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**Original Research Article**

# An Observational Study on the Newly Diagnosed Hypertensive Patients – Their Anthropometric Measurement and Current Life-Style

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## Abstract

***Background:*** Hypertension is one of the most common health problems globally and happens to be the leading risk factor for considerable morbidity and mortality. Hypertension is reported to be the fourth contributor to premature death in developed countries and the seventh in developing countries. Knowledge, attitudes and life style modifications of patients play an important role in controlling hypertension and preventing the long-term complications. ***Objective*****:** The objective of this study was (1) To find out the socieo-demographic characteristics of the newly diagnosed hypertensive patients, and (2) To find out the association between hypertension and its' four risk factors like obesity, physical activity, dietary habit, and smoking habit, among the newly diagnosed hypertensive patients. ***Methods*****:** This is an observational and cross-sectional study, carried out in the Medicine Department, of Enam Medical college & Hospital, Savar, Dhaka, Bangladesh. Study period was from January 2020 to December 2021. Total 125 patients were diagnosed having hypertension first time and were included in the study. Patients' waist circumference was measured in centimeters; body weight in kilogram and height in centimeter. Then BMI was calculated using the formula weight (kg)/height ($m^2$). Along with this patients' socio-demographic characteristics, and data regarding to the smoking & dietary habit were collected using a pre-designed, pre-tested structured questionnaire was used to collect data; then the data were analyzed in the using the softwire, statistical package social science (SPSS 22.0 version). ***Results*****:** We found more than half (53.60%) of our newly diagnosed patients are in the age group of 45 to 59 years (53.6%), and we had more male (57.6%) than female (42.4%). Among the 125 diagnosed hypertensive patients 70.40% had a BMI above 23 kg/$m^2$ and 65.60% had high waist circumference. Nearly one-third patients use tobacco either smoking, chewing or by any other means and more than two-third of our do not use tobacco. Above 95% are active and have physical activity either occupation related and exercise related. 65% of the them take average amount of salt in their diet, one-third patients eat fruits regularly and 80% consume vegetables regularly. ***Conclusions:*** We need a comparative study to find out the effect of anthropometric measurement and lifestyle on hypertension and their effect on patients' outcome, a case control study would be more conclusive.

**Keywords:** Hypertension, anthropometric measurement, lifestyle, risk factors.



## INTRODUCTION

Hypertension is one of the leading risk factors for global mortality [1] and one of the four major risk factors for coronary heart disease [2, 3]. Early detection and treatment of hypertension is an important tool for avoiding development of complications like, left ventricular hypertrophy, heart failure, stroke, sudden cardiovascular death, and renal failure. There are many studies on risk factors predisposing to hypertension. Obesity is a major risk factor, and >85% of all hypertension arises in individuals with a body mass index (BMI) >25 kg/$m^2$. Obese people have up to five times higher risk of developing hypertension than those having normal body weight, and up to two-thirds of all cases of hypertension are linked to excess weight [4]. BMI was related to myocardial infarction in the INTERHEART study but was shown to be less important than abdominal obesity (waist-to-hip ratio) [3, 5]. Physical activity has been shown to have beneficial effects on the risk of developing

hypertension, and a meta-analysis of 54 randomized trials [6], found that aerobic exercise was associated with a mean reduction in blood pressure of 4.9/3.7 mm Hg in hypertensive persons. Dietary modification is a central part of any treatment strategy for (pre) hypertensive youth [7]. The Dietary Approaches to Stop Hypertension (DASH) trials demonstrated that a dietary pattern rich in vegetables, fruits, and low-fat dairy products can effectively lower systolic and diastolic BP in normotensive and hypertensive adults [8]. Tobacco smoking is a well-documented risk factor for CVD, its association with hypertension remains a paradox [9]. Smoking is associated with chronic low-grade inflammation [10] and arterial stiffness [11, 12], which are associated with hypertension [13]. Carefully controlled experiments in healthy humans have shown that smoking causes an acute increase of blood pressure [11, 14], and that smoking cessation reduces blood pressure, heart rate, and plasma epinephrine and norepinephrine concentrations among smokers [15]. Apart from the known risk factors for hypertension mentioned earlier, there are still many other potential risk factors that can be analyzed, such as whether BMI or waist circumference is most important, or whether it is the genes interacting with obesity, or whether it is the quality of diet and lack of exercise, leading to insulin resistance that is more important. Sodium intake could also be important [16].

