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# Knowledge, Attitude, and Practices regarding Risk Factors, Prevention and Treatment of Hypertension among Urban Dwellers in Chennai: A Cross-Sectional Study

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## ABSTRACT

*Introduction* : Hypertension continues to remain a significant public health concern for the past few decades in both developed and developing countries. The disease also continues to increase significant mortality and morbidity due to patients' poor management causing an increasing impact on other chronic illnesses. This can be controlled only when the knowledge and attitude of people toward hypertension are adequate for them to practice the measures of prevention and management.

*Materials and methods* : A cross-sectional study was conducted among patients attending the outpatient department (OPD) of the Internal Medicine and Hypertension Centre of Excellence, MGM Healthcare Hospital, Chennai. A validated self-administered QR-coded questionnaire was developed focusing on assessing mainly three factors amidst patients – knowledge, attitude and practice of the known information in the area of hypertension. Enrolled patients were asked to fill up the questionnaire and their blood pressure levels were recorded using a digital sphygmomanometer.

*Results* : Three hundred and ninety-four patients were enrolled where 84% of them were under 45 years of age and 58% were males. 70% of participants recorded a moderate knowledge grade (25.2 (±12.4)) and the attitude score was good (4.29 (±1.7)). However, the practice including regular check-ups, screening, and diet and physical activity was sub-optimal.

*Conclusion* : Thus, the need to enforce adequate education that can influence appropriate attitudes and practice towards preventing or maintaining hypertension under control is evident, to ensure behavioral changes leading to improved quality of life.

**Keywords:** Cardiovascular diseases, Good clinical practice, Hypertension, Knowledge, Mortality.

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## INTRODUCTION

Hypertension or high blood pressure has been a prevailing silent pandemic for the past few decades in both developed and developing countries. Approximately, 1.28 billion adults around the world have hypertension and two-thirds of its prevalence is from low- and middle-income countries. The condition has also been raising the risk of prevalence of other chronic diseases like cardiovascular affections, stroke, and much more contributing to increasing mortality and morbidity.[1] Various risk factors (Figure 1) including our diet and inappropriate lifestyle have been known to increase the prevalence of hypertension, however, remain unknown to a majority of the population in certain developing countries.

Cardiovascular diseases (CVD) are known to be the leading cause of mortality worldwide contributing to more than 80% of deaths, especially in Sub-Saharan regions and hypertension is termed to be its leading risk factor.[2] This brings up the pressing need to address hypertension to reduce the burden of CVDs and achieve the Sustainable Development Goal (SDG) target 3.4 of reducing premature mortality due to non-communicable diseases (NCD) by 33% by 2030.[3]

In countries like India, nearly 63% of total deaths are due to NCDs and among them, 27% are due to CVDs.[4,5] The most affected age group is between 40 to 69 years (45%) and among them, only 12% of people have their blood pressure under control. This uncontrolled blood pressure has been termed to be one of the main risk factors for

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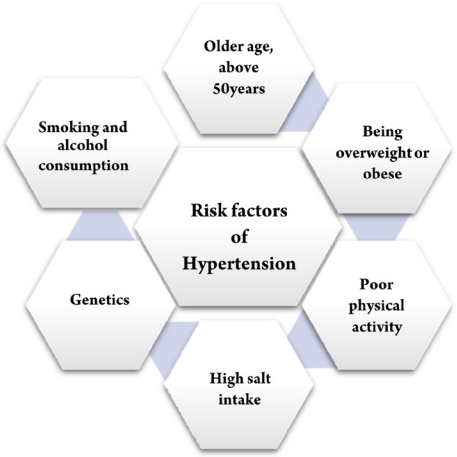



Figure 1: Common risk factors of Hypertension.

cardiovascular diseasesand stroke contributing to one-third of total deaths in the country.[6] India has thus set a target of a 25% relative reduction in the prevalence of hypertension (raised blood pressure) by 2025.[7]

However, previous studies have revealed that 46% of adults in the country are unaware oftheir condition and less than half of them are diagnosed and treated for hypertension.[8] Also, various recent studies have revealed that appropriate diet and lifestyle modificationscan help manage and improve the health of patients with hypertension and prevent the condition for those without.

