

## Early identification of hypertensive patients in apparently asymptomatic cohort and risk stratification as per new AHA guidelines (2017) among non-teaching employee of KGMU, Lucknow

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### Abstract:

**Background:** Work-related risk factors such as shift duty work, physical and mental stress, put health workers among a high occupational risk group for hypertension. Hypertension is recognized “as part of a bigger disease accompanied by increased weight, diabetes, renal conditions and co-existing morbidities. There is a dearth of information about the prevalence of hypertension and related risk factors among the healthcare worker.

**Materials and Methods:** Cross sectional design was adopted and participants selected by using convenience sampling technique who met the inclusion criteria. Data collected by using risk assessment tool.

**Results:** revealed that, 141 (34.4%) participants were categorized in stage I hypertension, 77 (18.8%) in stage II hypertension while 37 (9.0%) were under elevated blood pressure. Maximum participant belongs to demographic profile were designation- nursing staff (45.1%), religion- Hindu (93.9%), education- diploma/certificate (38.8%), married (82%), low income group (40.2%), joint family (67.1%) and no. of dependents: 1-3 (74.4%). Maximum participant belongs to non-modifiable risk factors were age group- 31-40 years (39.5%) and gender- females (60.2%) and family history of hypertension (28%). Maximum participant belongs to modifiable risk factors were non-vegetarian diet (52.2%), using mustered oil & soya for cooking (94.1%), ghee intake (77.6%), sedentary work style (60.2%), overweight (29%), elevated cholesterol (7.3%), menopause (10.1%), moderate stress (7.4%) and history of co-morbidity (20.2%). Identified risk factors were significantly associated with designation (Safai-wala and Hospital/sick attendant) ( $p < 0.001$ ), education (illiterates) ( $p = 0.031$ ), marital status ( $p = 0.029$ ), joint family ( $p = 0.013$ ), age group: 31 - 40 years ( $p = 0.001$ ), gender (male) ( $p < 0.001$ ), non-vegetarian ( $p = 0.003$ ), Smoking habits ( $p = 0.037$ ), Oral Tobacco ( $p = 0.034$ ), Alcohol Consumption ( $p = 0.001$ ), BMI Status: BMI Range:  $\geq 25$  participants ( $p = 0.007$ ), and menopause participants ( $p = 0.001$ ).

**Conclusion:** Finding concludes that majority participants were identified in stage I hypertension. Identified Non-modifiable risk factors were age group 31-40 years and females and family history of hypertension. Modifiable risk factors were identified are on non-vegetarian diet using mustered oil and soya for cooking ghee intake, sedentary work style, overweight, elevated cholesterol, menopause, moderate stress, history of co-morbidity etc. So, study recommends that early identification of hypertension helps to prevent major complications in later phase of life.

**Key Word:** Hypertension, Prevalence, Non-teaching employee, Risk stratification, Early identification

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### I. Introduction

India's fast growing economic growth is accompanied by changes in demography, lifestyle and culture. As a result of the sedentary lifestyle, many non-communicable diseases arose including hypertension. Cardiovascular diseases (CVDs) are estimated to be responsible for 1.5 million deaths each year and it is estimated that by 2020, CVDs will be a major cause of death and illness in India. High blood pressure is a major threat to CVDs, including stroke and myocardial infarction, and its burden is growing exponentially in developing countries as they undergo demographic change.<sup>1,2</sup>

The working population has been identified as the high-risk group for CVD due to the clustering of CVD risk factors such as raised blood pressure (BP), high BMI, and smoking, lot of job-related stress.<sup>3</sup>

Modification in physical activity, avoid alcohol and boost health seeking (high blood pressure screening) behavior will be positive preventive measures in combating hypertension.<sup>4</sup> There is a statistically significant link among hypertension and smoking, as well as hypertension and alcohol, on the other hand socio demographic variables were statistically linked with smoking.<sup>5</sup> There is a high prevalence of hypertension, 1 out of 3 Indian is affected.<sup>6</sup> The overall prevalence of hypertension among the study population was 26.2% and risk among male was greater than female.<sup>7</sup> In India the health system should focus on early hypertension screening and control to reduce cardiovascular mortality and morbidity.<sup>8</sup>

## II. Material And Methods

In this study, cross sectional design was adopted and participants selected by using convenience sampling technique who met the inclusion criteria. Data collected by using risk assessment tool. Population under the study was non-teaching employees of KGMU, Lucknow.

**Study Duration:** The period of study was from 01/03/2021 to 15/04/2021

**Sample size:** 410

### Sample size calculation:

Sample size is calculated by using WHO statistical formula as follows-  $n = Z^2 P(1 - P)/d^2$ . Here, we assumed that  $P = 18\% = 0.18$  (Prevalence of Hypertension),  $d = 3\%$  (Absolute precision) = 0.03,  $Z = 1.96$  (Statistic for a level of confidence). The sample size actually obtained for this study was 630 participants but due to COVID-19 Scenario, Only 410 Sample collected in this study.

