

# Occurrence of hypertension, its associated risk factors, awareness and adherence to therapeutic regimen among Tibetan adults: A cross-sectional study

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## ABSTRACT

**Background:** Hypertension is the leading health related problem as it occurs in people living in the whole world. Elevated blood pressure is positively correlated to cardiovascular disease and other complications that occur because of it. **Objectives:** The objectives of the study were to (1) assess the occurrence of hypertension and determine its associated risk factor and to (2) assess the awareness and adherence to antihypertensive medication. **Methods and Materials:** A cross-sectional observation study was conducted in a Tibetan colony of Dehradun. 300 samples were taken by stratified random sampling method. Structured questionnaire and interview schedule were used to collect data. **Results:** The occurrence of hypertension was in 50% sample (female 56.7% and male 43.3%). Out of 300 participants, only 45 (15%) were previously diagnosed with hypertension and were on antihypertensive medication. Risk factors such as increased age, positive family history of hypertension, obesity, and alcohol consumption were associated with the hypertension. About 53% of study participants were aware of hypertension adequately. Most (78%) people who were previously diagnosed with hypertension had poor compliance to restriction of salt in diet, 97% reported reason for not restricting salt was no taste without salt in meal. Poor compliance to drug was observed in 29% with major reason being, forgetfulness (61.5%) and did not want to take (31%). Awareness on hypertension was adequate with 53.7% of study participants. **Conclusion:** Occurrence of hypertension among Tibetan adults was above 50%. The risk factors of hypertension were increasing age, alcohol consumption, family history of hypertension and obesity. Adherence to antihypertensive medication was poor.


**KEY WORDS:** Hypertension; Risk Factors; Adherence; Therapeutic Regimen

## INTRODUCTION

Blood pressure checking is one of the simplest and commonest non-invasive procedure, used in identification of cardiovascular status of an individual and it helps in predicting the likelihood of future cardiovascular events.<sup>[1]</sup>

Cardiovascular diseases are one of the leading causes of deaths worldwide, around 17.9 million deaths occurred in 2016 which was 31% of all deaths occurred globally. Uncontrolled hypertension can cause ischemic heart disease, cardiac failure, cerebrovascular accident, and chronic kidney disease, worldwide an estimation of deaths due to stroke was 57% and of Coronary artery disease 24%, due to hypertension.<sup>[2]</sup>

Around 1.13 billion people all over the world have hypertension, of these most (two-thirds) belong to countries which are low and middle-income. In 2015, one man in every four men, and one female in every five women had

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hypertension.<sup>[3]</sup> Globally, 7.6 million premature deaths (about 13.5% of the worldwide total) were because of high blood pressure.<sup>[4]</sup>

The number of non-communicable disease cases is increasing constantly in India while it is still struggling with higher cases of communicable diseases and health conditions of women and children.<sup>[5]</sup> In India, overall prevalence of hypertension was 29.8%. Around 33% Indians living in urban areas are hypertensive out of these only 42% are aware of it and 38% are on antihypertensive regimen. However, 25% Indians living in rural areas are hypertensive of these 25% know that they are hypertensive and only 25% people are on antihypertensive regimen.<sup>[6]</sup>

The leading risk factors of several chronic diseases are speedy urbanization, increasing elderly population, high technology, inactive life style, and changes in dietary pattern.<sup>[7]</sup>

Although antihypertensive medications are effective and not costly, still in India, only a small number of adults are diagnosed with hypertension and get treatment. Lack of treatment to hypertensive people, and increase in cases of cardiovascular diseases in India requires attention at prevention and early detection levels of health care.<sup>[7]</sup>

Hypertension is continuing to be a leading health related problem in countries which are developed as well as developing.