## MATERIALS AND METHODS

This observational and cross-sectional study, was carried out in the Medicine Department, of Enam Medical college & Hospital, Savar, Dhaka, Bangladesh from the period of January 2020 to December 2021. A total 125 patients were diagnosed having hypertension for the first time and were included in the study. Patients' age below 20 years and above 60 years and patients who are already under treatment for high blood pressure were excluded from the study.

Oral consent was obtained from the participant prior to their enrollment in the study. Pre-designed, pre-tested proforma was used to collect data regarding demographic characteristics and different risk factors those are under study. Blood pressure was recorded in the sitting position in the right arm to the nearest 2mmHg using a mercury sphygmomanometer. Two readings were taken 5 minutes apart and mean of two was taken as the blood pressure [6]. Patients were diagnosed having hypertension if their blood pressure recorded greater than 140/90 mmHg – Joint National Committee 7 (JNC VII) Criteria [7].

Waist circumference was measured in centimeters using a tape kept horizontally midway between lower costal margin and the upper border of iliac crest at right mid-axillary line with the subject standing in gentle expiration. Height was measured with a tape to the nearest cm. Subjects were requested to stand upright without shoes with their back against the wall, heels together and eyes directed forward. Weight was measured with a traditional spring balance that was kept on a firm horizontal surface. Subjects were asked to wear light clothing and weight was recorded to the nearest 0.5 kg. Then BMI was calculated using the formula weight (kg)/height (m2). We used a WHO approved BMI scale for Asian populations: Underweight (<18.5 kg/m2), Normal weight (18.5 to <23.0 kg/m2), Overweight (23.0 to <27.50 kg/m2), and Obese (≥27.50 kg/m2) [17, 18]. Abdominal obesity, which is closely associated with intraabdominal or visceral fat (which can be distinguished from subcutaneous fat by imaging) and measured by waist circumference; for male>102 cm and for female >88 cm (male >90 and female >80 among Bangladeshi people) [17]. Patients' physical activity, dietary habit and smoking status were recorded as described by the patients and there was no opportunity to verify this information. Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 16.

## RESULTS

**Social and demographical profile of study participants:**

**Table 1: Demographic profile of study participants (N=125)**

| | Number (N=125) | Percentage |
|---|---|---|
| **Age group** | | |
| 20 to 29 years | 12 | 9.6 |
| 30 to 44years | 34 | 27.2 |
| 45 to 59 years | 67 | 53.6 |
| 50 years and above | 12 | 9.6 |
| **Sex** | | |
| Male | 72 | 57.6 |
| Female | 53 | 42.4 |
| **Education** | | |
| Illiterate | 26 | 20.8 |
| Primary | 44 | 35.2 |
| Secondary | 31 | 24.8 |
| Higher Secondary | 12 | 9.6 |
| Graduate | 12 | 9.6 |

| | | |
|---|---|---|
| **Occupation** | | |
| Service | 33 | 26.4 |
| Business | 15 | 12 |
| Farmers | 24 | 19.2 |
| Labourers | 12 | 9.6 |
| Housewife | 35 | 28 |
| Unemployed | 6 | 4.8 |
| **Marital Status** | | |
| Married | 109 | 87.2 |
| Unmarried | 14 | 11.2 |
| Widow | 2 | 1.6 |

Table 1, shows that more than half (53.60%) of our newly diagnosed patients are in the age group of 45 to 59 years (53.6%), and more than one-fourth (27.20%) of then are in the age group of 30 to 44 years. We had more male (57.6%) than female (42.4%). Majority of our participants had primary and secondary school level education; 35.2% and 24.8% respectively and one fifth of them were illiterate. 28% of the participants were housewives, nearly one-fifth were farmer and one-fourth were service holder. Married study subjects were 87.2%, whereas 11.2% and 1.6% were unmarried and widow respectively.

