Assessment of the Prevalence and Risk Factors of Hypertension among the Adults of Dhirenpara Zone of Kamrup Metro, Assam.

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Abstract:
Background*: Raised blood pressure has emerged as the important risk factor for global morbidity and mortality. Studies from various parts of India have reported high prevalence of hypertension. These studies have also reported that hypertension is increasing and there is low awareness and control. Objective: To assess the prevalence of hypertension among the adults; to identify the risk factors of hypertension among the adults; to determine the association between hypertension and selected variables.*
Material and method*: A quantitative survey approach with descriptive cross-sectional design was adopted for the study. A total number of 130 subjects were selected by systematic random sampling technique using voter's list 2019 as sampling frame. The data was collected through structured interview schedule included demographic variables, risk factors of Hypertension and one measurement Performa for measurement of Blood Pressure (BP), Weight and Height. Both descriptive and inferential statistics were used for data analysis.*
Results: *The findings of the study revealed that out of 130 number of adults, prevalence of hypertension was 44(33.8%) with maximum number i.e. 104(80%) medium level of risk for hypertension. Study shows 20 percent prevalence in male and 13.8 percent in case of female. Age specific prevalence shows 7.7 percent, 9.2 percent and 6.9 percent in the age group of 40-49 years, 50-59 years and 60-65 years respectively. No significant association between prevalence of hypertension and level of risk of hypertension (x^2 = 2.45 with df = 2, p= 0.294) found. Study shows significant association in cases of age (x^2 = 10.064 with df =4, p=0.039), gender (x^2 = 5.041 with df =1,p= 0.025), habits of smoking (x^2 = 4.556 with df = 1, p= 0.033) and psychological stress (x^2 = 10.712 with df = 2, p= 0.005).*
Conclusion: *The findings clearly suggest that majority of the adult population had moderate level of risk for hypertension and the prevalence is almost similar to the studies conducted in different parts of India.*
Key Words: *Hypertension, prevalence, adult population.*

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I. Introduction

Hypertension or high blood pressure is an important medical and public health problem. There is a direct relationship between hypertension and cardiovascular disease. The prevalence of hypertension in Indians is 25% in urban and 10% in rural population. According to estimates, there are nearly 31.5 million hypertensive in rural and 34 million in urban population.[1] This study mainly focus on identifying the prevalence and risk factors of hypertension would help the people to make the necessary lifestyle modifications. The World Health Report 2002 identified hypertension, or high blood pressure, as the third ranked factor for disability-adjusted life years. Hypertension is one of the primary risk factors for heart disease and stroke, the leading causes of death worldwide. Recent analyses have shown that in the year 2000, there were 972 million people having hypertension worldwide, and it is estimated that this number will increase to more than 1.56 billion by the year 2025. Awareness, prevention, treatment and control of hypertension is a significant public health measure.[2]There are various risk factors, which can increase blood pressure such as being overweight or obese, too much salt (sodium) in diet, too little potassium in diet, not being physically active, drinking too much alcohol, stress, non-steroidal Anti-inflammatory Drugs (NSAIDs), certain chronic conditions including diabetes, kidney disease and sleep apnea.[3]PonnagantiSC, UndavalliVK, SayyadAP, Narni H, Muthe A. (2018)[4] had conducted a study on prevalence of hypertension and its associated risk factors in the rural field practice area of tertiary care teaching hospital of coastal Andhra Pradesh, India. A cross-sectional study was conducted among 1500 individuals in the age group of 18-65 years living in villages under rural field practice area of Kerala district , Andhra Pradesh. The study found hypertension and prehypertension in the age group of 18-65 years was reported to be 27.7% and 24.3% respectively. There was significant association of hypertension and its risk

factors.

II.   Material and Methods

The study was conducted after obtaining permission from institutional ethical committee and Joint Director of Health & Family welfare, Assam and SDM&HO of Dhirenpara Zone of Kamrup Metro, Assam. It was a Descriptive cross-sectional research design study where data collected from 130 samples by systematic random sampling technique starting with collecting demographic, risk factors of hypertension and biophysiological measurement (blood pressure, weight and height) through Structured interview schedule and measurement performa.