The WHO reported, around 40% of hypertensive people were aged above 25 years. Globally around 54% cases of stroke and 47% of ischemic heart disease were because of high blood pressure.<sup>[4]</sup>

Study of global data 2005 for estimation of the worldwide prevalence of hypertension called attention to the deficiency of a national study investigating the prevalence in India.<sup>[2]</sup> Authentic data about the prevalence of Hypertension are necessary for the development of health policies on prevention and control of Hypertension at national and local level.<sup>[4]</sup>

An imperial study conducted by Yemi *et al.* in 2017 found that 62.2% of their total participant were inflicted with hypertension, among those tested positive for hypertension 78% of the participant were not previously aware of hypertension. About 77.3% of the participant, despite being aware of they being suffering from hypertension and were on treatment, still had uncontrolled hypertension.<sup>[8]</sup>

Considering all the above data, researcher, felt the need of conducting this research to generate data on occurrence of hypertension, its associated risk factors, awareness on hypertension and adherence to therapeutic regimen among Tibetan adults.

## Objectives of the Study

The objectives are as follows:

- Assess the occurrence of hypertension among adults residing in Dekyiling Tibetan colony
- Determine the risk factors associated with hypertension among adults residing in Dekyiling Tibetan colony
- Assess the awareness of adults regarding management of hypertension
- Assess adherence to therapeutic regimen among adults residing in Dekyiling Tibetan Colony with previously diagnosed hypertension.

## MATERIALS AND METHODS

### Research Design

The research design of the present study was cross-sectional observation study.

### Study Area

The present study was carried out in the Dekyiling Tibetan colony. It is one of the rural settlements in Dehradun, Uttarakhand, where Tibetan refugee resides. It has a total population of 3870 Tibetans. The settlement was established in 1978. The main occupation of residents is running small shops in summer and selling sweater across India during winters.

### Sample

The sample for the present study was Tibetan adults residing in the selected study area.

### Sampling Technique

Stratified random sampling technique was used to select 300 adults. This settlement was divided into six groups, each group has 15 blocks, and each block consists of 20 houses.

### Inclusion Criteria

Individuals who belonged to age group of 25–75 years and who gave consent for participation were included in the study.

### Exclusion Criteria

Individuals who were temporarily residing in study area, who were unable to provide information because of chronic physiological and psychological illnesses, whose anthropometry measurements could not be carried out were not included in the study.

### Data Collection Tools

Interview schedule consisting of Structured Knowledge Questionnaire, weighing scale, measuring tape, and OMRON Blood Pressure machine was used to collect the data.

## Method of Data Collection

The study area Dekyiling Tibetan settlement was divided into six groups, the group was further divided into 15 blocks each, each blocks had 20 houses. Out of these 15 blocks in each six groups, five blocks from each group were selected, further five houses were selected from each blocks. At the time of data collection, if in a selected household eligible person was not present then, the adjacent household was selected. Based on the inclusion and exclusion criteria study subjects were identified, the aim of the study was explained and written informed consent was taken from every study participant. Structured interview was conducted to collect the data regarding socio-demographic variables. Knowledge questionnaire was used to obtain data regarding awareness on hypertension and factors contributing non-adherence. Blood pressure was checked twice on the right arm using automatic electronic device (OMRON). The mean value of two readings was taken.<sup>[2]</sup>

## Ethical Consideration

Written Ethical permission was taken from Welfare Office of Dekyiling Tibetan Colony and Tibetan PHC center in Dekyiling Tibetan Colony and agreed to submit the final report on completion of project. Written consent was taken from the volunteered participants. Identified hypertensive subjects were suggested to consult physician at PHC center in study area.

## RESULTS

Table 1a depicts that a total of 300 participants took part in the study. Of these, maximum (51.6%) participants were in the age group of 25–50 years. Female constituted 61% of study participants, most (67%) were formally educated, and 67% belonged to joint family. Majority (82%) were married, majority 93% were non-vegetarian. Most (61%) were physically active at mild level, (67%) were performing exercises, out of which most (67%) goes for a walk, more than half (59.2%) performed exercises every day. About 77% reported no family history of hypertension, majority (85%) were not on anti-hypertensive medication.

Table 1b shows that the participants gave multiple response in personal habits, 35 (12%) were presently smoking, out of 35, 13 (37%) of the participants were smoking since past 1–10 years and most 25 (71%) used cigarette 5–1 packet/day. Out of 265, 52 (17%) of participants had the history of smoking in the past.