**Obesity Status**

BMI and waist circumferences of the patients are given below in the table II & III.

- Considering BMI, among the 125 diagnosed hypertensive patients 34 (47.22%) male and 29 (54.72%) patients are overweight and 16 (22.22%) male and 9 (16.98%) female are obese.
- Considering waist circumference 48 (66.67%) male and 34 (64.15%) female have high waist circumference.

**Table II: Distribution of hypertensive patients according to their BMI**

| BMI | Underweight (<18.5 kg/m2) | Normal weight (18.5 to <23.0 kg/m2) | Overweight (23.0 to <27.50 kg/m2), | Obese (≥27.50 kg/m2). | Total |
|---|---|---|---|---|---|
| **Male** | 7 | 15 | 34 | 16 | 72 |
| | 9.72% | 20.83% | 47.22% | 22.22% | |
| **Female** | 5 | 10 | 29 | 9 | 53 |
| | 9.43% | 18.87% | 54.72% | 16.98% | |

**Table III: Distribution of patients according to their Waist Circumferences**

| | | | Total |
|---|---|---|---|
| **Waist Circumference** | **Normal** | **High** | |
| **Male** | 24 | 48 | 72 |
| | 33.33% | 66.67% | |
| **Female** | 19 | 34 | 53 |
| | 35.85% | 64.15% | |

**Tobacco Uses**

Among the 72 male patients 26 (36.11%) use tobacco and among the 53 female patients 15 (28.30%) use tobacco. Main means of tobacco use among male is smoking and among female is chewing tobacco with pan. It is found that nearly one-third of the mail patients (64%) and more than one third of the female patients (72%) don't use tobacco in both sexes.

**Table IV: Tobacco use**

| Tobacco uses | Male | Percentage | Female | Percentage |
|---|---|---|---|---|
| Smoking | 20 | **27.78%** | 0 | |
| Tobacco chewing | 6 | | 15 | **28.30%** |
| Snuffing | 3 | | | |
| Tobacco users | 26 | **36.11%** | 15 | **28.30%** |
| Non-users | 46 | **63.89%** | 38 | **71.70%** |

**Dietary Habits**

Hypertensive patients are categorized according to their salt intake, and regular consumption of fruits & vegetables in table V. According to the patients' statement 65% of the them take average amount of salt and don't use additional salt in their regular diet. Only one-third of them consume extra salt irrespective of their socioeconomic variation and this is

true for both sexes. 80% patients take regular vegetables but only and the rest also consume vegetable but occasionally. Regarding fruits intake, around one-third of patients (63.50% male and 67.92% female) doesn't take fruits regularly, they are seasonal & occasional consumers. This is true in case of both sexes.

**Table V: Dietary habit**

| | **Average salt intake** | | **Extra salt intake** | | |
|---|---|---|---|---|---|
| | **N** | **Percentage** | **N** | **Percentage** | |
| Male | 47 | 65.28% | 25 | 34.72% | 72 |
| Female | 34 | 65.15% | 19 | 34.85% | 53 |
| | **Regular intake of fruits** | | **Occasional intake of fruits** | | |
| | **N** | **Percentage** | **N** | **Percentage** | |
| Male | 27 | 37.50% | 45 | 63.50% | 72 |
| Female | 17 | 32.08% | 36 | 67.92% | 53 |
| | **Regular intake of vegetables** | | **Occasional intake of vegetables** | | |
| | **N** | **Percentage** | **N** | **Percentage** | |
| Male | 57 | 79.17% | 15 | 20.83% | 72 |
| Female | 43 | 81.13% | 10 | 18.87% | 53 |

**Physical Activities**

Out of total 125 patients 58 (46.49%) are doing at least some degree of exercise other than their occupation related physical activities (Activity group A), 63 (50.40%) patients are having only occupation related & household physical activities (Activity group B) and only 4 (3.20%) patients not involved in any sorts of regular exercise or occupation related physical activity (Activity group C). Table VI, also shows the distribution of patients according to their occupation and physical activities.

