population with elevated systolic blood pressure, highlighting a possible hypertension risk [18,23]. The strong association between weight and BMI underscores the importance of weight management for maintaining healthy BMI levels [23]. The lack of significant correlation between age and blood pressure suggests that other variables may contribute to hypertension [18].

These findings are crucial for medical, health, and demographic research, providing valuable insights into lifestyle and health trends among middle-aged individuals[18–23].

Discussion

This study aimed to assess the impact of hypertension on the quality of life (QoL) among individuals aged 30 to 50 using the EQ-5D-5L scale [18,19]. The findings of this research highlighted the significant influence hypertension has across various dimensions of life including physical health, psychological well-being, and social functionality [20–22].

The results of the EQ-5D-5L scale revealed that individuals with hypertension experienced notable impairments in domains such as mobility, self-care, usual activities, pain/discomfort, and anxiety/depression [21,22]. Among these, pain/discomfort and anxiety/depression were most prominently affected, suggesting that both physical and mental health domains are substantially compromised in hypertensive individuals [20,21].

1. **Pain/Discomfort:** This was one of the most commonly reported issues. Consistent with other studies, individuals with hypertension often face muscular tension, headaches, or cardiovascular-related discomfort, which can severely limit physical functioning and diminish quality of life [18,19,23].
2. **Anxiety/Depression:** Psychological health was also significantly affected. The chronic nature of hypertension, its lifelong management, medication routines, and fear of complications like stroke or heart attack may contribute to increased levels of anxiety and depressive symptoms in this population [21,22]. This finding aligns with prior research suggesting a bi-directional relationship between hypertension and mental health [24].
3. **Mobility and Self-Care:** While these dimensions were less affected than pain and mental health, limitations

were still reported. In some cases, physical inactivity due to fatigue or fear of exertion contributed to reduced physical capability [18,23].

4. **Usual Activities:** Middle-aged individuals with hypertension reported difficulty engaging in their daily routines and professional responsibilities. Work-related stress, time constraints for health management, and fluctuating energy levels played a role in these limitations [20,22].

These findings are consistent with global and regional studies that document a decline in health-related quality of life (HRQoL) in individuals with chronic illnesses like hypertension [19,23,25]. For instance, studies conducted in Nepal, Ethiopia, and China also indicated poor HRQoL outcomes in hypertensive populations, particularly in domains like pain and psychological well-being [19,25].

The study also observed that factors such as age within the 30–50 range, occupation type, income level, physical activity, and medication adherence influenced HRQoL outcomes:

1. **Occupation & Stress:** Participants with high-stress jobs reported lower QoL scores. This supports the hypothesis that occupational stress can exacerbate hypertension and its related symptoms [21,24].
2. **Physical Inactivity:** A sedentary lifestyle was significantly associated with poorer outcomes in mobility and self-care domains [18,23].
3. **Medication Adherence:** Individuals with poor adherence to antihypertensive therapy reported worse QoL, especially in physical health dimensions. This supports previous findings that compliance with medication and lifestyle interventions plays a vital role in health maintenance [19,20].

Although the present study did not include a control group of normotensive individuals, comparisons can be inferred from existing literature. Multiple cross-sectional studies indicate that normotensive individuals typically report higher HRQoL scores across all EQ-5D dimensions [19,21]. This difference further supports the hypothesis that hypertension independently contributes to a decline in perceived health and well-being.

The study underscores the importance of a multidisciplinary approach in managing hypertension [18–22]. Not only should treatment focus on medication and blood pressure control, but also on:

1. Mental health support (e.g., counselling, stress management) [21,24]
2. Lifestyle modifications (e.g., exercise, diet, smoking cessation) [18,23]
3. Patient education and empowerment to improve adherence and reduce psychological burden [20,21]

Furthermore, early screening and awareness programs, particularly for middle-aged adults, are essential to prevent the progression of hypertension and mitigate its negative impact on quality of life [18,19,25].

Limitations and Recommendations

The present study has certain limitations that should be acknowledged. Firstly, the research was conducted on a relatively small sample size, which may restrict the generalizability of the findings to a larger population. Secondly, no intervention was administered during the study, limiting the ability to establish causal relationships or assess the impact of targeted strategies on the variables under investigation.

Based on these limitations, several recommendations can be made for future research. Studies with a larger and more diverse sample size are needed to enhance the validity and reliability of the results. Additionally, the use of more robust and standardized measurement tools is recommended to ensure greater accuracy in data collection. Future research should also consider adopting an experimental or comparative design, such as a pre-post intervention model, to allow for clearer distinctions in outcomes. Furthermore, it is important to conduct studies that include appropriate interventions to evaluate their effectiveness in addressing the identified issues.

