

A STUDY ON THE PREVALENCE, DETERMINANTS, TREATMENT AND CONTROL OF HYPERTENSION AMONG RURAL ADULT POPULATION OF KANCHEEPURAM DISTRICT, TAMILNADU

M.Vijayakarthyayan¹, J. Krishnakumar R²

^{1,2}Department Of Community Medicine, Sree Balaji Medical College And Hospital Chennai
*krishnakumar.j@bharathuniv.ac.in

ABSTRACT

This study was carried out among rural adult population of Kancheepuram District to study the prevalence, determinants, treatment and control among them. To assess the prevalence of hypertension among the study population. To identify the determinants of hypertension among the study population. To study about the treatment and control of hypertension

Keywords

determinants, non- communicable diseases, hypertension and blood pressure.

Introduction

Epidemiological transition worldwide has led to a tremendous increase in the elderly population in the developing countries with concomitant increase in the life expectancy. By 2025 it has been predicted that the developing countries will be facing a huge burden of the elderly all over the world. Developing countries are thus likely to face an enormous burden of chronic non- communicable diseases (NCDs) in the near future in comparison to communicable disease which were once a major problem. 1 - 4 The global distribution of disease burden in terms of disability - adjusted life years (DALY) losses indicates that communicable diseases account for 41 % DALY losses, non-communicable diseases account for 43 %, and injuries account for 16%. On Comparing the disease profile between various countries as per their income levels reveal that low- and middle-income countries accounts for more than 6 times (43. 8%) the burden of communicable diseases, when compared to the high- income (7. 2%) countries. In India, the disability- adjusted life years' losses due to communicable diseases account for 50% which is high, compared to 33% for NCDs, and 17% for accidents and injuries. 5

Non- communicable diseases (NCDs) are chronic diseases that are not transmitted from one person to another and are not communicable. They are usually diseases of long duration and they are slowly progressive in nature. NCDs are one among the major cause of mortality and morbidity among the adult population worldwide. 6 Commonly non- communicable diseases can be grouped into groups and they include cardiovascular diseases, cancers, chronic respiratory diseases and diabetes. 7 Worldwide, early death from these four major NCDs has fallen by 15% between the year 2000 and 2012 this rate of decline is unsatisfactory and insufficient to meet the global target of a one third reduction by the year 2030. 8 Globally about 38 million people die annually from Non communicable diseases as per the available. 9 By the year 2020 Worldwide based on current disease trends, NCDs are projected to account for 73 % of mortality and 60% of the morbidity. 10 According to the report given in the year 2015 by the World Health Organisation (WHO), every fourth Indian die before the age of 70 years due to an NCD. Internationally India is the first country to develop specific targets and indicators in this field of NCDs, which are aimed at reducing the mortality from NCDs to 25 per cent by the year 2025 worldwide. 11

High blood pressure is a risk factor that accounts for 12.3% of the deaths and disabilities combined in Tamilnadu during 2016. As per the NFHS 4 report the prevalence of hypertension in Tamil nadu is 11.5% in males and 6.2% in females. Tamilnadu is the first state to adopt an preventive scheme for hypertension. The government of Tamilnadu launched the welfare initiative known as Nalamana Tamizhagam. The main objective of this initiative is to screen all the rural population over 30 years of age for diabetes and hypertension. In urban areas of kancheepuram district the prevalence of hypertension is 3.9% and it is 3.2% in rural areas as per NFHS 4 data.

Important factor in the adequate control of hypertension is the early diagnosis and proper treatment. So screening is a single most important measure in hypertension and in India majority the healthcare is not accessible to all in the rural areas. Bulk of the patients go to the indigenous and private practitioners, where hypertension is not screened on a regular basis. Also Opportunistic screening of hypertension will not provide favourable results. Most of them unless they are severely ill they do not seek the help of the health care providers. Community-based screening is an important pivotal measure which can improve the detection and treatment of Hypertension by increasing the yield. 14

MATERIALS AND METHOD

STUDY DESIGN:

This study is a community based cross – sectional study conducted in rural area of Kancheepuram district, Tamil Nadu.

STUDY AREA:

The Study was conducted in Serappanachery Padappai (S. Padappai), rural field practice area of the Rural Health and Training Centre (RHTC) attached to our Institution (Sree Balaji medical college and hospital). The catchment area of the centre covers 20 villages and 5 sub centres.

STUDY POPULATION:

The population covered by the Rural Health and Training Centre is about 21187 as per 2011 census and among them 10817 were males and 10370 were females. Total number of houses in the study area is 4489. Study population identified were those belonging to the age group of 20 –60 years residing in the study area permanently at the time of the study.