Study Design: Descriptive cross-sectional research design

Study Location: Dhirenpara Zone of Kamrup Metro, Assam

Study Duration: Nov. 2018 to Nov. 2019

Sample size: 130 Adults

Sample size calculation: The sample size was calculated by using the Cochran's formula: $N = Z^2pq/D^2$
Where, Z= 1.96 (it is the value of the standard normal distribution that corresponds to two tailed significance level of 0.05)
P=0.253; according to 4th district level household survey of hypertension[5]: prevalence of hypertension in India is 25.3 %(proportion of exposure among study population)
Q= 0.747; (1-p)
D= 0.075(degree of error was 7.5%)
Investigator considered margin of error at 7.5 percent [6] i.e. proportion at 25.3±7.5% with 95% confidence Z= 1.96 (two tailed significance) and 50% power,   p=0.253; Q= 0.747; (1-p). D= 0.075(degree of error was 7.5%) we found n at 129.07 ≈ 130 (Rounded)

Subjects and selection method: A multistage sampling technique was used to select the health centres of Dhirenpara Zone in first and second step. A total 130 number of adults of age group 18-65years were selected by using Systematic random sampling technique. The following steps were used to draw the sample systematically:
Step I- The investigator collected the list of health centers listed under Dhirenpara Zone which is 6 in number.
Step II- The investigator selected one health center among these health center by simple random sampling (lottery) method i.e. Fatasil Ambari Primary Urban Health Centre.
Step III-   A list of adult population of age group 18-65 years was prepared from the voter list by the investigator from the selected health center was found to be 3000. Among these population systematic random sampling technique was used to draw the desired samples by calculating the Kth number (i.e. Total population/desired samples i.e. 3000/130=24th number). The first subjects was selected randomly by lottery method.

Inclusion criteria
1. Subjects who are willing to participate
2. Subjects who are available at home during data collection

Exclusion criteria
1.Subjects who are acutely or critically ill at the time of data collection

Procedure methodology:
A structured interview schedule was prepared to collect data regarding risk factors of hypertension and biophysiological measurement (blood pressure, weight and height) was carried out. The tool used in the study is a structured Interview Schedule consists of three sections.
Section I: Demographic characteristics
This section consists of demographic variables of the respondents which include age, gender, occupation, religion, education, monthly family income
Section II: Structured interview schedule

This section was prepared to identify the risk factors of hypertension; i.e. Age >50 years, male gender, habits of smoking, habits of drinking alcohol, physical activity, family history of hypertension, dietary habits (fat and salt intake), Body Mass Index and psychological stress.

Physical activity was assessed based on WHO's guidelines, where subjects were categorized as physically active and physically inactive; those who had performed moderate intensity aerobic physical activity, vigorous intensity aerobic physical activity, muscle strengthening physical activity were classified as physically active and those who had not performed any above activities were considered as physically inactive.

Intake of fats: It was assessed by enquiring whether they are vegetarian or non vegetarian, type of oils used for cooking, food preference, and frequency of taking meat and high fatty content food items.

Psychological stress was assessed by using Perceived Stress Scale (PSS-10) originally developed by Cohen S., Kamarck T. &Mermelstein R. (1983), modified by Cohen S. &Williumson G. (1988).

Section III: Measurement Performa

This section was prepared for Biophysiologic and anthropometric measurement like blood pressure was measured by using mercury sphygmomanometer and stethoscope as the mean of the three readings taken 10 minutes apart, weight was measured by using Krupp's weighing scale (adult weighing machine), height was measured by using stadiometer.

Statistical analysis:

Data was analyzed using SPSS version 20. Under the structured interview schedule, scoring had been given against the answer of each question to find out the level of risk. 3 marks had been given for the greater risk answer and 0 mark for the lesser risk answer. The total score of this section was 21. Out of which low risk was (<5), medium risk was (5-10) and high risk was (>11).