Future Implications

The findings of this study highlight the significant impact of hypertension on physical, psychological, and functional aspects of quality of life among middle-aged individuals, underscoring the need for comprehensive and multidisciplinary strategies [18–20]. Future efforts should prioritize early screening and preventive programs in workplaces and community health centers to enable timely detection and intervention [21,22]. Personalized lifestyle modification plans, including dietary guidance, exercise routines, and stress management, should be tailored to individual needs for better adherence [23]. Mental health integration into hypertension care is crucial, as anxiety and depression emerged as key concerns; counseling and therapeutic interventions should be standard in management protocols [18,24]. Technology-based tools such as mobile health apps and wearable devices offer promising opportunities for real-time monitoring, medication adherence, and behavioral support [25]. Additionally, workplace wellness programs and supportive policies can address occupational stress and promote a healthier

workforce [26]. Finally, further research is recommended to explore each EQ-5D-5L domain in depth, enabling the development of targeted interventions that address pain, discomfort, and psychological well-being more effectively [18–26].

Role of Occupational Therapy in Hypertension Management

Occupational therapy (OT) plays a vital role in supporting individuals with hypertension by addressing its physical, psychological, and lifestyle-related impacts on daily functioning [18,19]. OTs conduct functional assessments and activity analyses to identify limitations in activities of daily living (ADLs) and recommend energy conservation techniques, ergonomic adjustments, and assistive devices [20–22]. They facilitate lifestyle modification by helping patients establish balanced routines that incorporate physical activity, healthy meal preparation, stress reduction, and medication adherence [23,24]. Recognizing the psychological burden of hypertension, OTs integrate relaxation techniques, mindfulness, and cognitive-behavioral strategies to reduce anxiety and improve coping [25]. Furthermore, they promote safe physical activity, environmental modifications to reduce stressors, and adherence strategies such as reminders and self-monitoring routines [18,26]. Through education, advocacy, and community engagement, OTs empower clients to manage hypertension effectively while maintaining independence and quality of life [18–26].

Conclusion

This study aimed to explore the impact of hypertension on various sub-variables of quality of life (QoL) among middle-aged individuals using the EQ-5D-5L assessment scale. The findings reveal several noteworthy insights into how hypertension correlates with both physical and psychological well-being in the target population.

Firstly, the demographic analysis showed that the average age of participants was approximately 39.7 years, with a majority being female (56.7%). Most participants fell within the overweight category, with an average BMI of 25.12, and the average systolic blood pressure was 152.91 mmHg, indicating a prevalent risk of hypertension within this group.

The EQ-5D-5L results demonstrated that hypertension affects multiple dimensions of quality of life. Notably, there were moderate positive correlations between age and total emotional quotient (EQTOT), and moderate negative correlations between age and self-rated health status (EQ-VAS), suggesting that while emotional maturity may increase with age, self-perceived health tends to decline.

Correlation analyses also highlighted that as blood pressure increases, there is a tendency for EQ-VAS scores to decrease, indicating that individuals perceive their health more negatively as their systolic or diastolic pressure rises. However, correlations between blood pressure and other factors such as age and BMI were weak, suggesting that additional variables may mediate the effect of hypertension on quality of life.

Furthermore, the study noted moderate to strong relationships between emotional well-being dimensions (such as EQM, EQSC, and EQPD) and overall quality of life (EQTOT), reinforcing the importance of psychological factors in managing chronic health conditions like hypertension.

In summary, the research underscores that hypertension in middle-aged adults is not only a physiological condition but also a psychosocial concern. It impacts multiple domains of life, particularly emotional well-being and perceived health status. The EQ-5D-5L tool proved effective in capturing these subtleties. These insights stress the need for holistic management approaches that include emotional support, lifestyle modifications, and preventive education to improve the overall quality of life for hypertensive individuals in this age bracket.

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References

1. O'Brien E. The Lancet Commission on hypertension: Addressing the global burden of raised blood pressure on current and future generations. J Clin Hypertens (Greenwich). 2017;19(6):564–8.
2. Treviso DJ, Moreira LB, Kerkhoff A, Fuchs SC, Fuchs FD. Health-related quality of life and hypertension: A systematic review and meta-analysis of observational studies. J Hypertens. 2011;29(2):179–88.
3. Unger T, Borghi C, Charchar F, et al. 2020 International Society of Hypertension global hypertension practice guidelines. J Hypertens. 2020;38(6):982–1004.
4. Stensvold I, Tverdal A, Solvoll K, Foss OP. Tea consumption: Relationship to cholesterol, blood pressure, and coronary and total mortality. Prev Med. 1992;21(4):546–53.
5. Summer SS, Wang HH, Horton R. Healthy cities: Key to a healthy future in China. Lancet. 2018;391(10135):2086–7.