The Dietary Approach to Stop Hypertension (DASH) practice was designed and developed tohelp treat or prevent high blood pressure.[9] This approach limits foods that are high in sodium, saturated fat, and added sugars, thus helping to prevent developing other complications.[10] However, most people, especially in developing countries were found to be unaware of such lifestyle modifications and have been advised to follow once they seek treatment for hypertension.

This study was thus undertaken to assess the knowledge and awareness of people withvarious other chronic diseases, regarding hypertension, its risk factors, treatment and their attitude towards applying the preventive measures in daily life.

## Objective

- To assess and explore the knowledge regarding the risk factors and complications ofhypertension among the study population
- To determine their attitude and practice about lifestyle changes that help preventhypertension.
- To determine the prevalence of hypertension and prehypertension among the study population

## MATERIALS AND METHODS

A cross-sectional study was conducted among patients with various acute and chronic illnesses attending the OPD of Internal Medicine and Hypertension Centre of Excellence, MGM Healthcare Hospital, Chennai. A validated self-administered QR-coded questionnaire was developed focusing on assessing mainly three factors amidst patients – knowledge, attitude and practice of the known information in the area of hypertension. Enrolled patients were asked to fill up the questionnaire and their blood pressure levels were recorded using a digital sphygmomanometer. Three recordings of the blood pressure of participants were collectedand an average of three was taken up for final analysis.

Participants who were above 18 years of age and willing to participate in the study were included. All patients were given an informed consent form and patient information sheet regarding the purpose and mode of study and only those who gave their consent were taken up for the study. This study was approved by the Local Institutional Ethics Committee.

## DATA ANALYSIS AND INTERPRETATION

The questionnaire used for the study included four sections where demographic data of patients were recorded followed by their knowledge and attitude regarding hypertension, its risk factors, lifestyle measures to prevent or manage them, and finally their practice of the same. The knowledge, attitude, and practice sections of the questionnaire were analyzed based on scoring out of 80 (Table 1)

Table 1: Scoring interpretation of each section

| Sections | Scoring and interpretation |
|---|---|
| Knowledge (Total score = 62) | More than 31 – Good knowledge |
| | 15 – 31 – Moderate knowledge |
| | Less than 15 – Poor knowledge |
| Attitude (Total score = 5) | More than 3 – Good attitude |
| | Less than or equal to 3 – Poor attitude |
| Practice (Total score = 13) | More than 7 – Good practice |
| | Less than or equal to 7 – Poor practice |

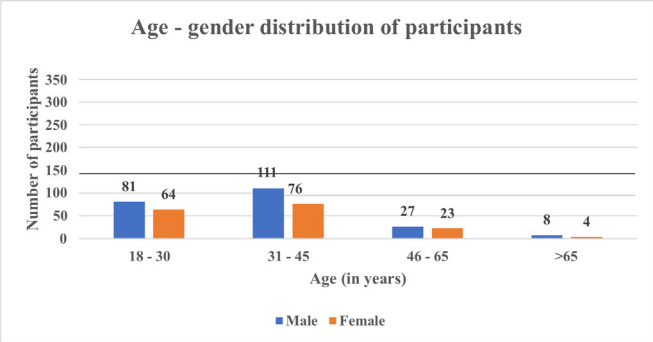
The resulting scores of all three sections were aggregated, analyzed based on average scoresand expressed in the form of frequency and percentage. Cross tabulations and Chi-square tests were used to test the relationship between variables and a linear regression model was used to assess the factors that determine the knowledge, attitude, and practice of people concerning hypertension.