INCLUSION CRITERIA:

The inclusion criteria for the study were adult population of age group (20 - 60 years) residing in the study area, who were willing to participate in the study.

EXCLUSION CRITERIA:

The exclusion criteria for the study were females who were pregnant, psychiatric patients, who are severely ill and those who didn't give consent to participate in the study were excluded.

ETHICAL APPROVAL:

The study proposal was presented and approval from Institutional Ethics Committee was obtained prior to the pretesting.

STATISTICAL ANALYSIS:

The statistical analysis of the data was done using descriptive and analytical statistics. The descriptive statistics analysed were presented as frequency distribution and percentage. The analytical statistics used were Chi – square, Odds Ratio and Confidence Interval. Binary logistic regression was used to called the adjusted odds ratio. The association of Socio-demographic characters and risk factors with hypertension was assessed. P value < 0.05 was considered as statistically significant value. Data was entered in Microsoft excel and analysed using the software SPSS, version 22 software.

RESULTS

Socio- demographic characteristics of the study population is shown in Table 1. Among the study participants ,44.2% belonged to 51-60 years of age,24.2% belonged to 20 - 30 years of age and 20.8% belonged to 31 - 40 years of age. About 57.4% of the study participants were females and 42.6% were males. Nearly 82.4% are married and 5.44% were unmarried. Almost 18.7% of the study samples had no formal education,30.2% had middle school education and 21.3 % had high school education. Among the participants around 43.7% were unemployed, 32.2% are engaged in unskilled occupation and 17.8% are involved in semiskilled occupation. According to the modified BG Prasad socio economic classification 49.6% belonged to lower middle socio economic category and 21.8% belonged to upper lower socio economic group. In this study 56.8% of them belong to nuclear family and about 30% belonged to joint family and the rest were belonging to three generation family.

Table 1: Socio demographic characteristics of the study population

6.	Socio Economic Status		
	Upper	90	7.2
	Upper Middle	234	18.7
	Lower Middle	620	49.6
	Upper Lower	272	21.8
	Lower	34	2.7
7.	Type of Family		
	Nuclear Family	710	56.8
	Joint Family	438	35.0
	Three Generation Family	102	8.2

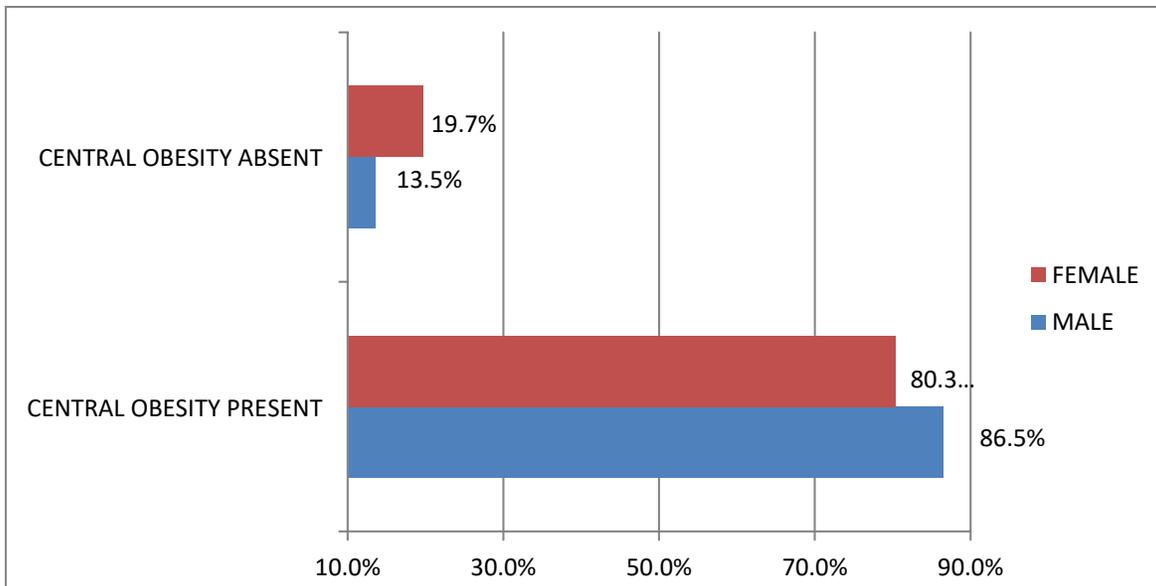


Figure 1: Prevalence of central obesity among the study population

Blood pressure category among the study population:

Blood pressure was classified based on JNC 8 criteria. Table 6 depicts the blood pressure category. Nearly 64% of the study participants belonged to normal BP category, 22.4% were pre hypertension, 9.3% belonged to stage 1 hypertension category and 4.3% belonged to stage 2 hypertension category.