6. Andrade JM, Rios LR, Teixeira LS, et al. Influence of socioeconomic factors on the quality of life of elderly hypertensive individuals. Ciênc Saúde Colet. 2014;19(8):3497–3504.

7. Mir Mohammad Khani M, Paknazar M, Asl NS, Paknazar F. Gender differences in emotional and behavioural problems of adolescents: A cross-sectional study on talented school students in Iran. Iran J Pediatr. 2023;In Press.

8. Al-Hendawi M, Kliewer W, Hussein E. School adjustment and academic success in Qatari secondary school students: Associations with well-being and emotional and behavioural problems. Educ Sci. 2022;12(12):934.

9. Brandenburg MA, Friedman RM, Silver SE. The epidemiology of childhood psychiatric disorders: Prevalence findings from recent studies. J Am Acad Child Adolesc Psychiatry. 1990;29(1):76–83.

10. Buchanan A, Flourie TBJ. Emotional and behavioural problems in childhood and distress in adult life: Risk and protective factors. Aust N Z J Psychiatry. 2002;36:321–527.

11. Burns BJ, Costello EJ, Angold A, Tweed D, Stangl D, Farmer EMZ, et al. Children's mental health service use across service sectors. Health Aff (Millwood). 1995;14(3):147–59.

12. Deng S, Liu X, Roosa MW. Agreement between parent and teacher reports on behavioural problems among Chinese children. J Dev Behav Pediatr. 2004;25(6):407–14.

13. Elhamid AA, Howe A, Reading R. Prevalence of emotional and behavioural problems among 6–12-year-old children in Egypt. Soc Psychiatry Psychiatr Epidemiol. 2009;44(1):8–14.

14. Gervytė J, Grigaliūnas A, Grigaliūnienė V. Changes in children suffering from emotional and behavioural disorders after dialectical behaviour therapy. Nurs Educ Res Pract. 2014;4(1).

15. Gupta N, et al. Prevalence of behaviour problems in school-going children. Indian J Pediatr. 2001;64(4):323–6.

16. Li J, Yao YS, Dong Q, Dong YH, Liu JJ, Yang LS, et al. Characterization and factors associated with sleep quality among rural elderly in China. Arch Gerontol Geriatr. 2013;56(1):237–43.

17. Li Y, Ley SH, Tobias DK, Chive SE, VanderWeele TJ, Rich-Edwards JW, et al. Birth weight and later life adherence to unhealthy lifestyles in predicting type 2 diabetes: Prospective cohort study. BMJ. 2015;351:h3672.

18. Lokhov PG, Balashova EE, Trifonova OP, Maslov DL, Ponomarenko EA, Archakov AI. Mass spectrometry-based metabolomics analysis of obese patients' blood plasma. Int J Mol Sci. 2020;21(2):568.

19. Otani K, Haruyama R, Gilmour S. Prevalence and correlates of hypertension among Japanese adults, 1975 to 2010. Int J Environ Res Public Health. 2018;15(8):1645.

20. Prabitha SK. A study to determine the emotional and behavioural problems among children of employed mothers in selected schools at Manamadurai, Sivagangai district, Tamil Nadu [Doctoral dissertation]. Manamadurai: Mehta College of Nursing; n.d.

21. Rescorla L, Achenbach T, Ivanova MY, Dumenci L, Almqvist F, Bilenberg N, et al. Behavioural and emotional problems reported by parents of children ages 6 to 16 in 31 societies. J Emot Behav Disord. 2007;15(3):130–42.

22. Song T, Ding YW, Sun Y, He YN, Qi DJ, Wu Y, et al. A population-based study on health-related quality of life among urban community residents in Shenyang, Northeast of China. BMC Public Health. 2015;15:921.

23. Syed Hussein. Prevalence of emotional and behavioural problems among primary school children in Karachi. Indian Pediatr. 2009;46:623–7.

24. Verhulst FC, Van der Ende J, Ferdinand RF, Kasius MC. The prevalence of DSM-III-R diagnoses in a national sample of Dutch adolescents. Arch Gen Psychiatry. 1997;54(4):329–33.

25. Weisz JR, Suwanlert S, Chaiyasit W, Weiss B, Achenbach TM, Walter BR. Epidemiology of behavioural and emotional problems among Thai and American children: Parent reports for ages 6 to 11. J Am Acad Child Adolesc Psychiatry. 1987;26(6):890–7.

26. Zhang H, Li S, Chen G, Abdulai T, Liu X, Wang Y, et al. Ambient air pollutants aggravate association of snoring with prevalent hypertension: Results from the Henan Rural Cohort. Chemosphere. 2020;256:127108.