## RESULTS

### Demographic distribution

394 participants were enrolled in the study where 187 (47%) of them belonged to the agegroup of 31–45 years and 227 (58%) participants were males (Figure 2). 145 participants (37%) were younger belonging to the age group of 18–30 years. 91% (358) of them were professionally qualified and 54.1% (213) belonged to the upper socio-economic group.

The clinical history of participants showed that 61% (240) of them had a history of some chronic illnesses including 55 (14%) with past history of hypertension followed by 36 (9%)with diabetes mellitus. Also, their family history showed that 197 (50%) have diabetes mellitus in their family followed by 159 (40%) with hypertension, 82 (21%) with



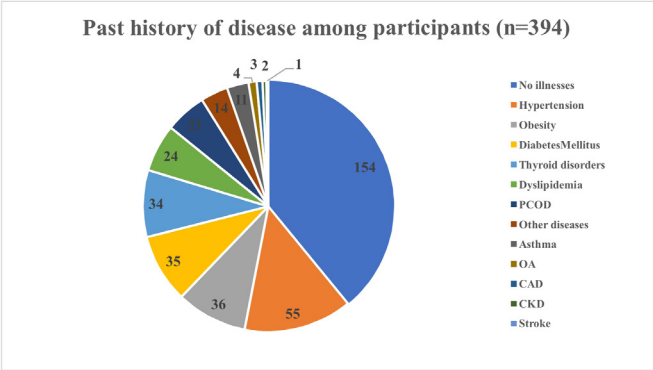




Figure 2: Demographic distribution of participants (n=394)

cardiovascular diseases, and 37 (9%) with dyslipidemia. Concerning their habits, 341 (86%) participants had no history of smoking, and 294 (75%) had no history of alcohol consumption. Concerning their current blood pressure, among 55 (100%) participants with a past history of hypertension, 34.5% had recordings within normal range (indicating controlled hypertension). However, among majority of known hypertensive patients, 52.7% had uncontrolled blood pressure readings. Among those with no past history of hypertension (339), 37 (11%) showed readings of prehypertensive stage and 14 (4%) showed stage 1 hypertension.

Among the 358 participants who perceived themselves as not being obese, the assessments revealed that 213 were actually overweight, 35 had grade 1 obesity, and 11 had grade 2 obesity. This indicates a discrepancy between their perception of their weight status and the actual classification based on body mass index (BMI) criteria.

## Knowledge regarding Hypertension

The knowledge of participants regarding hypertension was assessed based on six aspects –blood pressure measurement, primary and secondary risk factors, screening and its importance, symptoms and complications, treatment, and diet and lifestyle measures of prevention (Table 2).

On overall evaluation, 70% of participants exhibited a moderate grade of knowledge and theirmean score was 25.2 (±12.4). Among them, 32.7% demonstrated good knowledge regarding the risk factors, prevention, and management of high blood pressure.

Table 2: Knowledge regarding hypertension

| **Knowledge regarding hypertension** | | | **Frequency of correct answers (%) (n=394)** |
|---|---|---|---|
| **Blood pressure measurement** | Normal levels | | 328 (83%) |
| | Appropriate measurement steps (137 (35%)) | Sit erect | 220 (55.8%) |
| | | Back support | 145 (36.8%) |
| | | Uncrossed legs | 101 (25.6%) |
| | | Flat feet | 131 (33.2%) |
| | | Empty bladder | 45 (11.4%) |
| | | Appropriate Cuff size | 134 (34%) |
| | | Bare arm | 142 (36%) |
| | | Tight cuff | 126 (32%) |
| | | Arm support | 171 (43.4%) |
| | | BP apparatus at heart level | 128 (32.5%) |
| | | No Talking or listening | 121 (30.7%) |
| | | Relaxed posture | 178 (45.2%) |
| **Risk factors** | Primary (220 (56%)) | Hereditary | 179 (45.4%) |
| | | Sedentary lifestyle | 264 (67%) |
| | | Smoking | 183 (46.4%) |
| | | Excess salt intake | 259 (65.7%) |
| | | Obesity | 241 (61.2%) |
| | | Lack of rest or appropriate sleep | 242 (61.4%) |
| | | Anxiety | 227 (57.6%) |
| | | Excess fast-food intake | 166 (42.1%) |
| | Secondary (86 (22%)) | CKD | 101 (25.6%) |
| | | Adrenal Disorder | 69 (17.5%) |
| | | Diabetes Mellitus | 148 (37.6%) |
| | | Steroids use | 72 (18.3%) |
| | | Pheochromocytoma | 39 (9.9%) |
| **Screening** | Appropriate age | | 83 (21%) |
| | Importance | | 350 (89%) |
| | Health check-ups and monitoring (176 (45%)) | Eye screening | 136 (34.5%) |
| | | Dyslipidaemia screening | 178 (45.2%) |
| | | Cardiac evaluation | 238 (60.4%) |
| | | Renal evaluation | 133 (33.8%) |
| | | Weight monitoring | 196 (49.7%) |

