Prevalence of selected risk factors among Hypertensive Population in Rural Haryana- A Community based study

A dissertation submitted in partial fulfilment of the requirements

for the award of

Post-Graduate Diploma in Health and Hospital Management

By-

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Certificate of Internship Completion

TO WHOM IT MAY CONCERN

This is to certify that Dr. Chandravali Madan has successfully completed her 3 months internship in our organization from January 01, 2013 to April 01, 2013. During this intern she has worked on - **Prevalence of selected risk factors among Hypertensive Population in Rural Haryana- A Community based study (Age group > 18 years)**under the guidance of me and my team at CRHSP,Ballabhgarh.

We wish him/her good luck for his/her future assignments

Dr. Puneet Misra

Additional Professor

CRHSP,Ballabhgarh

Certificate of Approval

The following dissertation titled "- **Prevalence of selected risk factors among Hypertensive Population in Rural Haryana- A Community based study (Age group > 18 years)**" is hereby approved as a certified study in management carried out and presented in a manner satisfactory to warrant its acceptance as a prerequisite for the award of **Post- Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation

Name Signature

DR. BRIJENDER SINGH DHILLON

PROF. Minakshi Gautam.

Prof. Kirti Udayai

STUDENT NAME

CHANDRAVALI

Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Chandravali Madan**, a graduate student of the **Post- Graduate Diploma in Health and Hospital Management**, has worked under our guidance and supervision. She is submitting this dissertation titled "- **Prevalence of selected risk factors among Hypertensive Population in Rural Haryana- A Community based study (Age group > 18 years)**" in partial fulfilment of the requirements for the award of the **Post-Graduate Diploma in Health and Hospital Management**.

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

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FEEDBACK FORM

Name of the Student: Dr. Chandravali Madan

Dissertation Organisation: CRHSP, Ballabhgarh

Area of Dissertation: Research work

Attendance: Good

Objectives achieved: Yes

Deliverables: demonstrated in project activities

Strengths: She is motivated and hard working girl, Result oriented, and always willing to learn, team player

Suggestions for Improvement: keep on doing good work with motivation and initiative and also motivate staff under your area of work

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Date:
Place:

Abstract

Prevalence of selected risk factors among Hypertensive Population in Rural Haryana- A Community based study (Age group > 18 years)

By

Dr. Chandravali Madan

Background- Hypertension is a major contributor to the cardiovascular morbidity and mortality in industrialized countries. Reports suggest that hypertension is rapidly increasing in developing countries like India. Non-communicable diseases are likely to overshadow infectious diseases in the coming years and pose a heavy strain on health budgets in our country. Risk factors for cardiovascular disease are also often risk factors for other chronic diseases. Many risk factors are related. For example, if someone is not physically active, that person is more likely to become overweight and more likely to develop high blood pressure. Common risk factors that can lead to hypertension disease are tobacco use, physical inactivity, overweight/obesity and alcohol use.

Objectives- To estimate Prevalence of selected risk factors among Hypertensive population and to study its determinants.

Study and design- A community-based cross-sectional study was conducted in 28 villages included under CRHSP, ballabhgarh

Method- We studied 373 subjects aged 18 years and above. The data were collected by semi structured questionnaire , clinical examination (blood pressure), and examination (weight and height).

Statistical analysis- Chi-square test, Student's t-test and Co-relation method.

Results- The mean blood pressures were 164.48 mmHg systolic and 95.14 mmHg diastolic in participants consuming alcohol and 158.25 mmHg systolic and 90.93 mmHg diastolic in participants consuming tobacco.

A significant correlation of systolic blood pressure with increasing age was seen. Study has shown strong association of hypertension (systolic as well as diastolic) with alcohol consumption and association of diastolic hypertension with tobacco consumption ($p<0.05$). Student t test showed significant association with tobacco consumption, alcohol consumption and frequency of alcohol consumption with diastolic blood pressure ($p<0.05$) whereas systolic blood pressure shown significant association with increasing age ($p<0.001$) and gender (males having more mean blood pressure than females) ($p<0.05$)

Conclusion - Risk factors of hypertension were alcohol and tobacco and its significantly associated with age and gender. Higher BMI values also significantly contributed to the risk of hypertension. All risk factors necessitates health education and intervention at the primary health care level for its prevention.

Acknowledgement

I have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals in the organization. I would like to extend my sincere thanks to all of them.

I am highly indebted to **Dr Puneet (Additional Professor)** and **Dr Harshal Salve** (Senior Resident)**,** for their guidance and constant supervision as well as for providing necessary information regarding the project & also for their support in completing the project.

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I would also like to express my gratitude towards **Indrajit Bhattacharya** (**Professor, IIHMR New Delhi**) and **Dr. Rajesh Bhalla (Dean , Academic Affairs, IIHMR)** for their kind co-operation and encouragement at each step, which helped me in completion of this project.

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Abbreviations

1. SBP – Systolic blood pressure

2. DBP- Diastolic blood pressure

3. HTN- Hypertension

4. Cat- Category

5. Cons- Consumption

6. Freq- Frequency

7. BMI- Basal metabolic rate

8. WHO- World Health Organisation

9. PHC- Primary Health care centre

10.CRHSP- Comprehensive Rural Health Centre

PART 1 – INTERNSHIP REPORT

1.1 **ABOUT THE ORGANIZATION**

1.1.1 History

AIIMS was created in 1956 to serve as a nucleus for nurturing excellence in all aspects of health care. Creating a country imbued with a scientific culture was Jawaharlal Nehru's dream, and immediately after independence he prepared a grand design to achieve it. Among the temples of modern India which he designed, was a centre of excellence in the medical sciences. Nehru's dream was that such a centre would set the pace for medical education and research in Southeast Asia , and in this he had the wholehearted support of his Health Minister, Rajkumari Amrit Kaur.

The health survey and development committee ,chaired by Sir Joseph Bhore, an Indian Civil Servant ,had in 1946 already recommended the establishment of a national medical centre which would concentrate on meeting the need for highly qualified manpower to look after the nation's expanding health care activities . The dreams of Nehru and Amrit Kaur and the recommendations of the Bhore Committee converged to create a proposal which found favor with the government of New Zealand. A generous grant from New Zealand under the Colombo Plan made it possible to lay the foundation stone of All India Institute of Medical Sciences (AIIMS) in 1952.The AIIMS was finally created in 1956,as an autonomous institution through an Act of Parliament ,to serve as a nucleus for nurturing excellence in all aspect of health care.