### Subjects & selection method:

The study conducted among non-teaching staff of King George Medical University Lucknow, Uttar Pradesh, Lucknow which were divided in 3 categories: Safai-wala (S/W), Hospital/Sick attendant and Nursing staff.

### Inclusion criteria:

1. Non-teaching staff that do not have any previous history of hypertension.
2. Age is between ages 18 to 60 years.
3. Sample who does not take any cardiac medications

### Exclusion criteria:

1. Sample who have already hypertension and taking medical treatment
2. Sample who were not willing to participate in study

### Procedure of data collection:

Ethical permission from IEC and administrative permission from Registrar, KGMU were obtained. Informed consent from participants taken before initiating the study. Demographic profile and risk assessment tool were used for data collection. The reliability of the risk assessment tool was 0.763 (Cronbach's Alpha value). Blood pressure was taken through Omran Oscillometric Device. Two blood pressure readings were recorded at 1 hour interval in morning shift only.

### Statistical analysis

In this study descriptive and inferential statistics will be used for analysis like Mean, Frequency percentage, Chi square test. Chi-square was performed to test for differences in proportions of categorical variables. The level  $P < 0.05$  was considered as the cutoff value or significance.

## III. Result

### Section I: Distribution of demographic profile of the participants

Result revealed that, maximum participants were nursing staff (45.1%). Distributions according to religion in the group show that (93.9%), participants were Hindu. According to educational qualifications most of the participants had done diploma/certificate 38.8%. Marital status of the respondents was married (82%) and most of the participants belong to low income group (40.2%). Mostly participants were belong to the joint family (67.1%) and had no. of dependents between 1-3 (74.4%).

### Section 2: Distribution of non-modifiable risk factors among participants

Table – 1: Distribution of Non-modifiable risk factors among participants

**n = 410**

Non-Modifiable Risk Factors	Category	f	(%)
Age	18 - 30 years	139	33.9
	31 - 40 years	162	39.5
	41 - 50 years	66	16.1
	51 - 60 years	43	10.5

<b>Gender</b>	Male	163	39.8
	Female	247	60.2
<b>Family History of hypertension</b>	No	295	72.0
	Yes	115	28.0

**Table – 1:** revealed the non-modifiable risk factors: maximum participants belong to the age group 31-40 years (39.5%) and 60.2% of the participants were females and family history of hypertension was found in 28% cases.

### Section 3: Distribution of participants according to modifiable risk factors

**Table – 2: Distribution of participants according to modifiable risk factors**

**n = 410**

<b>Modified Risk Factor Variables</b>	<b>Category</b>	<b>f</b>	<b>(%)</b>
Eating habits	Vegetarian	196	47.8
	Non-Vegetarian	214	52.2
Dietary habits			
A. Salt Intake	Normal as usual intake	404	98.5
	Adding extra salt than usual intake	6	1.5
B. Cooking Oil	Mustard	17	4.1
	Mustard+Olive	2	.5
	Mustard+Soya	386	94.1
	Soya	2	.5
	Sunflower	3	.7
C. Intake of Ghee	No	92	22.4
	Yes	318	77.6
Physical Activities other than duty hours	Sedentary Work	247	60.2
	Planned Exercise	163	39.8
Smoking habits	No	389	94.9
	Yes	21	5.1
Use of Oral Tobacco	No	340	82.9
	Yes	70	17.1
Alcohol Consumption	No	354	86.3
	Yes	56	13.7
BMI Status	< 18.5 (Underweight)	21	5.1
	18.5 – 24.99 (Normal)	248	60.5
	> 25 – 29.99 (Overweight)	119	29.0
	> 30 – 34.99 (Obese)	20	4.9
	> 35 (Severely obese)	2	0.5
Cholesterol history (Verbalized by participants)	Never testing	304	74.0
	Normal	76	18.5
	Elevated	30	7.3
Intake of Over-the-counter Drugs	No	394	96.1
	Yes	16	3.9
Female Physiological History (n=247)	Pregnancy History	0	0.0
	MC History	2	.8
	Menopause	25	10.1
Level of Stress	No stress	353	86.1

(Verbalized by participants)	Mild stressful	27	6.6
	Moderate stressful	30	7.4
	Severe stressful	0	0
Sleep Pattern	Regular	400	97.6
	Irregular	10	2.4
History of co-morbidity	No	327	79.8
	Yes	83	20.2
If yes	Diabetic	12	2.9
	HBsAG	0	0.0
	HCV/HBV	0	0.0
	HIV	0	0.0
	other	71	17.3

**Table – 2:** from this table modifiable risk factors were identified are taking non-vegetarian diet (52.2%), using mustered oil and soya for cooking (94.1%), ghee intake (77.6%), sedentary work style (60.2%), overweight (29%), elevated cholesterol (7.3%), menopause (10.1%), moderate stress (7.4%), history of co-morbidity (20.2%) etc.