| | | | |
|---|---|---|---|
| **Symptoms and Complications** | No symptoms | | 52 (13%) |
| | Symptoms (192 (49%)) | Anger | 238 (60.4%) |
| | | Tension | 281 (71.3%) |
| | | Early morning headache | 128 (32.5%) |
| | | Tiredness | 149 (37.8%) |
| | | Giddiness | 135 (34.3%) |
| | | Nervousness | 130 (33%) |
| | | Chest pain | 134 (34%) |
| | | Nose bleeding | 71 (18%) |
| | | Palpitation | 186 (47.2%) |
| | | Vision loss /blurring of vision | 99 (25.1%) |
| | | Sweating | 171 (43.4%) |
| | | Facial flushing | 67 (17%) |
| | | Blood spot in the eye | 48 (12.2%) |
| | | Sleep disturbed | 156 (39.6%) |
| | Complications (153 (39%)) | Heart diseases (cardiac failure) | 279 (70.8%) |
| | | Stroke | 285 (72.3%) |
| | | Renal diseases | 123 (31.2%) |
| | | Vision loss | 115 (29.2%) |
| | | Sudden Death | 143 (36.3%) |
| | | Seizures in pregnancy | 91 (23.1%) |
| | | Seizures | 103 (26.1%) |
| | | Intrauterine death | 83 (21.1%) |
| **Treatment duration** | | | 212 (54%) |
| **Diet and lifestyle management** | Appropriate Diet (232 (59%)) | DASH diet | 118 (29.9%) |
| | | Reduced salt intake | 308 (78.2%) |
| | | More fruit inclusion | 228 (57.9%) |
| | | Reduced fatty foods | 275 (69.8%) |
| | Adequate exercise | | 233 (59.1%) |

Approximately, 70% of participants lacked knowledge regarding the potential complications of hypertension, including kidney failure (68.8%), loss of vision (70.8%), and sudden death (63.7%). One significant finding of concern was that 46% of participants believed that treatment for hypertension was only necessary until the blood pressure reading returned to normal levels.

## *Attitude and practice regarding the prevention and management of hypertension*

On average, 86% of participants displayed a good attitude toward prevention and management of hypertension and more than 90% understood the importance of diet and regular physical activity. 85% of participants displayed a good attitude towards the prevention and treatment of hypertension and their mean (SD) attitude score was 4.29 (±1.7). 75% of the elderly population (age above 65 years) displayed a good attitude toward hypertension management (Table 3).