All-India Institute of Medical Sciences was established as an institution of national importance by an Act of Parliament with the objects to develop patterns of teaching in Undergraduate and Post-graduate Medical Education in all its branches so as to demonstrate a high standard of Medical Education in India; to bring together in one place educational facilities of the highest order for the training of personnel in all important branches of health activity; and to attain self-sufficiency in Post-graduate Medical Education.

The Institute has comprehensive facilities for teaching, research and patient-care. As provided in the Act, AIIMS conducts teaching programs in medical and para-medical courses both at undergraduate and postgraduate levels and awards its own degrees. Teaching and research are conducted in 42 disciplines. **In the field of medical research AIIMS is the lead, having more than 600 research publications by its faculty and researchers in a**

year. AIIMS also runs a College of Nursing and trains students for B.Sc.(Hons.) Nursing post-certificate) degrees.

1.1.2 Departments

Twenty-five clinical departments including four super specialty centers manage practically all types of disease conditions with support from pre- and Para-clinical departments. However, burn cases, dog-bite cases and patients suffering from infectious diseases are not entertained in the AIIMS Hospital. **AIIMS also manages a 60-beded hospital in the Comprehensive Rural Health Centre at Ballabgarh in Haryana and provides health cover to about 2.5 lakh population through the Centre for Community Medicine**. The Comprehensive Rural Health Services Project (CRHSP), Ballabgarh, situated in the state of Haryana in Northern India, was started in 1965 by the All India Institute of Medical Sciences in collaboration with the state government of Haryana. The field practice area of the project comprises of 28 villages catering to a population of 87052. Health Management System (HMIS) is a computerized management system introduced in the project in 1988. Demographic data, Maternal and Child Health Services data, and data pertaining to various health services provided in the area are stored.

1.1.3 Objectives of AIIMS

- To develop a pattern of teaching in undergraduate and postgraduate medical education in all its branches so as to demonstrate high standard of medical education to all medical colleges and other allied institutions in India.
- To bring together in one place educational facilities of the highest order for the training of the personnel in all important branches of the health activity to attain self sufficiency in postgraduate in medical education.

1.1.4 Functions of AIIMS

- Undergraduate and postgraduate teaching in medical and related physical biological sciences.
- Nursing and dental education
- Innovations in education.
- Producing medical teachers for the country.
- Research in medical and related sciences.

- Health care : preventive, promotive and curative; primary, secondary & tertiary.
- Community based teaching and research.

1.2 <u>AREAS ENGAGED IN AND TASKS UNDERTAKEN</u>

1.2.1 Routine or general management

- Involved as a Research Assistant in the project named "Adherence to treatment amongst patients with hypertension & diabetes mellitus in rural Haryana: Community based study" funded by AIIMS
    - <u>Roles and responsibilities in the project</u>
    - To work on the setting up of a surveillance system using Field workers this would include planning for the same and training them.
    - To work on the questionnaire after circulating and discussing with all investigators, pre test the same with 15 hypertensive patients.
    - To make a detailed plan for the community mobilization.
- Involved as Administrative assistant in HSS 2012-13 (HIV Sentinel Surveillance Program)
    - Co ordinate between NACO and State under surveillance
    - Document problems encountered in surveillance
    - Record Maintenance
    - Analysis of surveillance

1.2.2 In The In-Depth Study

- As a trainee worked on the project "**Adherence to treatment amongst patients with hypertension & diabetes mellitus in rural Haryana: Community based study**".
    - <u>Roles and responsibilities in the project</u>
        1. To develop a community survey questionnaire to check the status of adherence in hypertension and diabetes patients.
        2. Data collection from 28 selected villages under the two PHC of AIIMS.
        3. To make a detailed report of the study done.
        4. To perform data analysis and make report of it.

- Areas Visited during the survey
  - 28 villages involved under CRHSP, Ballabhgarh, CCM,AIIMS.

1.3 **Reflective Learning during Internship**

- Designing tools for the survey
- Understanding the process of Micro-planning.
- Understanding the process of designing of community mobilization plan.
- Procedures for budgeting of community mobilization plan.

PART 2- DISSERTATION REPORT

Chapter 1- Introduction

Hypertension is one of the important public health challenges worldwide because of **its high frequency and concomitant risks of cardiovascular and kidney disease**. It has been identified as a leading risk factor for mortality and ranked third as a cause of disability adjusted life-years [1,2] . The accelerating epidemic of hypertension in India was documented by studies done at various places across the country [3]

Tobacco use is the most common cause of avoidable cardiovascular mortality worldwide [4.] There are now 1.3 billion cigarette smokers, 82 percent in developing countries, and if current practices continue, there will be an estimated one billion tobacco-related deaths during the 21st century. The immediate noxious effects of smoking are related to sympathetic nervous over activity, which increases myocardial oxygen consumption through a rise in blood pressure, heart rate, and myocardial contractility [5.]

Smoking causes an acute increase in blood pressure (BP) and heart rate and has been found to be associated with malignant hypertension. Nicotine acts as an adrenergic agonist, mediating local and systemic catecholamine release and possibly the release of vasopressin. Paradoxically, several epidemiological studies have found that BP levels among cigarette smokers were the same as or lower than those of non smokers

<u>Rationale of the study</u> – In terms of attributable deaths, the leading behavioural and physiological risk factors globally are raised blood pressure (to which 13% of global deaths are attributed), followed by tobacco use (9%), raised blood glucose (6%), physical inactivity (6%) and being overweight or obese (5%).13 It has been estimated that raised blood pressure causes 51% of stroke deaths and 45% of coronary heart disease deaths[13] Mean blood pressure has decreased dramatically in nearly all high-income countries. For example, mean age-standardized male systolic blood pressure (SBP) in the United States decreased from 131 mm Hg (95% uncertainty interval 127–135) in 1980 to 123 mm Hg (120–127) in 2008, while mean age-standardized female SBP decreased from 125 mm Hg (121–130) to 118 mm Hg (115–122) mm Hg. In contrast, mean blood pressure has been stable or increasing in most African countries.14,15 Today, mean blood pressure remains very high in many African and some European countries.The prevalence of raised blood pressure in 2008 (SBP ≥140 mm Hg or diastolic blood pressure (DBP) ≥90 mm Hg) was highest in the WHO African Region at 36.8% (34.0–39.7). Applying the lessons learnt in high-income countries to low- and middle-

income settings has the potential to significantly reduce the overall rate of adult mortality from cardiovascular diseases.