28 (9%) were presently chewing, out of 28, more than half 15 (54%) of the participants were chewing tobacco since past 1–10 years, most 20 (71%) chewed tobacco 4–6 times/day.

**Table 1a:** Frequency and percentage distribution of socio-demographic variables of study participants,  $n=300$

Variables	Frequency (%)
Age	
25–50	155 (51.6)
51–75	145 (48.4)
Gender	
Male	117 (39)
Female	183 (61)
Educational qualification	
No formal education	99 (33)
Secondary education	118 (39.3)
Senior secondary education	34 (11.3)
Graduate and above	49 (16.4)
Type of family	
Nuclear	99 (33)
Joint	199 (66.3)
Extended	2 (0.7)
Marital status	
Single	242 (81)
Married	3 (1)
Separated	
Dietary pattern	
Vegetarian	22 (7)
Non-vegetarian	278 (93)
Physical activity	
Sedentary life style	181 (60.3)
Mild level physical activity	101 (33.7)
Moderate level physical activity	16 (6)
Performing exercise	
Yes	201 (67)
No	99 (33)
Types of exercise performed	
Walking	134 (67)
Jogging	13 (6.5)
Cycling	6 (3)
Yoga	13 (6.5)
Multiple exercise	35 (17)
Number of days of exercises in a week	
Everyday	119 (59.2)
Thrice a week	33 (16.4)
Less than thrice a week	26 (13)
More than thrice a week	23 (11.4)
Do you have family history of hypertension	
Yes	69 (23)
No	231 (77)
Are you on antihypertensive medication	
Yes	45 (15)
No	255 (85)

**Table 1b:** Frequency and percentage distribution of personal habits of study participants. *n*=300

Personal habits	Frequency (%)
Do you smoke cigarette	
Never	213 (71)
Yes, in the past	52 (17)
Yes, in the present	35 (12)
If present, since (years)	
1–10	13 (37)
11–20	12 (34)
21–30	10 (29)
Consumption of cigarette per day	
2–4 piece/day	10 (29)
5–1 packet/day	25 (71)
Do you chew tobacco	
Never	257 (86)
Yes, in the past	15 (5)
Yes, in the present	28 (9)
If present, since (years)	
<1–10	15 (54)
11–20	13 (46)
Frequency of chewing tobacco	
1–3 times/day	8 (29)
4–6 times/day	20 (71)
Do you drink alcohol	
Never	221 (74)
Yes in the past	28 (9)
Yes in the present	51 (17)
If yes,	
Regularly	14 (27)
Occasional	37 (73)
Do you eat fried food every day?	
Yes	76 (25)
No	224 (75)
Do you eat <5 portions of fruits/vegetables a day?	
Yes	154 ((51)
No	146 (49)
Do you include red meat in your meal every day?	
Yes	53 (18)
No	247 (82)
Do you get 8 h of sleep at night?	
Yes	279 (93)
No	21 (7)
Do you often stay late night?	
Yes	71 (24)
No	229 (76)
Do you take sleeping pills?	
Yes	2 (1)
No	289 (99)

Out of 272, 15 (5%) had the history of chewing tobacco in the past.

51 (17%) were presently consuming alcohol, out of 28, most 37 (73%) were consuming alcohol occasionally, 14 (27%) were regularly consuming alcohol. Out of 249, 28 (9%) had the history of consuming alcohol in the past.

Half of the participants (51%) were consuming <5 portions of fruits/vegetables a day, only 25% of the participants ate fried food every day, with 18% included red meat in their meal every day.

Majority (93%) of the participants took 8 h of sleep at night, with 1% reported taking sleeping pills.

Table 2a shows that out of 300 study participants, the blood pressure was normal in 109 (36.3%), elevated in 41 (13.7%), Stage I High blood pressure in 56 (18.7%), Stage II High blood pressure in 90 (30), and hypertensive crisis in 4 (1.3%).