Table 3: Attitude and practice regarding prevention and management

| **Attitude and practice concerning hypertension** | | **Frequency (%)** |
|---|---|---|
| **Attitude** | | |
| **Appropriate measurement** | | 343 (87%) |
| **Diet and physical activity** | Appropriate diet | 363 (92.1%) |
| | Regular exercise | 384 (97.5%) |
| **Screening and regular health check ups** | Screening routine | 350 (88.8%) |
| | Regular check ups | 251 (63.7%) |
| **Practice** | | |
| **Regular and appropriate monitoring** | Regular BP monitoring | 191 (48.5%) |
| | Following appropriate steps during measurement | 103 (26.1%) |
| **Healthy diet** | | 161 (41%) |
| **No smoking** | | 364 (92%) |
| **Appropriate weight management** | | 197 (50%) |
| **Regular physical activity** | | 136 (34.5%) |
| **Regular intake of medicines** | | 55 (n=55; 100%) |

However, concerning practice, their lifestyle habits and blood pressure monitoring appeared to be suboptimal, except for non-smoking (93%) and their mean score was poor (4.37 (±1.4)). Nearly 48% engaged in regular blood pressure monitoring, of whom only 26% adhered to its appropriate steps for monitoring (Figure 3). Though participants seemed to have good attitudes towards appropriate diet and physical activity, less than 40% were found to maintain a healthy diet and engage in regular exercise.

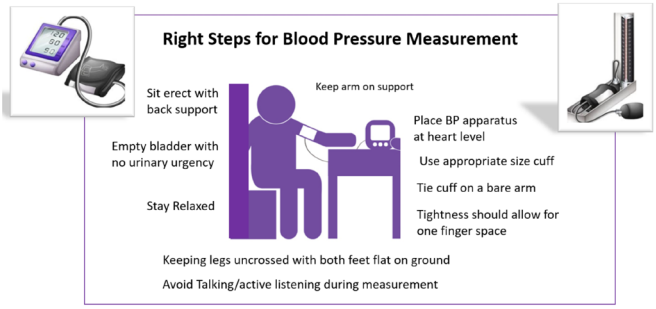



Figure 3: Steps for Measurement of Blood Pressure at Home

However, participants with a past history of hypertension displayed a good practice grade in 70.9% of cases and had a high attitude score of 94.5%.

## *Determinants of knowledge, attitude, and practice of Participants concerning hypertension*

Various factors were known to have a significant influence on the knowledge, attitude, and practice of participants towards

hypertension, which were considered, standardized, and correlated using a linear regression model to determine their impact. The results showed that the variables that had significant ($p<0.05$) impact were their age, education, and occupation levels.

Concerning knowledge and attitude towards hypertension, the R-value was 0.95 indicating a good level of prediction. However, for practice, the R-value was 0.73 indicating moderate prediction.

For adequate knowledge among participants regarding hypertension and its management, education played a major role followed by their age and occupation (0.24 (±0.02) vs 0.1 (±0.047) vs 0.03 (±0.01); $p<0.05$; Table 4).

Also, concerning their attitude, educational qualification showed a significant role followed by age and occupation (0.23 (±0.01) vs 0.08 (±0.02) vs 0.01 (±0.006); $p<0.05$; Table 4).

Concerning their practice, their educational qualification was the only factor that showed significant influence (0.079 (±0.004); $p<0.05$; Table 4).

Table 4: Determinants of knowledge, attitude, and practice concerning hypertension among participants (n=394)

| S. No | Variable | | B (Std Error) | T value | CI |
|---|---|---|---|---|---|
| 1 | **Knowledge** | Education | 0.242 (±0.02) | 12.39 | 0.204 – 0.281 |
| | | Age | 0.1 (±0.05) | 2.105 | 0.007 – 0.193 |
| | | Occupation | 0.027 (±0.013) | 2.106 | 0.002 -0.051 |
| 2 | **Attitude** | Education | 0.231 (±0.01) | 23.31 | 0.21 – 0.25 |
| | | Age | 0.085 (±0.024) | 3.55 | 0.038 – 0.133 |
| | | Occupation | 0.015 (±0.006) | 2.29 | 0.002 – 0.027 |
| 3 | **Practice** | Education | 0.079 (±0.004) | 21.49 | 0.072 – 0.086 |

($p<0.05$)

Thus, higher levels of education, age, and occupation were found to be associated with higher knowledge, attitude, and practice scores, indicating a positive correlation between educational attainment, knowledge, and behavior related to hypertension.