Risk factors are behaviors or conditions that increase your chance of developing a disease. Risk factors for cardiovascular disease are also often risk factors for other chronic diseases. Many risk factors are related. For example, if someone is not physically active, that person is more likely to become overweight and more likely to develop high blood pressure. The following are common risk factors that can lead to cardiovascular disease:

- Tobacco Use

- Physical Inactivity

- Poor Diet

- Overweight/Obesity

- High Blood Pressure

- High Blood Cholesterol

- Diabetes

Problem statement- To estimate Prevalence of selected risk factors among Hypertensive Population in Rural Ballabgarh.

The prevalence of hypertension was 32.8% in the urban population and 14.5% in the rural population.[26]

Review of literature-

A high prevalence of hypertension was seen in the urban and rural population of a north Indian district Risk factors of hypertension were age and gender in urban as well as rural population. Diabetes, higher BMI values, decreased level of physical activity and increased waist circumference also significantly contributed to the risk of hypertension, which necessitates intervention at the primary health care level for its prevention.[26]

Heavy smoking is associated with a persistent rise in blood pressure and also with an increase in blood pressure variability. These effects (which may escape clinic blood pressure measurements performed during non-smoking) may account for some of the smoking-related cardiovascular risk [5].

Although cigarette smoking produces an acute rise in blood pressure (BP), results from epidemiologic studies have generally shown smokers to have lower BP than nonsmokers. This phenomenon has frequently been ascribed to a failure to account for other BP-associated differences between smokers and non smokers. Consequently, the role of cigarette smoking as a risk factor for hypertension remains unclear. In this article the results of a large epidemiologic study of smoking and BP in a working population are presented. The results show a pattern of higher BP among nonsmokers and ex-smokers than among smokers. These differences could not be explained by various potentially confounding factors, such as relative weight, ethnic origin, alcohol and coffee intake, and participation in leisure time sports. While the considerable adverse effects of smoking on health are well established, the role of smoking as a risk factor for hypertension is not supported by the epidemiologic evidence. Furthermore, the data are highly suggestive of lower BP among smokers compared with nonsmokers, whereas ex-smokers have BPs similar to those of nonsmokers. [6]

Chronically, cigarette smoking induces arterial stiffness which may persist for a decade after smoking cessation. The incidence of hypertension is increased among those who smoke 15 or more cigarettes per day [7], and the coexistence of hypertension and smoking decreases left ventricular function in asymptomatic people [8.]

With each cigarette, the blood pressure rises transiently and the pressure effect may be missed if the blood pressure is measured 30 minutes after the last smoke. The transient rise in blood pressure may be most prominent with the first cigarette of the day even in habitual smokers. In one study of normotensive smokers, there was an average elevation in systolic pressure of 20 mmHg after the first cigarette [9.] Furthermore, ambulatory blood pressure monitoring suggests an interactive effect between smoking and coffee drinking in patients with mild essential hypertension, resulting in a mean elevation in daytime systolic pressure of approximately 6.0 mmHg [10.]

However, habitual smokers generally have lower blood pressures than nonsmokers as observed in most [11,12] ,but not all [13] , studies. The mild reduction in BP in smokers is related to decreased body weight [14] . Support for this observation is the higher body weight and increased blood pressure among former smokers versus that observed among never-smokers [15.] A vasodilator effect of cotinine, the major metabolite of nicotine, also may contribute to the lower blood pressure [16] .

Despite these observations, smoking should be avoided in any hypertensive patient because it can markedly increase the risk of secondary cardiovascular complications and enhance the progression of renal insufficiency [17,18]. An example of the latter effect was observed in one prospective study (with a mean follow-up of 35 months) that examined the factors associated with alterations in renal function among 53 hypertensive patients in whom the serum creatinine concentration rose from 1.5 to 1.9 mg/dL (133 to 168 µmol/L) despite a significant reduction in the target mean blood pressure (127 to 97 mmHg) [17]. Smoking was the most significant independent factor underlying progressive renal disease (serum creatinine 1.5 and 2.1 mg/dL [133 and 186 µmol/L] at the beginning and end of the study for smokers, respectively, versus 1.25 and 1.32 mg/dL [110 and 117 µmol/L] for nonsmokers, respectively). The mechanism underlying this adverse effect is unclear but may be related to the transient increase in systemic blood pressure with smoking being transmitted to the glomerulus, resulting in glomerular hypertension.

Objectives-

General Objectives-

To estimate Prevalence of selected risk factors among Hypertensive population.

Specific objectives-

1. To estimate Prevalence of Tobacco consumption among Hypertensive Participants.
2. To measure association between Tobacco consumption and Hypertension.
3. To measure Prevalence of Alcohol consumption among Hypertensive Participants.
4. To measure association between Alcohol consumption and Hypertension.
5. To estimate association between overweight/obesity and Hypertension.
6. To study the determinants of hypertension.

Chapter 2 - Data and Methods

Study design adopted for the study is cross sectional study.

Period of study- 15 January, 2013 – 15 February, 2013

The population of 22 villages of rural Haryana is selected randomly for study

Sample size was 373, Method of sampling is simple random sampling.

Tool used for data collection is semi structured questionnaire.

Clinical examination and examinations: Blood pressure was measured by a clinician using sphygmomanometer. In the sitting position, the right hand was used.

Data analysis: The data were analysed using the Statistical Package for Social Sciences (SPSS) soft ware (Version 20.0)

Prevalence of hypertension in relation to various other variables along with 95 per cent confidence interval was calculated. Bivariate analysis was carried out to find out associations between age, educational status, tobacco consumption, alcohol consumption, Basal metabolic rate with hypertension.

Hypertension - Individuals with systolic blood pressure (SBP) of >= 140 and or diastolic pressure (DBP) of >= 90 and those who were already under medication were considered as hypertensive

Sample size calculation – $N = Z^2 P(1-P)/d^2$

Prevalence = 30% [21,22]

D= 5 %

N= 323

Adding, Rejection rate= 20%

N= 388

Chapter 3- Results and Findings

A. Univariate Analysis

1A. DEMOGRAPHIC PROFILE OF PARTICIPANTS, N= 373

1.1 Distribution of participants according to health facility available in village-

VILLAGE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Having PHC	45	12.1	12.1	12.1
	Having Sub centre	149	39.9	39.9	52.0
	Others	179	48.0	48.0	100.0
	Total	373	100.0	100.0	

Interpretation – 12% of participants belong to village having PHC health facility in village, 40% of participants belong to village having sub centre and maximum number i.e 48% belong to village where doctors visit anaganwadi centre or school premises.