Low level of risk: < Mean – SD

Medium level of risk: between mean +SD & mean – SD

High level of risk**:** > Mean + SD

Computation of chi square to find the association between hypertension and selected variables like age, gender, occupation, religion, , habits of smoking, habits of drinking, physical activity, positive family history, dietary habits related to fat and salt intake, Body Mass Index (BMI) and psychological stress.The level of significance was set at 0.05 levels to interpret the findings.

III.   Result

The collected data from subjects were grouped and analysed using both descriptive and inferential statistics The findings of the study reveal that majority of samples 32(24.6%) were in age group of 18-29 years where 71(54.6%) were female and 59(45.4%) were male, 54(41.5%) were housewife, 33(25.4%) were high school pass, 70(53.8%) had Rs 20,001 and above monthly family income. About prevalence of Hypertension 44(33.8%) number of subjects were hypertensive out of which 25 number of subjects had stage I hypertension, 12 number of subjects had stage II hypertension and 7 number of subjects had Isolated Systolic Hypertension, Prevalence of hypertension in terms of old and new cases majority of them i.e. 37(28.4%) were newly diagnosed cases of hypertension (new case) and rest 7(5.38%) were already diagnosed cases of hypertension.

Total subjects who were diagnosed as a case of hypertension, majority i.e. 11(8.5%) were in the age group of 50-59 years, 27(20.7%) were male, about history of smoking majority of subjects i.e. 105(80.8%) had no history of smoking, among which those who have history of smoking according to duration of smoking 17(13.1%) had history of <5 years of smoking followed by 6(4.6%) had history of 5-10 years of smoking and 2(1.5%) had history of >10 years of smoking. About quantity of smoking 25(19.2%) subjects had history of smoking for less than 10 cigarettes/day, majority of subjects i.e. 106(81.5%) had no history of drinking alcohol and only 24(18.5%) had history of drinking alcohol, among which majority of subjects13(10%) had history of drinking alcohol for <5 years, about duration of drinking alcohol 11(8.5%) had history of 2-3.5 drinks/day. Regarding physical activity majority of the subjects i.e. 117(90%) were physically active. 71(54.6%) had positive family history of hypertension. majority of the subjects i.e. 71(54.6%) had history of taking high fatty food intake in diet. majority of the subjects i.e. 95(73.1%) had history of salty food intake, 92(70.8%) had no history of taking extra salt in food, and rest 38(29.2%) had history of taking extra salt in food, among those 37(26.6%) had history of taking 0.5-1 teaspoon of extra salt in food, majority of subjects i.e. 125(96.15%) had normal Body Mass Index, majority of the subjects i.e. 119(91.5%) had moderate stress.

Table no 1 depicts that out of 130 subjects, 44(33.8%) number of subjects were hypertensive out of which 25 number of subjects had stage I hypertension, 12 number of subjects had stage II hypertension and 7 number of subjects had Isolated Systolic Hypertension; on the other hand, 86(66.2%) number of subjects were normotensive, out of which 62 number had normal blood pressure and 24 number of subjects were in pre hypertensive grade.