## DISCUSSION

Various studies have been conducted among hypertensive patients over the years to assess their knowledge regarding the disease, and attitude toward its prevention and management. However, most of the findings recorded a lack of adequate knowledge and in turn poor attitude and practice towards prevention and management of hypertension.

Mangaiarkkarasi *et al.* 2019, conducted a cross-sectional questionnaire study concerning their knowledge, attitude, and practice towards the disease and the study revealed that the average knowledge was moderate among 75% of participants, and positive attitude was found regarding regular medications. Our study also showed similar results where 70% exhibited moderate grades of knowledge and attitude.[11]

Another study by Kumaraswamy *et al.* (2022) in a tertiary care hospital showed only 55% of participants with moderate grades of knowledge indicated inadequacy. The study also revealed the significant influence of their educational levels on their knowledge concerning hypertension which was similar to our study.[12] The determinants of knowledge, attitude, and practice of participants concerning hypertension in our study revealed the significant influence of education in all three aspects followed by their age and occupation.

Overall, the study findings highlighted significant gaps in knowledge regarding the DASH diet, exercise recommendations, the chronic nature of hypertension, and the importance of screenings and preventive measures for managing and controlling the condition.

Cross-sectional studies by Shaikh *et al.* 2010 and Das *et al.* 2020, also showed a lack of adequate knowledge and highlighted the need for a better doctor-patient relationship to enhance better understanding and communication.[13] The study also showed that only 22% of participants had good attitudes and compliance over regular check-ups and treatment. Our study, however, recorded better compliance where 76% of participants showed a good attitude towards regular check-ups, screening, and medications.[13,14]

Concerning the practice of participants, studies conducted by Das *et al.*, 2020 and Mangaiarkkarasi *et al.*, 2019 showed good grades among 85% of participants, practicing regular follow-ups and salt-regulated diet, yet less than 30% recorded regular physical activity.[11,14] One cross-sectional study by Kebede *et al.*, 2022 showed nearly 40% of participants with good knowledge about appropriate lifestyle modifications. Yet, only four out of ten patients practiced regular physical activity, salt-regulated diet, and stress management.[15] Our study though showed similar findings where the practice was sub-optimal, the practice of regular physical activity was significantly higher (34%) than in other studies. However, these findings reveal the need to improve practice even among those who possess adequate knowledge and develop appropriate models to influence the regular practice of knowledge for prevention and management.

## CONCLUSION

Hypertension has continued to remain a significant global health problem contributing to substantial mortality and morbidity worldwide. This detrimental condition continues to impose a threat on the quality of life of individuals due to their inadequate understanding and poor practice leading to increased prevalence of uncontrolled hypertension and its lethal complications. However, despite the concerning knowledge gaps, the participants generally display a good attitude toward hypertension prevention and treatment. This positive attitude provides an opportunity for healthcare providers to enforce appropriate measures to educate and motivate the population and ensure behavioral changes among them that can improve the management and control of hypertension.

### Limitations

As majority of the study populations belong to upper socioeconomic status with high level of education, the findings may not able to

generalize to a community with low socioeconomic status and lower educational qualifications.

## Recommendations

1) Regular screening of young adults (>18 years old) should be done in educational institutes or workplaces and educate them regarding the need for early screening.
2) Patients and caretakers should be educated on regular intervals regarding diet, exercises, symptoms, complications, regular screening, proper medications and follow-up to prevent and control high blood pressure.
3) The ideal steps of blood pressure monitoring at home should be explained to the people.