1.2 Distribution of participants according to age

Statistics

AGE

N	Valid	373
	Missing	0
Mean		57.27
Median		58.00
Mode		60
Std. Deviation		14.473
Minimum		24
Maximum		95

Age_cat

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-45 years	84	22.5	22.5	22.5
	>45 years	289	77.5	77.5	100.0
	Total	373	100.0	100.0	

Interpretation – 77.5 % of participants are from age group of > 46 years. Mean age is 57 years.

1.3 Distribution of participants according to sex

SEX

		Frequency	Percent	Valid Percent	Cumulative Percent
	Male	94	25.2	25.2	25.2
Valid	Female	279	74.8	74.8	100.0
	Total	373	100.0	100.0	

Interpretation – Maximum females are housewife in village, that's why they were available during survey. Male are either working or not available at home were interviewed during evening hours or weekends.

1.4 Distribution of participants according to caste

Caste

		Frequency	Percent	Valid Percent	Cumulative Percent
	General	117	31.4	31.4	31.4
	SC/ST	45	12.1	12.1	43.4
Valid	BC	210	56.3	56.3	99.7
	OBC	1	.3	.3	100.0
	Total	373	100.0	100.0	

Interpretation – Maximum participants belong to backward class and least are from other backward classes.

1.5 Distribution of participants according to their educational status

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
	Illiterate	216	57.9	57.9	57.9
	Till primary school	36	9.7	9.7	67.6
Valid	Till Higher secondary	108	29.0	29.0	96.5
	Graduate and above	13	3.5	3.5	100.0
	Total	373	100.0	100.0	

Interpretation – Maximum population in villages is illiterate (60%).

1.6 Distribution of participants according to occupations

Occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
	Dependent	53	14.2	14.2	14.2
	Housewife	264	70.8	70.8	85.0
Valid	Currently Working	46	12.3	12.3	97.3
	Unemployed	10	2.7	2.7	100.0
	Total	373	100.0	100.0	

 Interpretation – Maximum females were interviewed that's why maximum participants are housewives. 14.2 % are dependent elderly and 2.7 % are dependent adults who are not currently working. Only 12.3 % is working population.

2A. Distribution of participants according to their basal metabolic rates (kg/m^2)

Statistics

BMI

N	Valid	373
	Missing	0
Mean		24.59
Median		24.00
Mode		23
Std. Deviation		4.936
Minimum		14
Maximum		42

BMI_categories

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	underweight	34	9.1	9.1	9.1
	normal	162	43.4	43.4	52.5
	overweight/obese	177	47.5	47.5	100.0
	Total	373	100.0	100.0	

Interpretation –maximum participants belongs to overweight/obese category suggest that overweight people have more tendency towards hypertension.
Mean BMI was 24.59. Prevalence of overweight/obese was 47.4 %

3A. Distribution of Participants according to Stages of Hypertension

HTN_stages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	normal	10	2.7	2.7	2.7
	Pre hypertensive	89	23.9	23.9	26.5
	hypertension stage 1	120	32.2	32.2	58.7
	hypertension stage 2	154	41.3	41.3	100.0
	Total	373	100.0	100.0	

Interpretation – 41.3% of participants has hypertension stage 2 (SBP>160, DBP> 100), 32.2 % of participants has hypertension stage 1 (SBP 140-159, DBP 90-99), 23.9% of participants are pre hypertensive (SBP 120-139, DBP 80-89) and only 2.7 % of participants has normal BP (SBP <119, DBP <79). This suggests poor adherence to the treatment.

4A.Distribution according to isolated SBP & DBP

isolated_DBP_htn

		Frequency	Percent	Valid Percent	Cumulative Percent
	no	362	97.1	97.1	97.1
Valid	yes	11	2.9	2.9	100.0
	Total	373	100.0	100.0	

isolated_SBP_htn

		Frequency	Percent	Valid Percent	Cumulative Percent
	no	277	74.3	74.3	74.3
Valid	yes	96	25.7	25.7	100.0
	Total	373	100.0	100.0	

Interpretation – 2.9 % participants having isolated SBP(>140)and (DBP <90) and 25.7% isolated DBP.

	SEX		
	Male	Female	
isolated_DBP_htn	1(0.3%)	10(2.7%)	11(2.9%)
isolated_SBP_htn	28(7.5%)	68(18.2%)	96(25.7%)

Interpretation – 0.3% males and 2.7% females has isolated DBP and 7.5% males and 18.2% females have SBP.

5A. **Risk factors of Hypertension-**

1. Alcohol

Distribution of participants according to consumption of alcohol

Alcohol_cons

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	352	94.4	94.4	94.4
Valid	Yes	21	5.6	5.6	100.0
	Total	373	100.0	100.0	

Interpretation – Data shows Prevalence of alcohol consumption in hypertensive people = 5.6%

Alcohol_freq

		Frequency	Percent	Valid Percent	Cumulative Percent
	once a day	7	1.9	33.3	33.3
Valid	sometimes	14	3.8	66.7	100.0
	Total	21	5.6	100.0	
Missing	System	352	94.4		
Total		373	100.0		

Interpretation – maximum participants are not regular drinkers.

2. Tobacco consumption
   2.2 Prevalence of tobacco consumption

Tobacco_cons

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	250	67.0	67.0	67.0
Valid	Yes	123	33.0	33.0	100.0
	Total	373	100.0	100.0	

Interpretation – Prevalence of tobacco consumption in hypertensive = 33%

SEX * Tobacco_cons Crosstabulation

Count

		Tobacco_cons		Total
		no	yes	
SEX	Male	42	52	94
	Female	208	71	279
Total		250	123	373

Interpretation - Prevalence among female hypertensive was 25.4 % and among male hypertensive participants was 55.3%

2.2 Type of tobacco consumed

Type	Frequency	Percentage
Cigarette	3	2.4
Bidi	74	60.2
chew toabacco	7	5.7
Khaini	5	4.1
Hukka	46	37.4