Table 2b depicts that out of 300 participants, 150 participants were hypertensive with their systolic blood pressure 130 - >180. Increased age was associated with an increased risk of hypertension (95% Confidence interval [CI]:  $\chi^2=49.66$ ,  $P = 0.00001$ ). Family history of hypertension was associated with increased risk of developing hypertension (95% CI:  $\chi^2 = 4.23$ ,  $P = 0.03$ ). Concerning biological determinants of hypertension, obesity defined as Body mass index (BMI) = 25 kg/m<sup>2</sup> was associated with increased risk of developing hypertension (95% CI:  $\chi^2=11.25$ ,  $P = 0.0007$ ). Factors such as gender, smoking cigarette, exposure to second hand smoking, chewing tobacco, and alcohol consumption were not significantly associated with increased risk of developing hypertension.

Table 3a shows that out of 300 participants, 161 (53.7%) had adequate knowledge about hypertension whereas 139 (46.3%) had minimum knowledge. Total knowledge score was 8, mean value was 3.7, median 4, and standard deviation was 1.62.

Table 3b illustrates that age, educational qualification, and type of family were significantly associated with knowledge score. Gender, marital status, and dietary habit were not significantly associated with knowledge score.

Table 4a illustrates that more than half (64%) of the diagnosed hypertensive patient performed exercise, whereas 36% did not, only 22% of participants restricted salt in diet, whereas majority 75% did not, majority 71% of participants reduced non-vegetarian intake especially red meat, whereas 29% did not, most 96% of participants did not smoke, whereas 4% still smokes, most 91% of participants did not consume

alcohol, whereas 9% still consumes alcohol, majority 71% of participants had anti-hypertensive drug regularly, whereas 29% did not, only 13% of participants visited health care facility for follow-up, whereas majority 87% did not.

**Table 2a:** Frequency and percentage distribution of systolic and diastolic blood pressure category according to the AHA guidelines. *n*=300

Blood pressure category	Systolic blood pressure	Frequency (%)
Normal	<120	109 (36.3)
Elevated	120–129	41 (13.7)
High blood pressure Stage I	130–139	56 (18.7)
High blood pressure Stage II	140–180	90 (30)
Hypertensive crisis	>180	4 (1.3)

Table 4b illustrates that out of 16 diagnosed hypertensive patients with no adherence to performing exercise, 6 (38%) did not performed exercise due to business, 9 (56%) due to weakness, and 1 (6%) do not want to. Out of 35 participants, 34 (97%) did not restricted salt in diet due to tasteless without salt and. Out of 13 participants, 6 (46%) did not restricted non-vegetarian especially red meat and 7 (54%) due to tasteless without meat in diet. Out of 2 participants, 1 (50%) smokes cigarette due to irritation without smoking and 1 (50%) could not quit smoking. Out of 4 participants, 1 (25%) consumed alcohol because do not want to quit and 3 (75%) could not quit it. Out of 13 participants, 8 (61.5%) did not take antihypertensive drug regularly due to forgetfulness, 4 (31%) do not want to take, and 1 (7.5%) took Ayurvedic medicine. Out of 39 participants, 19 (49%) did not visited health care facility due to busy schedule and

**Table 2b:** Association between blood pressure category with its risk factor for hypertension. *n*=300

Blood pressure category	Non-hypertensive <120-129 ( <i>n</i> =150)	Hypertensive 130->180 ( <i>n</i> =150)	Chi-square value	<i>P</i> -value
Age				
25–50	108	47	49.66	0.00001*
51–75	42	103		
Gender				
Male	52	65	2.36	0.12
Female	98	85		
Family history				
Yes	42	27	4.23	0.03*
No	108	123		
Exercise				
Yes	103	99	0.24	0.62
No	47	51		
BMI				
Non-obese	85	56	11.25	0.0007*
Obese	65	94		
Smoking cigarette				
Never	109	104	0.40	0.52
Yes, Past	21	31		
Yes, Present	20	15		
Exposure to second hand smoking				
Yes	43	37	0.61	0.43
No	107	113		
Chewing tobacco				
Never	129	128	0.02	0.86
Yes, Past	8	7		
Yes, Present	13	15		
Alcohol consumption				
Never	117	104	2.90	0.08
Yes, Past	8	20		
Yes, Present	25	26		

df=1, 95% CI: *P*≤0.05 \*Significant. CI: Confidence interval, BMI: Body mass index

20 (51%) did not find necessary to visit health-care facility for follow-up.