Table no 1: Prevalence of hypertension among the adults

Prevalence of hypertension		Frequency(f)	Total Frequency(f)	Percentage (%)
Normotensive	Normal: ≤120/80mmHg	62	86	66.2
	Pre hypertension : 120-139/80-89mmHg	24		
Hypertensive	Stage I Hypertension: 140-149/90/99 mm of Hg	25	44	33.8
	Stage II Hypertension: >160/100 mm of Hg	12		
	Isolated Systolic Hypertension: >140/<90 mm of Hg	7		
Total		130	130	100
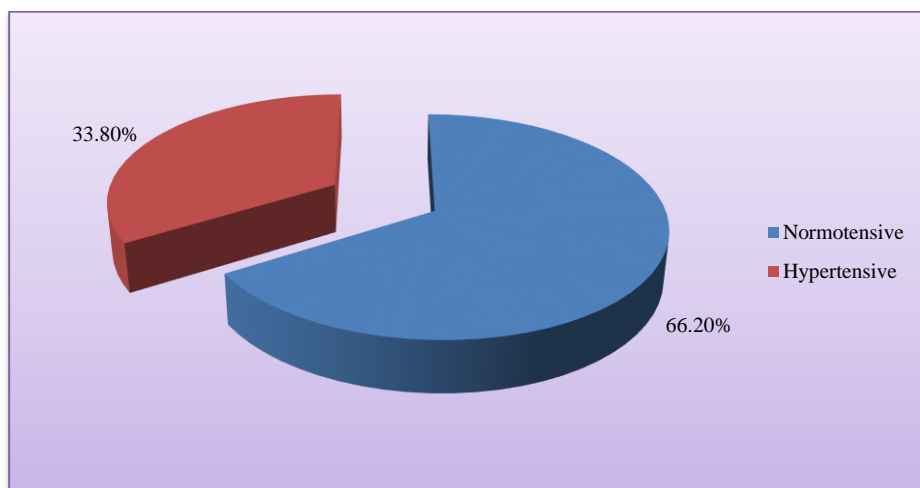
Table no 2 depicts that 9(6.92%) subjects were having low risk of hypertension, 101(77.69%) were having medium risk of hypertension and 20(15.39%) were having high risk of hypertension. Findings indicate all the subjects were exposed to risk factors to some extent.

Table 2: Frequency and percentage distribution of adults according to level of risk

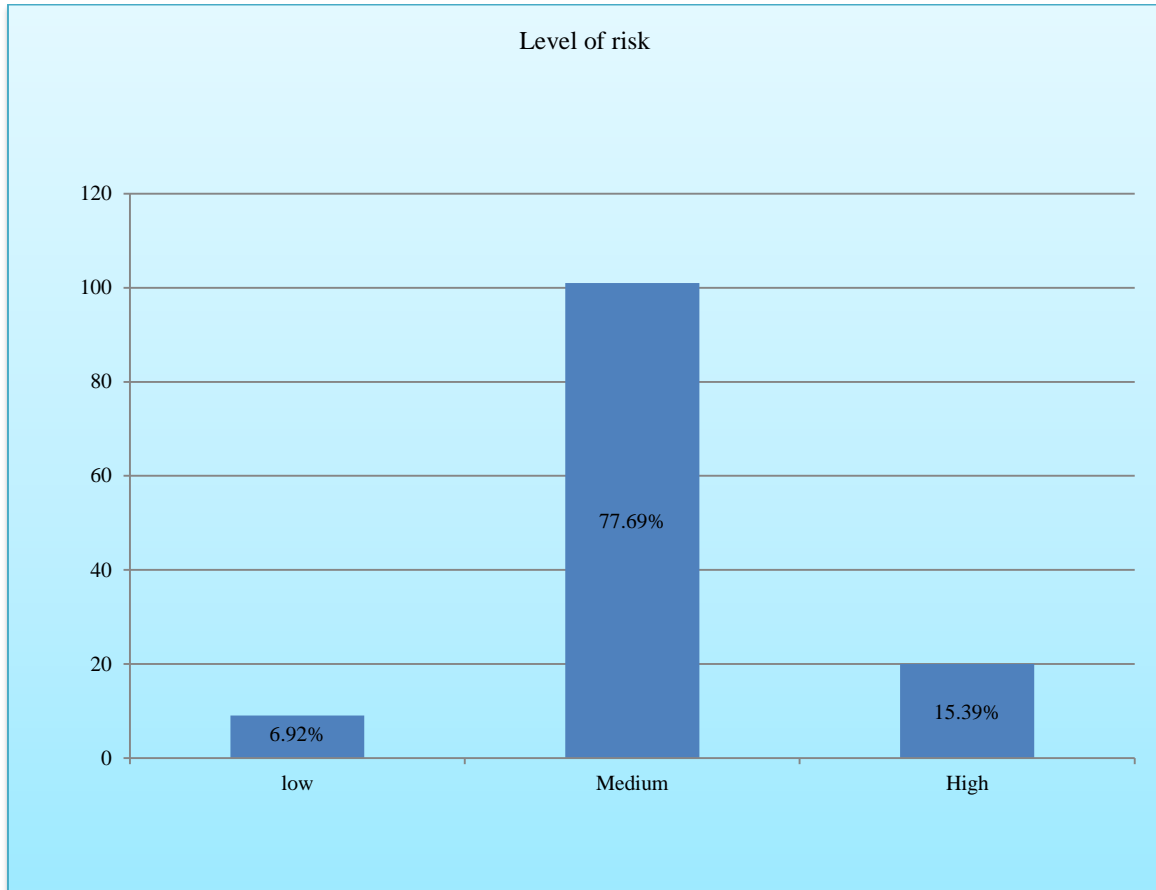| Level of risk	Frequency(f)	Percentage(%)	Mean	SD	Mean±SD
Low (<5)	9	6.92			
Medium(5-10)	101	77.69			
High(>10)	20	15.39	7.846	3.033	7.846±3.033
Total	130	100			