Percentage of Type of tobacco consumed

	cigarette	bidi	chew toabacco	khaini	hukka
Percentage	2.4	60.2	5.7	4.1	37.4
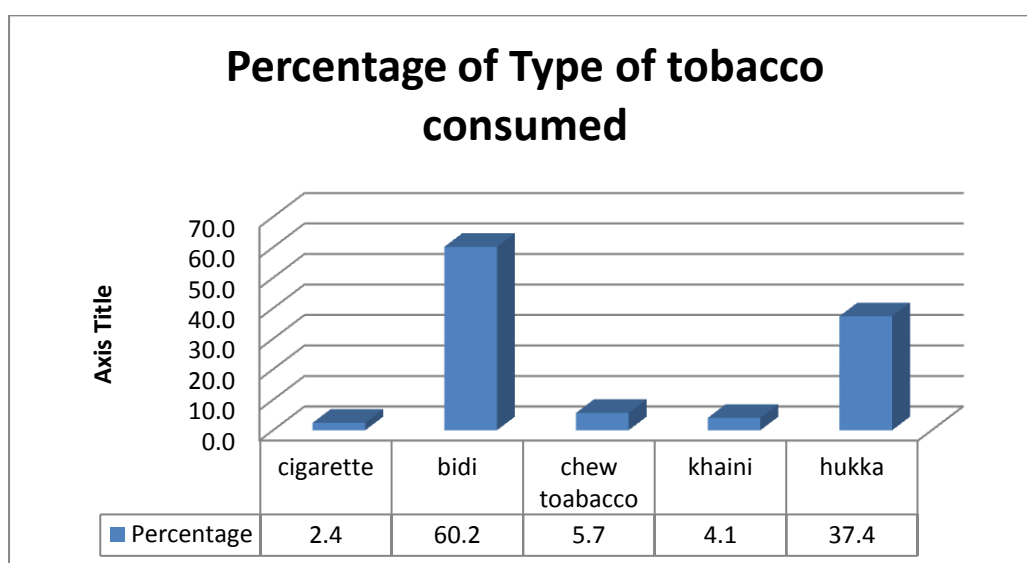
Interpretation – Bidi is most common form of tobacco consumed in villages. Second common form is Hukka.

2.3 Frequency of tobacco consumption

Tobacoo_frq

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	many times a day	108	29.0	88.5	88.5
	once a day	2	.5	1.6	90.2
	Sometimes	12	3.2	9.8	100.0
	Total	122	32.7	100.0	
Missing	System	251	67.3		
Total		373	100.0		

Interpretation – Consumption of tobacco is more in villages. 88.5% consumes tobacco many times in a day either in one form or in various forms.

6A. Distribution of Population
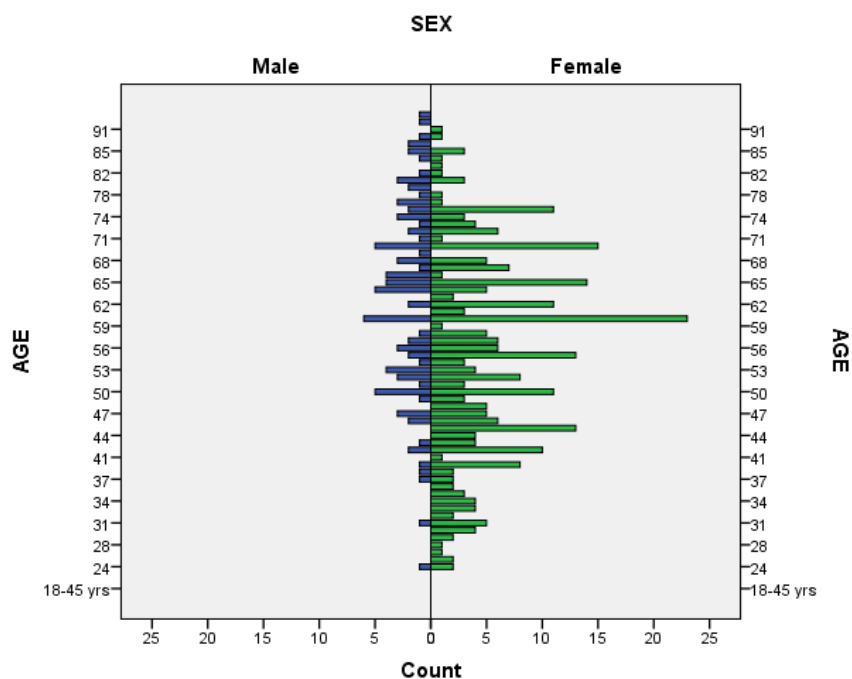
Interpretation- Population is normally distributed.

B. Bivariate analysis

1B. Association between type of Village and Hypertension

Crosstab

Count

		HTN		Total
		No	Yes	
VILLAGE	Having PHC	9	36	45
	Having Subcentre	32	117	149
	Others	63	116	179
Total		104	269	373

P= 0.005, x^2= 9.192, df=2

Interpretation – PHC served villages had 20% non hypertensive participants and 35 % non hypertensive participants fall under others category.

2B. Association between sex and Hypertension

Crosstab

Count

		HTN		Total
		normal BP	Hypertensive	
SEX	Male	12	82	94
	Female	92	187	279
Total		104	269	373

P= <0.001, x^2= 14.28, df=1

Interpretation - 93% males are hypertensive and 67% females are hypertensive. This data indicates male has poor adherence for treatment.

3B. Association between Education and Hypertension

Crosstab

Count

		HTN		Total
		normal BP	Hypertensive	
Education	Illiterate	60	156	216
	Till primary school	8	28	36
	Till Higher secondary	32	76	108
	Graduate and above	4	9	13
Total		104	269	373

P= 0.736, x^2= 0.114, df=1

Interpretation- Illiterates have more tendency towards hypertension.

4B. Association between occupation and Hypertension

Crosstab

Count

		HTN		Total
		normal BP	Hypertensive	
Occupation	Dependent	5	48	53
	Housewife	86	178	264
	Currently Working	10	36	46
	Unemployed	3	7	10
Total		104	269	373

P= 0.005, x^2= 12.74, df=3

Interpretation – 90% dependents are hypertensive. Other categories have approx ration of 7:3 (hypertensive: non hypertensive)

5B. Association between Physical exercise and Hypertension

Doing _exercise * HTN Crosstabulation

Count

		HTN		Total
		normal BP	Hypertensive	
Doing _exercise	no	18	71	89
	yes	4	26	30
Total		22	97	119

Interpretation – Participants which are not active and avoid physical work are more hypertensive than active participants.