**DISCUSSION**

India, same as other countries which are developing is also experiencing speedy transitions in life style of its people. The present study which is an observation cross sectional study identified occurrence of hypertension in Tibetan adults. The occurrence was significantly higher in adults who were more than 50years of age. This finding is similar to the reports on prevalence of hypertension highest at 60+ years (Ad. OR 4.5, 95% CI: 2.1–6.3,  $P = 0.002$ ).<sup>[9,10]</sup> The prevalence of hypertension in middle aged (36–45) adults was high compared to other age-group was the finding of the study conducted by Tabrizi *et al.* (2016). This variation in result might be due to study sample age group 15–65 years whereas our study sample age group is 25–75 years.<sup>[11]</sup> Having family history of hypertension is a well-known risk factor for hypertension as we also found in this study (95% CI:  $\chi^2 = 4.23$ ,  $P = 0.03$ ) which is consistent with the study conducted in

Vietnam by Son *et al.*<sup>[12]</sup> The finding is contrary to the study conducted by Famadi *et al.* (2019) found that there was no significant association between family history and raised blood pressure in children.<sup>[13]</sup> This difference in finding could be the reason that study being conducted among school age and adolescents who’s physically active. The study found that increased BMI is significantly associated with increased risk for hypertension (95% CI:  $\chi^2 = 11.25$ ,  $P = 0.0007$ ) which is consistent with the study conducted in Varanasi by Singh *et al.*<sup>[7]</sup> On the contrary, the study conducted by Famadi *et al.* (2019) found that there was no significant association between Body Mass Index and hypertension.<sup>[13]</sup> This variation might be due to the study was conducted among school age group and adolescents who’s physically active and only 3% of study population were obese and 72% had normal BMI.

With regard to awareness of hypertension 53.7% of participants had adequate knowledge and 46.3% had minimum knowledge about hypertension, this finding is consistent with the study conducted in Northern Sri Lanka by Pirasath *et al.* (2017) where 69.9% had adequate and 30.1% had minimum knowledge about hypertension.<sup>[14]</sup> The study found significant association between educational qualification and knowledge score which is consistent with the study conducted in Ghana by Peter *et al.*<sup>[15]</sup> The prevalence of awareness of hypertension is 78% which is higher than our study (53.7%).<sup>[16]</sup> The alterations in findings could be the study defined awareness as the proportion of adults with hypertension who report either having been diagnosed with hypertension by a health professional or who report taking medication for high blood pressure.

**Table 3a:** Frequency and percentage distribution of knowledge of Tibetan adults regarding hypertension.  $n=300$

Knowledge level	Values	Frequency (%)
Poor	<3	139 (46.3)
Average	4–6	149 (49.7)
Good	>7	12 (4)

**Table 3b:** Association between knowledge score with selected demographic variables of study participants.  $n=300$

Demographic variable	At and above median (>4)	Below median (<4)	Chi-square value	P-value
Age				
25–50	99	56	13.42*	0.0002*
51–75	62	83		
Gender				
Male	66	51	0.58	0.44
Female	95	88		
Educational qualification				
No formal education	33	66	24.56*	0.00001*
Formal education	128	73		
Type of family				
Nuclear	62	37	4.77*	0.02*
Joint	99	102		
Marital status				
Single	36	19	3.76	0.05
Married	125	120		
Dietary habit				
Vegetarian	8	14	2.85	0.09
Non-vegetarian	153	125		

df=1,  $P \leq 0.05$ . \*Significant

**Table 4a:** Comparison of diagnosed hypertensive patients according to adherence and non-adherence to therapeutic regimen. *n*=45