Figure 2: Adequate knowledge regarding hypertension among the study population:

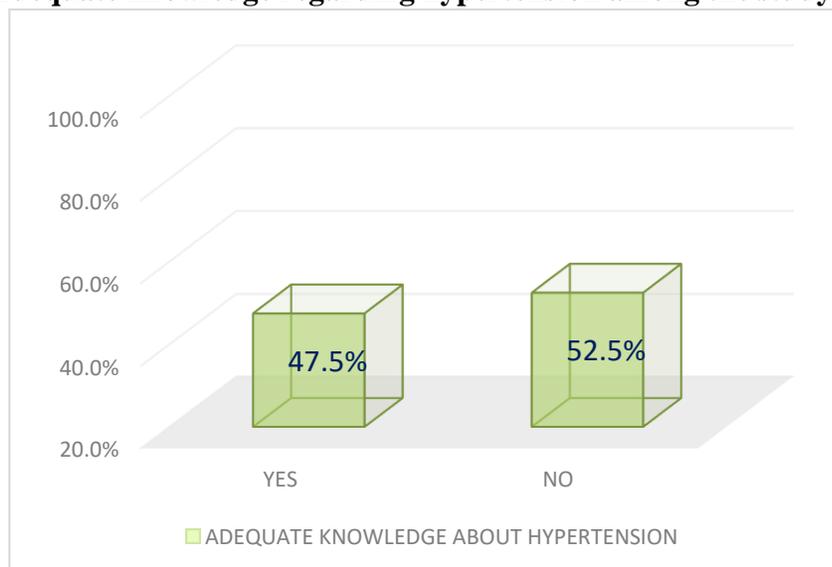


Table 2: Knowledge about normal BP value among the study participants

Sl No	Knowledge Of Normal BP Value	Frequency	Percentage (%)
1.	Claim to Know Normal BP Value (N- 1250)		
	Yes	310	24.8
	No	940	75.2
2.	Value Mentioned (>130/ 90) (N- 1250)		
	Correct	186	60
	Incorrect	124	40

Known hypertensive among the study population

Among the hypertensive under treatment, 68.8% have their blood pressure under control and 31.2% have uncontrolled hypertension. In this study only 2.9% of them are using alternative medicines for treatment of hypertension.

Figure 3: Hypertension control among the study population

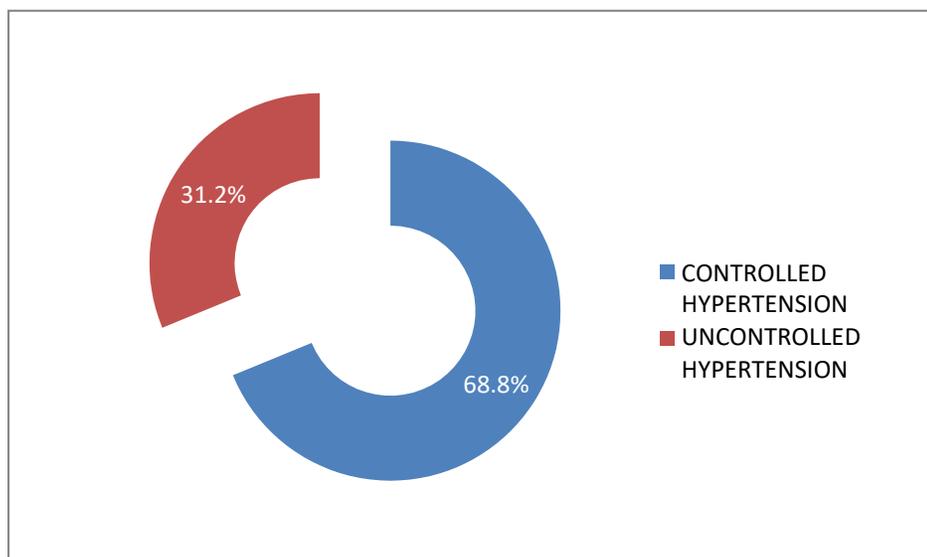
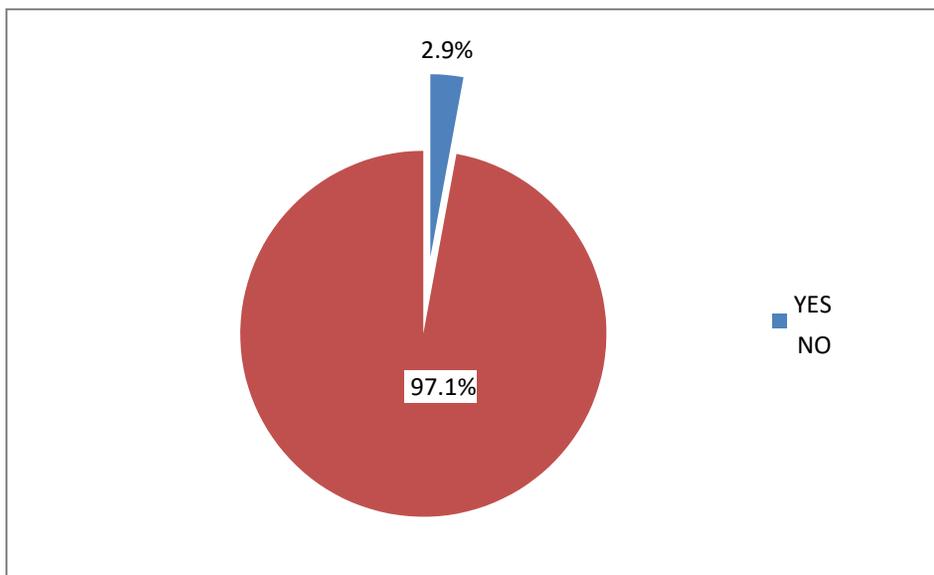