6B. Association between obesity and Hypertension

BMI_obesity * HTN Crosstabulation

Count

		HTN		Total
		normal BP	Hypertensive	
BMI_obesity	overweight	31	87	118
	obesity	13	46	59
Total		44	133	177

Bar Chart
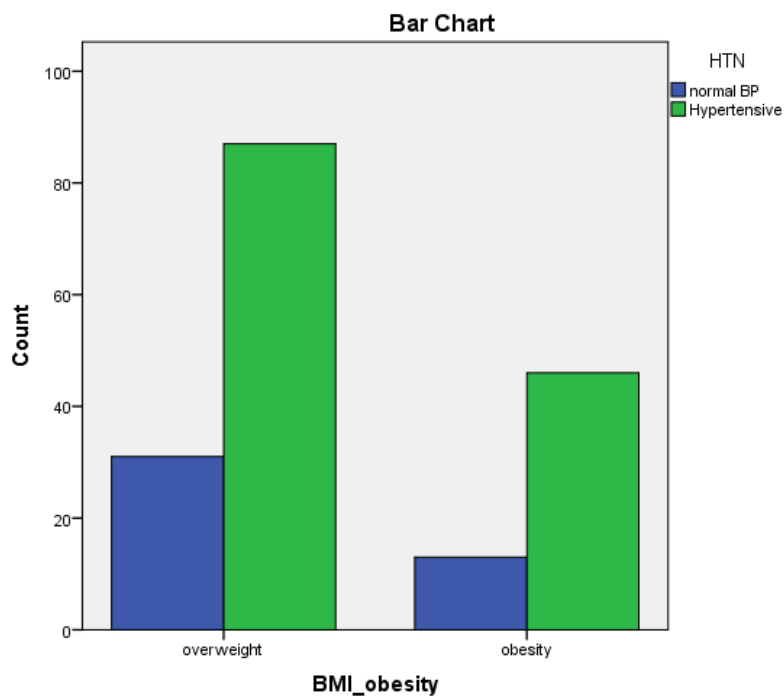
HTN_stages * BMI_obesity Crosstabulation

Count

		BMI_obesity	Total
		overweight/obese	
HTN_stages	Normal	2	2
	prehypertensive	42	42
	hypertension stage 1	56	56
	hypertension stage 2	77	77
Total		177	177

Bar Chart
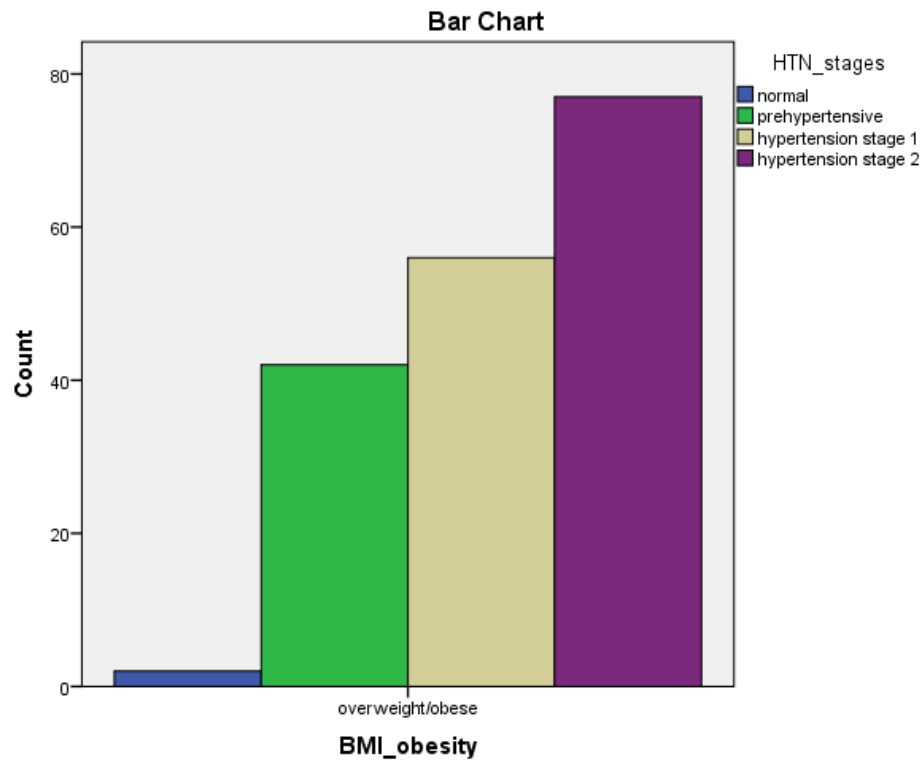
Interpretation – Hypertension stages increasing with BMI indicating positive relation between them.

7B. Association between Hypertension and alcohol consumption

Crosstab

Count

	HTN		Total
	normal BP	Hypertensive	
Alcohol_cons yes	2	19	21
Total	2	19	21

Bar Chart
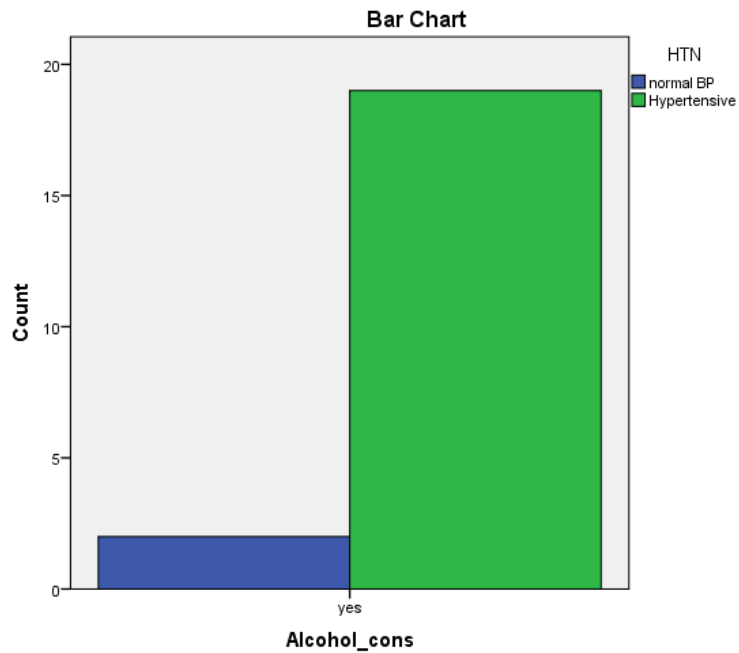
Interpretation - 10% alcoholics have normal blood pressure. 90% of alcoholics have high blood pressure.