Table no 3 depicts that out of 62 normal cases majority i.e. 46 were in medium level of risk, 9 were in high level of risk, 7 were in low level of risk; out of 24 pre hypertensive cases 20 were in medium level of risk, 3 were in high level of risk, 1 were in low level of risk; out of 25 stage I hypertensive cases 19 were in medium level of risk, 5 were in high level of risk, 1 were in low level of risk; out of 12 stage II hypertensive cases 10 were in medium level of risk, 2 were in high level of risk; out of 7 Isolated Systolic hypertensive cases 6 were in medium level of risk, 1 were in low level of risk. The obtained Chi-square value for the association between prevalence of hypertension and level of risk is 4.43 (df= 8) which is less than tabulated value 15.51 and p value 0.816>0.05 which is statistically not significant.

Table no 3 depicts Association between prevalence of hypertension and level of risk of hypertension and Prevalence of Hypertension with selected variables

Level of risk	Prevalence of hypertension					Chi square	df	p-value
	Normal (f)	Pre HTN (f)	Stage I HTN(f)	Stage II HTN (f)	Isolated systolic HTN (f)			
Low	7	1	1	0	0			
Medium	46	20	19	10	6	4.43	8	0.816[NS]
High	9	3	5	2	1			
Total	62	24	25	12	7			

There is no significant association between prevalence of hypertension and level of risk of hypertension, age, occupation, religion, habits of drinking, physical activity, positive family history, dietary habits related to fat and salt intake, and Body Mass Index(BMI) at 0.05 level of significance.
 In the other hand there is significant association between Prevalence of Hypertension and some selected variables such as gender, habits of smoking, and psychological stress at 0.05 level of significance.
       Table no 4 depicts that the obtained Chi-square value for the association between prevalence of hypertension and gender is 13.050(df= 4) which is more than tabulated value 9.49 and p value 0.011<0.05 which is statistically significant. Hence, there is significant association between hypertension and gender.

Table no 4: Association between prevalence of hypertension and Gender

Gender	Prevalence of hypertension					Total	Chi square	df	p-value
	Normal (f)	Pre HTN (f)	Stage I HTN (f)	Stage II HTN (f)	Isolated systolic HTN (f)				
Male	18	14	15	8	4	59			
Female	44	10	10	4	3	71	13.050	4	0.011*
Total	62	24	25	12	7	130			

Table no 5 depicts that the obtained Chi-square value for the association between prevalence of hypertension and habits of smoking is 13.86(df= 4) which is more than tabulated value 9.49 and p value 0.008<0.05 which is statistically significant. Hence, there is significant association between hypertension and habits of smoking.