Therapeutic regimen	Adherence (Frequency & %)	Non-adherence (Frequency & %)
Performing exercise	29 (64)	16 (36)
Restricting salt in diet	10 (22)	35 (78)
Reducing non-vegetarian intake(red meat)	32 (71)	13 (29)
Smoking cigarette	43 (96)	2 (4)
Alcohol consumption	41 (91)	4 (9)
Taking antihypertensive drug regularly	32 (71)	13 (29)
Visiting follow up	6 (13)	39 (87)

**Table 4b:** Frequency and percentage distribution of Factors contributing non-adherence to therapeutic regimen *n*=45

Factors contributing non-adherence	Frequency (%)
Not performing exercise ( <i>n</i> =16)	
Busy	6 (38)
Weakness	9 (56)
Do not want to	1 (6)
Do not know	0 (0)
Not restricting salt in diet ( <i>n</i> =35)	
Don't know	0 (0)
No taste without salt	34 (97)
Not necessary to restrict salt	1 (3)
Not restricting red meat intake ( <i>n</i> =13)	
Do not know	0 (0)
Feeling weakness without meat intake	(646)
No taste without meat in food	7 (54)
Not necessary to restrict meat intake	0 (0)
Smoking cigarette ( <i>n</i> =2)	
Cannot quit	1 (50)
Don't want to	0 (0)
Feel irritated without smoking	1 (50)
Alcohol consumption ( <i>n</i> =4)	
Don't want to	1 (25)
Cannot quit	3 (75)
Feel weakness without alcohol	0 (0)
Taking anti-hypertensive medicine regularly ( <i>n</i> =13)	
Forgetfulness	8 (61.5)
Financial problem	0 (0)
Don't want to take	4 (31)
Weakness	0 (0)
Taking Ayurvedic medicine	1 (7.5)
Not visiting health care facility for follow-up ( <i>n</i> =39)	
Busy	19 (49)
Financial problem	0 (0)
Not necessary	20 (51)
Health care facility is distant	0 (0)
No one to accompany	0 (0)

Finding of the study showed that more than half (64%) of the diagnosed hypertensive participants performed exercise, which is consistent with the study conducted in selected community area in Dehardun by Devi *et al.* reported that approximately half of the participants (48.57%) performed exercise<sup>[17]</sup> which is higher than the study conducted by Buda *et al.* (2017) results were only 33 (16.1%) practiced physical activity for 30 min/day.<sup>[18]</sup> This difference in findings might be the reason due to period of data collection of present study was June 2020 (COVID-19 inflicted year). The study showed poor compliant with restriction of salt in diet with majority (78%) noncompliant, which is consistent with the study conducted in Almadinah Almunawwarah by IHM manal reported poor compliant with dietary regimen.<sup>[19]</sup> On the contrary study conducted by Devi *et al.* reported that 83 (79.05%) were compliant in restricting salt in diet, this variations in findings might be due to the social and cultural differences and difference in dietary lifestyle.<sup>[17]</sup>

Finding of the study showed that out of 45 diagnosed hypertensive patient, 13 (29%) did not take anti-hypertensive drug because of forgetfulness (61.5%). Finding of the study was consistent with the study conducted by Pauline and Owumi reported noncompliant to therapeutic regimen is due to factors such as forgetfulness (8.4%) and busy schedule (3.6%).<sup>[20]</sup> On the contrary study conducted by Thakur *et al.* (1999) found that the major reasons for discontinuing the treatment were ignorance about the need of regular treatment, this may be due to difference in participants educational status.<sup>[21]</sup>

**Strength and Limitations of the Study**

- Blood pressure was measured twice with interval of 5 min and average of two readings was taken
- Investigator made home visits to check the blood pressure, calculate BMI, and interviewed the sample
- Study was conducted in selected community area which limits the generalization of the present study.

**CONCLUSION**

From the results of this study, it can be concluded that the prevalence of hypertension was high in rural settlement

Dekyiling Tibetan Colony, thus the people residing in this area are at risk of developing several chronic diseases and other health consequences in future if care not taken. During study, individuals with hypertension were suggested to consult doctor at PHC Dekyiling and some of them were now taking treatment for hypertension. Awareness programs are required to sensitize the people about hypertension. There is a need to strengthen the surveillance systems and community based screening programs for early detection and management of hypertension.

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