8B. Association between Hypertension and tobacco consumption

Crosstab

Count

	HTN		Total
	normal BP	Hypertensive	
Tobacco_cons yes	26	97	123
Total	26	97	123

Bar Chart
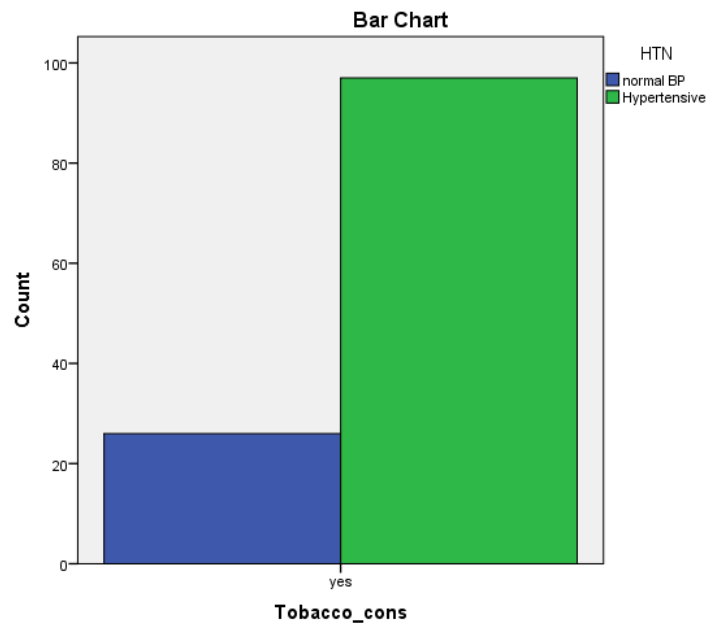
Interpretation – 21% of participants consuming tobacco are non hypertensive and 79% are hypertensive.

C. Statistical test application –

1C.Statistical relation of determinants with hypertension-

Factors		Normal BP	Hypertensive	Total	P value	OR
Age	18-45 years	50	34	84	.000	6.4
	>46 years	54	235	289		
SEX	Male	12	82	94	.000	0.297
	Female	92	187	279		
Occupation	Dependent	5	48	53	.163	
	Housewife	86	178	264		
	Currently Working	10	36	46		
	Unemployed	3	7	10		
VILLAGE	Having PHC	9	36	45	.010	
	Having Sub centre	32	117	149		
	Others	63	116	179		
Education	Illiterate	60	156	216	.736	
	Till primary school	8	28	36		
	Till Higher secondary	32	76	108		
	Graduate and above	4	9	13		
Caste	General	33	84	117	.850	
	SC/ST	14	31	45		
	BC	56	154	210		
	OBC	1	0	1		
Alcohol_cons	No	102	250	352	.053	3.87
	Yes	2	19	21		
Tobacco_cons	No	78	172	250	.042	1.69
	Yes	26	97	123		
Cigarette_cons	No	25	94	119	0.607	
	Yes	1	2	3		
Bidi_cons	No	12	37	49	0.459	
	Yes	14	60	74		
Chew_Tobacco_Cons	No	25	90	115	0.640	
	Yes	1	6	7		
Khaini_Cons	No	25	92	117	0.942	

	Yes	1	4	5		
Hukka_Cons	No	15	61	76	0.585	
	Yes	11	35	46		
Tobacoo_frq	many times a day	23	85	108	.825	
	once a day	0	2	2		
	sometimes	3	9	12		
Alcohol_freq	once a day	0	7	7	0.293	
	sometimes	2	12	14		
Association between Age, sex, village, alcohol consumption, tobacco consumption with hypertension is statistically significant.						
DBP_Category and alcohol frequency	low	0	3	3	.040	
	normal	0	4	4		
	high	7	7	14		
SBP_Category and alcohol consumption	low	1	0	1	.030	
	normal	112	2	114		
	high	239	19	258		

2C.Association between determinants and systolic & diastolic blood pressures

		SBP		total	P value
		no	yes		
SEX	Male	13	81	94	.000
	Female	102	177	279	
Age_cat	18-45 years	53	31	84	.000
	>45 years	62	227	289	
Alcohol_cons	no	113	239	352	.030
	yes	2	19	21	
Tobacco_cons	no	84	166	250	.099
	yes	31	92	123	

		DBP		total	P value
		no	yes		
SEX	Male	45	49	94	.037

		168	111	279	
	Female				
Age_cat	18-45 years	62	22	84	.000
	>46 years	151	138	289	
BMI_cat	underweight	20	14	34	.048
	normal	104	58	162	
	overweight	59	59	118	
	obese	30	29	59	

3C. Association of SBP with alcohol consumption

SBP_Cat * Alcohol_cons Crosstabulation

Count

		Alcohol_cons		Total
		No	yes	
SBP_Cat	low	1	0	1
	normal	112	2	114
	high	239	19	258
Total		352	21	373

P= 0.03, x2= 4.7, df=1

Interpretation - Percentage of high systolic blood pressure in teetotallers is 68% but in alcoholics is 90.4%. This shows with alcohol consumption SBP increases significantly

SBP_Category * Alcohol_freq Crosstabulation

Count

		Alcohol_freq		Total
		once a day	sometimes	
SBP_Category	normal	0	2	2
	high	7	12	19
Total		7	14	21

4C. Association of systolic blood pressure and diastolic blood pressure with tobacco consumption

Crosstab

Count

		SBP_Category		Total
		normal	high	
Tobacoo_frq	many times a day	27	81	108
	once a day	0	2	2
	sometimes	4	8	12
Total		31	91	122

Interpretation – 89% of participants have high SBP who consumes tobacco many times a day. SBP increases with frequency of consumption.

Crosstab

Count

		DBP_Category			Total
		low	normal	high	
Tobacoo_frq	many times a day	23	33	52	108
	once a day	0	1	1	2
	sometimes	2	3	7	12
Total		25	37	60	122

Interpretation – increasing frequency of consumption of tobacco cause some effect on DBP, 21.3% have low DBP and 48 % has high DBP

5C. Co-relation between continuous variables-

	Pearson Correlation	Sig. (2-tailed)
BMI & AGE	-0.228	.000
BMI & SBP	.061	.241
BMI & DBP	.134	.010
SBP & AGE	.372	.000
DBP & AGE	.093	.074
SBP & DBP	.628	.000

Interpretation – Age is strongly co related with BMI (negative co relation) and SBP (positive co relation). BMI is positively and strongly co related with DBP.