**Table VI: Physical activity**

| | **Male** | | | **Female** | | | **N** |
|---|---|---|---|---|---|---|---|
| | **Group A** | **Group B** | **Group C** | **Group A** | **Group B** | **Group C** | |
| **Service** | 12 | 8 | 1 | 7 | 5 | 0 | 33 |
| **Business** | 10 | 3 | 0 | 2 | 0 | 0 | 15 |
| **Farmers** | 12 | 10 | 0 | 0 | 2 | 0 | 24 |
| **Labourers** | 0 | 10 | 0 | 0 | 2 | 0 | 12 |
| **Housewife** | 0 | 0 | 0 | 12 | 23 | 0 | 35 |
| **Unemployed** | 3 | 0 | 3 | 0 | 0 | 0 | 6 |

| **Physical activity** | **Male** | **Female** | **Total** | **Percentage** |
|---|---|---|---|---|
| **Activity group A** | 37 | 21 | 58 | 46.40% |
| **Activity group B** | 31 | 32 | 63 | 50.40% |
| **Activity group C** | 4 | 0 | 4 | 3.20% |

## DISCUSSION

Regarding socio-demographic characteristics of the participants, the study results revealed that the majority (over 80%) of the newly diagnosed hypertensive patients are between 30 to 59 years of age and more than half of our patients are in the age group of 45 to 59 years old. Which are little different from a study conducted by Abd El-Hay and El Mezayen *et al*., [19], where 60.4% of their patients were between 55–64 years old. This is also in agreement with Tam *et al*., [20] where the prevalence of hypertension by age group and gender, there was a high prevalence of hypertension among older adults. We had more male than female people who were diagnosed hypertensive in our study. The prevalence of hypertension in a study done by M. Rahman et al. was 20.1% with no significant difference between males (20.3%) or females (19.9%). But, the prevalence of hypertension increased with increasing age, and those aged 65 years and above the prevalence was 40.5% among males and 50.5% females [21]. In our study we found that nearly one third of newly diagnosed hypertensive patients uses tobacco either smoking, chewing or by any other means and more than two-third of our do not use tobacco. A study done by Au Bich Thuy *et al*., found that smokers and ex-smokers has a higher perveance of hypertension then non-smokers [22]. Among the newly diagnosed hypertensive patients, around 70% were found having high BMI (overweight or obese) in both sexes and two-third of the patients had high waist circumferences in both male and female. The similar findings were reported by number of epidemiological studies e.g., Das *et al*., [23], Todkar SS *et al*., [24], Reddy SS and

Prabhu GR *et al*., [25]. A study done by Black and Hawks et al, found the incidence of hypertension increases by 5-fold when BMI changes from 21 to 26 kilogram/square-meter [26]. Dietary habit is an important factor which can be modified to control hypertension and many other medical conditions. We found that the patients use to take enough vegetable, but one-third of the patients consume extra salt and one-third of the patients don't eat regular fruits. There is scope to further modify their diet to control hypertension and its complications. 50% of our patients only have occupation related physical activity and 3% don't have any sorts of regular physical activity. It is needed to establish an exercise schedule for these patients to control their hypertension and reduce the complications related to this.

## CONCLUSIONS

We need a comparative study to find out the effect of anthropometric measurement and lifestyle on hypertension and their effect on patients' outcome, a case control study would be more conclusive.

**Conflict of Interest:** None.

**Source of Fund:** None.

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