Table no 5: Association between prevalence of hypertension and habits of smoking

Habits of smoking	Prevalence of hypertension					Total	Chi square	df	p-value
	Normal (f)	Pre HTN (f)	Stage I HTN (f)	Stage II HTN (f)	Isolated systolic HTN (f)				
Yes	4	8	8	4	1	25			
No	58	16	17	8	6	105	13.86	4	0.008**
Total	62	24	25	12	7	130			

Table no 6 depicts that the obtained Chi-square value for the association between prevalence of hypertension and Psychological stress is 15.73 (df= 8) which is more than tabulated value 15.51 and p value 0.046<0.05 which is statistically significant. Hence, there is significant association between hypertension and Psychological stress.

Table no 6: Association between prevalence of hypertension and psychological stress

Psychological stress	Prevalence of hypertension					Total	Chi square	df	p-value
	Normal (f)	Pre HTN (f)	Stage I HTN (f)	Stage II HTN (f)	Isolated systolic HTN (f)				
Low	1	0	0	0	0	1			
Medium	59	24	20	9	7	119	15.73	8	0.046*
High	2	0	5	3	0	10			
Total	62	24	25	12	7	130			

IV. Discussion

Discussion relation to prevalence of Hypertension among the adults:

The findings of the present study revealed that out of 130 subjects, 33.8%(44) subjects were having Hypertension out of which 5.38%(7) were old cases of Hypertension and 28.4%(37) were newly detected cases of Hypertension in the study. The present study showed that the prevalence of hypertension increase significantly with increasing age. A sharp increase after the fifth decade of life, i.e. 8.5% was found in the age group of 50-59 years, 8.4% in the age group of 40-49 years, 6.9% was found in the age group of 60-65 years, 5.4% was found in the age group of 18-29 years, while the least case was found in the age group of 30-39 years and there was no significant association of prevalence of hypertension with age(p= 0.128).

Similar kind of findings has been found in many studies. A study was done by Demise GA, Greffie SE, Mesfin N(2017)[7] among residents of Gondhar city in Ethiopia. The prevalence of hypertension in the age group of ≥35 years was 36.1%. It consistently increased from 9.5% in the age group of 18-25 years to 46.3% in the age group of ≥65 years.

Further gender wise prevalence of Hypertension showed that maximum number of subjects i.e. 20.7 %(27) were male and 13.1 %(17) were female. The present findings had support from the study done by Singh S, Shankar R, Singh GP[8] in Urban Varanasi; where the prevalence of hypertension was 32.9 %(male 40.9%, female 26.0%). There was significant association between prevalence of hypertension and gender.

Discussion related to risk factors of hypertension among the adults under Fatasil Ambari Urban Primary Health Centre Kamrup Metro Assam:

The present study showed that the risk factors were categorized into different areas like age above 50 years, male gender, habits of smoking, habits of drinking, physical inactivity, positive family history of hypertension, high fat intake, salty food and extra salt intake, psychological stress and BMI>25 and its prevalence were identified as follows:

Out of the 130 subjects, 31.5% subjects were above 50 years, 43.4% subjects were male, 19.2% subjects had habits of smoking, 18.5% subjects had habits of drinking alcohol, 10% subjects were found physically inactive, 54.6% subjects had positive family history of hypertension, 45.4% subjects had history of high fat intake, 26.9% subjects had history of salty food intake, 29.2% subjects had history of extra salt intake, 7.7% subjects had high psychological stress and 3.85% subjects had history of obesity(>25 BMI).

Previously identified risk factors for hypertension include being overweight or obese, too much salt (sodium) in diet, too little potassium in diet, not being physically active, drinking too much alcohol, stress, non-steroidal Anti-inflammatory Drugs (NSAIDs), certain chronic conditions including diabetes, kidney disease and sleep apnea.[3] All these risk factor can lead to heart diseases, stroke and myocardial infarction.