## REFERENCES


1. WHO. Hypertension [Internet]. 2023 [cited 2023 Jul 24]. Available from: https://www.who.int/news-room/fact-sheets/detail/hypertension
2. Tapela NM, Clifton L, Tshisimogo G, Gaborone M, Madidimalo T, Letsatsi V, et al. Prevalence and Determinants of Hypertension Awareness, Treatment, and Control in Botswana: A Nationally Representative Population-Based Survey. Int J Hypertens. 2020 May 31;2020:e8082341.
3. Bennett JE, Stevens GA, Mathers CD, Bonita R, Rehm J, Kruk ME, et al. NCD Countdown 2030: worldwide trends in non-communicable disease mortality and progress towards Sustainable Development Goal target 3.4. The Lancet. 2018 Sep 22;392(10152):1072–88.
4. UNICEF. UNICEF DATA. 2023 [cited 2023 Jul 27]. India (IND) - Demographics, Health & Infant Mortality. Available from: https://data.unicef.org/country/ind/
5. Ram U, Jha P, Gerland P, Hum RJ, Rodriguez P, Suraweera W, et al. Age-specific and sex-specific adult mortality risk in India in 2014: analysis of 0·27 million nationally surveyed deaths and demographic estimates from 597 districts. Lancet Glob Health. 2015 Dec 1;3(12):e767–75.
6. Koya SF, Pilakkadavath Z, Chandran P, Wilson T, Kuriakose S, Akbar SK, et al. Hypertension control rate in India: systematic review and meta-analysis of population-level non-interventional studies, 2001–2022. Lancet Reg Health - Southeast Asia [Internet]. 2023 Feb 1 [cited 2023 Jul 27];9. Available from: https://www.thelancet.com/journals/lansea/article/PIIS2772-3682(22)00130-5/fulltext
7. UN. THE 17 GOALS | Sustainable Development [Internet]. 2023 [cited 2023 Jul 27]. Available from: https://sdgs.un.org/goals
8. Bharatia R, Chitale M, Saxena GN, Kumar RG, Chikkalingaiah null, Trailokya A, et al. Management Practices in Indian Patients with Uncontrolled Hypertension. J Assoc Physicians India. 2016 Jul;64(7):14–21.
9. Challa HJ, Ameer MA, Uppaluri KR. DASH Diet To Stop Hypertension. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2023 Jul 27]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK482514/
10. Siervo M, Lara J, Chowdhury S, Ashor A, Oggioni C, Mathers JC. Effects of the Dietary Approach to Stop Hypertension (DASH) diet on cardiovascular risk factors: a systematic review and meta-analysis. Br J Nutr. 2015 Jan 14;113(1):1–15.
11. Mangaiarkkarasi R, Murugesan S, Marshall Raj G, Adhimoolam M. Knowledge, attitude and practice of hypertension among hypertensive patients in a tertiary care teaching hospital. Int J Basic Clin Pharmacol. 2019 Apr 23;8:1013.
12. Kumaraswamy. Assessment of Knowledge, Attitude and Practice in Hypertensive Patients in a Tertiary Care Teaching Hospital | International Journal Of Pharmaceutical Sciences And Research [Internet]. 2022 [cited 2023 Jul 26]. Available from: https://ijpsr.com/bft-article/assessment-of-knowledge-attitude-and-practice-in-hypertensive-patients-in-a-tertiary-care-teaching-hospital/
13. Shaikh MA, Kumar R. Hypertension Knowledge, Attitude and Practice in Adult Hypertensive Patients at LUMHS. 11(02).
14. Das A, Lahiri G, Bose A, Sarkar D. Assessment of patients' knowledge, attitude and practice regarding hypertension in a tertiary care hospital. Int J Community Med Public Health. 2020 Nov 25;7:4967.
15. Kebede T, Taddese Z, Girma A. Knowledge, attitude and practices of lifestyle modification and associated factors among hypertensive patients on-treatment follow up at Yekatit 12 General Hospital in the largest city of East Africa: A prospective cross-sectional study. PLOS ONE. 2022 Jan 27;17(1):e0262780.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