**Section IV: Prevalence of hypertension and categorization the stages of blood pressure**

**Table 3:** Categorization the stages of blood pressure in participants as per new AHA guidelines (2017)

n=410

Hypertension	Systolic BP		Diastolic BP		Interim BP	
	Frequency	%	Frequency	%	Frequency	%
Normal (<120/<80 mm Hg)	202	49.3	193	47.1	155	37.8
Elevated BP (120-129/<80 mm Hg)	106	25.9	-	-	37	9.0
Hypertension stages						
Stage I Blood pressure (130-139/80 – 89 mmHg)	54	13.2	147	35.9	141	34.4
Stage II Blood pressure (>140/>90 mm Hg)	48	11.7	70	17.1	77	18.8
Total	410	100.0	410	100.0	410	100.0

**Table – 3:** showed that hypertension was identified in elevated blood pressure (9%), stage I (34.4%) and stage II (18.8%)

**Section V: Association between demographic profile, non-modifiable risk factors and modifiable risk factors**

Study results revealed that demographic variables like designation (Safai-wala and Hospital/sick attendant) (p<0.001), education (illiterates) (p=0.031) and marital status (p=0.029), joint family (p = 0.013) were significantly associated with Hypertension. More cases of hypertension were found in Safai-wala and Hospital/sick attendant, illiterates, lower education group, married, Muslim, more no. of dependents and joint family. Study findings revealed that Non-Modifiable Risk Factors like Age (31 - 40 years) (p=0.001) and gender (male) (p<0.001) were significantly associated with hypertension while family history was less associated with hypertension. Study revealed that hypertension was significantly associated with Unhealthy diet/eating habits: non-vegetarian (p = 0.003.), Smoking habits (p = 0.037), Oral Tobacco (p = 0.034), Alcohol Consumption (p = 0.001), BMI Status: BMI Range: >=25 participants (p = 0.007), and Female Physiological History: menopause participants (p = 0.001).

**IV. Discussion**

Our study identified a high prevalence of elevated blood pressure and hypertension stage I & II among health care worker which was 9% and 53.9%, respectively. The prevalence of hypertension in the present study (53.9%) was higher in comparison with the prevalence reported in other studies. Few studies reported the results in line with the present study. According to WHO (2015), the overall prevalence of hypertension in India was 23.5% and gender specific prevalence was 24.2% and 22.7% among the men and women, respectively.<sup>9</sup>

Hypertension was significantly associated with designation ( $p < 0.001$ ), education ( $p = 0.031$ ) and marital status ( $p = 0.029$ ). In some studies, the educational level had a positive correlation with hypertension but in others, illiteracy was included a risk factor and in present study More cases of hypertension were found in illiterates and lower education group.<sup>10, 11</sup>

Further hypertension was significantly associated with Age ( $p = 0.001$ ), gender ( $p < 0.001$ ), dependents ( $p = 0.013$ ) and dietary habit ( $p = 0.003$ ). More cases of hypertension were found for higher age, males and more no. of dependents and non-vegetarian. This finding consistent with several studies which shown that men younger than 65 years consistently have higher levels of hypertension compared to women of the same age group.<sup>12</sup>

Men exhibit higher prevalence of hypertension and elevated hypertension than their female counterparts. Similarly, various studies came out with the higher percentage of hypertension in men than women. One of the possible explanations for this gender disparity in hypertension prevalence could be partially due to biological sex difference and partially due to behavioral risk factors like smoking, alcohol consumption, or physical activity.<sup>13, 14, 15</sup>

Tobacco use and alcohol use were found to be risk factors for being hypertensive in the study subjects. Hypertension was significantly associated with smoking habit ( $p = 0.037$ ), use of oral tobacco ( $p = 0.034$ ) and alcohol consumption ( $p < 0.001$ ). More cases of hypertension were found for smokers, tobacco consumers and alcohol consumers. Current alcohol users were approximately 1.6 times more likely to be hypertensive, while past alcohol users were 2.3 times more likely to be hypertensive; all compared to those who had never used alcohol. Several studies have reported alcohol use to be a risk factor for hypertension.<sup>16</sup>

The BMI ( $p = 0.007$ ) status, which reflects increased body fat mass, was demonstrated to be an independent risk factor for hypertension, which was consistent with previous studies showing an association between high body fat levels and hypertension.<sup>17, 18</sup>

It was also significantly associated with BMI ( $p = 0.007$ ). More cases of hypertension were found for overweight and obese. Among women hypertension was significantly associated with Menopause ( $p < 0.001$ ). More cases of hypertension were found among menopause women. Moreover several studies have also shown an increased prevalence of hypertension in this group.<sup>19</sup>

## V. Conclusion

From the finding of the study, it was observed that prevalence rate of elevated Blood Pressure and hypertension was very high among health care worker. Study concludes that majority participants were stage I hypertension. Risk factors identified under this study are gender, elder age group, having consumption of alcohol, tobacco, smoking, overweight, menopause and non-vegetarian diet. So, study recommends that early identification of hypertension helps to prevent major complications in later age.

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