Many other studies also considered the following factors as risk factors. A study conducted by Agrawal VK, Bhalwar R, Basanar DR. [9] revealed that prevalence of smoking and tobacco use was 16%, alcohol intake 9.4%, daily salt intake(≥5gm) 34.2%, daily saturated fats intake (≥10% of daily energy intake) 47.0% and physical inactivity (work and leisure) as 18.5%. Body Mass Index was ≥25 in 18% and ≥30 in 3.25 men and women. In supporting to the present study another study was conducted by Bansal K S, Saxena V, Goel D (2012)[10] had revealed that the overall prevalence of hypertension was 32.3%(95% CI 28.9 to 35.8) where 24% were current smoker, 32.4% had history of drinking alcohol, 15.9% had diabetes, 13.6% had high psychological stress, 9.4% were overweight.

Association between hypertension and selected demographic variables:

In the present study, significant association was found between prevalence of hypertension and gender(x^2=13.050), habits of smoking(x^2= 13.86) and psychological stress (x^2= 15.73) but no significant association was found between prevalence of hypertension with other variables like age, occupation, religion, habits of drinking, physical activity, family history of hypertension, fat intake, salt intake and Body Mass Index.

Prevalence of hypertension and gender:

In the present study it has been found that hypertension (stage I, stage II& Isolated Systolic HTN) was seen more among males i.e. 27(20.8%) than that of females i.e. 17(13.1%) and there was significant association between prevalence of hypertension and gender (p=0.011).The lower prevalence of hypertension among females could be contributed by the protective effect of estrogen present in women before menopause.

Singh M, Kotwal A, Mittal C, Babu SR, Bharti S, Ram CVS (2017)[11] had conducted a similar kind of present study where the study results showed that there was positive correlation between gender and prevalence of hypertension.
The investigator did not come across a study with contrast findings.

Prevalence of hypertension and habits of smoking:

In the present study out of hypertensive (stage I, stage II& Isolated Systolic HTN) cases 31 (23.8%) subjects had no history of smoking and only 13(10%) subjects had history of smoking. The present study findings revealed a significant association between hypertension and habits of smoking (p= .008).

The findings of the present study was supported by a similar kind of study conducted by Halprin OR, Gaziano M, Sesso DH[12] on smoking and the risk of incident hypertension in middle-aged and older men. The result had showed that the cumulative incidence of hypertension for never smokers was 34%; past smokers had a cumulative incidence of hypertension of 39%; those who reported stopping smoking at 2 years follow up had a cumulative incidence of 43%.

In contrast, a study was conducted by Mahmood SE, Srivastava A, Shrotriya VP, Shaifali I, Mishra P[13] had revealed that the overall prevalence of hypertension was 10.8%. Prevalence of hypertension was significantly associated with aged 40 years and above, with high body mass index, and increased waist hip ratio (p<.05); but smoking habit (p=.150) and alcohol consumption (p= .214) was insignificantly associated with prevalence of hypertension.

Prevalence of hypertension and psychological stress:

The present study findings revealed significant association between prevalence of hypertension (stage I, stage II& Isolated Systolic HTN) and psychological stress at 0.05 level of significance. This present study findings can be supported by a study conducted by Liu MY, Li N, Li WA, Khan H[14] had revealed that psychological stress was associated with an increased risk of hypertension (or=2.40,95% CI=1.65-3.49). Another study was conducted by Gasperin D, Netuveli G, Dias-da-Costa SJ, Pattussi PM[15] had revealed that individuals who had stronger responses to stressor tasks were 21% more likely to develop blood pressure increases when compared those with less strong responses to stressor(or:1.21;95%CI:1.14-1.28;p<0.001).

V.   Conclusion

Hypertension is a silent killer is becoming a global public Health issue. High blood pressure is also known as raised blood pressure or hypertension increases the risk of heart attacks strokes and kidney failure. On the basis of the study findings it can be concluded that the prevalence of hypertension is rising and the cases of hypertension were more in aging subjects, male gender, smoker and with increased psychological stress. For non modifiable risk factor like age, gender lifestyle modification, regular monitoring of blood pressure by conducting screening programme should be done to prevent the development of hypertension. For modifiable risk factor such as habits of smoking, high level of psychological stress health education, counseling programme related to the disease, risk factors and complication of hypertension is suggestive.
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