6C. Independent t test to compare means-

1. Comparing means between SBP & DBP with Alcohol consumption

Group Statistics

	Alcohol_cons	N	Mean	Std. Deviation	Std. Error Mean
SBP	No	352	155.08	23.775	1.267
	Yes	21	164.48	21.554	4.703

p= 0.07, t = -1.767, df= 371, SD= 5.31

Group Statistics

	Alcohol_freq	N	Mean	Std. Deviation	Std. Error Mean
SBP	once a day	7	173.43	21.157	7.997
	sometimes	14	160.00	21.057	5.628

p= 0.18, t = 1.376, df= 19, SD= 9.7

Interpretation – Mean of Systolic pressure is increased with alcohol consumption and with increasing frequency of alcohol consumption.

Group Statistics

	Alcohol_cons	N	Mean	Std. Deviation	Std. Error Mean
DBP	no	352	89.00	12.236	.652
	yes	21	95.14	12.970	2.830

p= 0.02, t = -2.22, df= 371, SD= 2.75

interpretation – Alcohol cause significant effect on DBP

Group Statistics

	Alcohol_freq	N	Mean	Std. Deviation	Std. Error Mean
DBP	once a day	7	102.86	11.437	4.323
	sometimes	14	91.29	12.263	3.277

p= 0.05, t = 2.08, df= 19, SD= 5.55

interpretation – DBP increases significantly with increase in alcohol frequency.

2. Comparing means between SBP & DBP with tobacco consumption

Group Statistics

	Tobacco_cons	N	Mean	Std. Deviation	Std. Error Mean
DBP	no	250	88.57	12.396	.784
	yes	123	90.93	12.128	1.094

P= 0.08, t= -1.74, df=371,SD=1.35

Group Statistics

	Tobacco_cons	N	Mean	Std. Deviation	Std. Error Mean
SBP	no	250	154.31	24.376	1.542
	yes	123	158.25	22.216	2.003

P= 0.132, t= -1.51, df=371,SD=2.6

		Mean	T value	P value
DBP and cigarette	no	90.81	-1.252	0.213
	yes	99.67		
SBP and cigarette	no	158.16	-.755	0.452
	yes	168.00		

Interpretation – cigarette smokers and non smokers shows remarkable mean difference between SBP and DBP

3.comparing mean of BMI with khaini consumption

Group Statistics

	Khaini_Cons	N	Mean	Std. Deviation	Std. Error Mean
BMI	no	117	23.37	4.866	.450
	yes	5	28.60	4.827	2.159

P= 0.02, t= -2.355, df=120,SD=2.2

Summary - Determinants significant with respect to test in systolic and diastolic blood pressure

Test	SBP	DBP	BMI
Chi square	Sex Age Alcohol consumption	Sex Age BMI	
T test	Alcohol consumption Sex Age	Alcohol consumption Alcohol frequency Tobacco consumption	Khaini consumption
Co-relation	Age	BMI	Age

A significant correlation of systolic blood pressure with increasing age was seen. Study has shown strong association of hypertension (systolic as well as diastolic) with alcohol consumption and diastolic hypertension with tobacco consumption ($p < 0.05$)

Student t test showed significant association with tobacco consumption, alcohol consumption and frequency of alcohol consumption with diastolic blood pressure ($p < 0.05$) whereas systolic blood pressure shown significant association with increasing age ($p < 0.001$) and gender (males having more mean blood pressure than females) ($p < 0.05$).BMI shown association with Khaini consumption which is an area of further research.

Chapter 4 – Discussion

49% population is elderly population (Age >60 yrs)

Study revealed 93% males and 67% females are hypertensive. This data indicates either males are more prone towards hypertension or they have poor adherence for treatment. Isolated systolic blood pressure means people who have only raised systolic blood pressure (>140) but normal diastolic pressure (<90). This Study show that 2.9 % participants had isolated SBP(>140) and 25.7% isolated DBP. Isolated diastolic hypertension is the commonest subtype of hypertension. 0.3% males and 2.7% females has isolated DBP and 7.5% males and 18.2% females have SBP. Education level in Haryana villages is very low, around 60% of people are illiterate. Prevalence of overweight/obese was 47.4 %

Study showed Prevalence of alcohol consumption in hypertensive people was 5.6% out of which maximum participants were not regular drinkers.
Prevalence of tobacco consumption in hypertensive was 33%. Out of all types of tobaccos available and Bidi is most common form of tobacco consumed in villages. Second common form is Hukka.88.5% consumes tobacco many times in a day either in one form or in various forms.

Sedentary life style or avoiding Physical exercise is important risk factor for hypertension and many other diseases. In study it is also proven that Participants which are not active and avoid physical work are more hypertensive than active participants. Mean of Systolic pressure is increased with alcohol consumption and with increasing frequency of alcohol consumption. 89% of participants have high SBP who consumes tobacco many times a day proving SBP increases with frequency of consumption of tobacco.
Tobacco consumption, frequency of alcohol consumption and BMI has shown statistically significant effect on diastolic blood pressure. Age and sex has significant effect on systolic blood pressure. Interestingly, Khaini consumption (type of tobacco) shown statistically significant effect on BMI (basal metabolic rate), which need further research on it.

Out of 373 participants only 119 (32%) were taking medicine, and only 60 (16%) were adherent to the treatment. Reason of non adherence was maximum participants (42.3%) felt better without drugs.

The lifestyle risk factors like diet, dietary salt, fibre, saturated fat, trans-fat, physical activity or stress among the community were not estimated. It is well known that factors like dietary salt consumption can influence the BP independent of other risk factors.[24]

Also, though it was the target of the study to get the data of risk factors from all subjects whose BP was measured but it could not be achieved because of various socio-cultural beliefs of the community. All the adult members available in the village were investigated but those who had gone to fields, job or out of the city (predominantly males) for employment opportunities were missed. This is reflected in over representation of older age group and female subjects in the study. Also, there is slight under-representation of younger age group.

Another limitations was that the diagnosis was made only on one reading of blood pressure and the incomplete follow up data.

Studies carried out among the Lepchas of Sikkim Himalayas has documented hypertension prevalence of 30.77 per cent among males and 25.77 per cent among females (By using older WHO criteria for hypertension)[23]

The awareness of hypertension (medically diagnosed) status was comparable to the studies done almost a decade back in rural India[25]

Chapter 5 – Conclusion

Study showed significant association with tobacco consumption, alcohol consumption and frequency of alcohol consumption with diastolic blood pressure ($p<0.05$) whereas systolic blood pressure shown significant association with increasing age ($p<0.001$) and gender (males having more mean blood pressure than females) ($p<0.05$). Risk factors of hypertension were alcohol and tobacco and it is significantly associated with age and gender. Higher BMI values also significantly contributed to the risk of hypertension. All risk factors necessitates health education and intervention at the primary health care level for its prevention

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