Figure 4: Alternative medicine use among the study population



In the Univariate analysis the variables that are significantly associated with hypertension are age (p value-<0.0001), marital status (p value-<0.0001), education (p value- 0.015),occupation (p value-0.003), socio economic status (p value-<0.015),family type (p value-<0.0001),positive family history (p value- 0.009),co morbidity (p value-<0.0001),knowledge about hypertension (p value -<0.0001) and BMI (p value-<0.0001).There was no association found between other variables and hypertension.

Table 4: Univariate analysis findings among the study population

S. No	Variable	Total Frequency (N-1250)	Hypertension			
			Frequency (N-298)	Chi-square value	P value	Odds Ratio (95% CI)
1.	Age > 40 Years < 40 Years	438 812	264 34	124.3 87	<0.0001*	5.724 (3.916-8.366)
2.	Sex Female Male	532 718	168 130	0.181	0.670	0.949 (0.730-1.234)
3.	Marital Status Married Unmarried/ Divorce/ Widower	1030 120	226 72	23.94 3	<0.0001*	17.051 (12.407 - 23.434)

4.	Education ≥ High School	356	91	15.82 8	0.015 *	1.139 (0.857- 1.514)
	Education < High School	894	207			
5.	Occupation ≥ Skilled	80	22	19.50 1	0.003 *	1.225 (0.736- 2.039)
	< Skilled	1120	276			
6.	Socioeconomic Status Upper / Middle Class	944	227	12.29 5	0.015 *	1.047 (0.772- 1.420)
	Lower Class	306	71			
7.	Family Type Joined/ Three Generation	540	158	22.24 4	<0.00 01*	1.684 (1.296- 2.188)
	Family Nuclear Family	710	140			
8.	Tobacco Use Yes	160	33	1.045	0.307	0.808 (0.538- 1.125)
	No	1090	265			
9.	Alcohol Use Yes	232	59	0.397	0.529	1.111 (0.799- 1.544)
	No	1018	239			
10.	Unhealthy Diet Yes	906	221	0.554	0.457	1.187 (0.832- 1.503)
	No	344	77			
11.	Physical Inactivity Yes	828	194	3.427	0.180	0.940 (0.715- 1.235)
	No	422	104			
12.	Positive Family History Yes	268	80	6.788	0.009 *	1.491 (1.102- 2.016)
	No	982	218			
13.	Co-Morbidity Yes	310	129	71.71 8	<0.00 01*	3.251 (2.456- 4.304)
	No	940	169			
14.	Knowledge About Hypertension	570	204	58.77	<0.00	3.071

	Yes	680	94	4	01*	(2.329-4.050)
	No					
15.	BMI Overweight/ Preobese/ Obese	765	234	20.27	<0.00	2.886 (2.128-3.914)
	Underweight/ Normal	485	64	7	01*	

* P value <0.05 is significant at 95% CI

The variables which were significantly associated in Univariate analysis were only included in multivariate analysis which is shown in Table 15. The multivariate analysis was done using Enter method. Model was found to be statistically significant (Cox and Snell R² = 0.240, Nagelkerke R² = 0.3660, P value <0.001). The variables that are significant in multivariate analysis are age, comorbidity, knowledge about hypertension, family type and BMI. Other variables were found to be insignificant in multivariate analysis.

Table 5: Multivariate analysis findings

S.No	Variable	Hypertension				Nagelkerke r square value
		P value	Adjusted OR	95% CI		
1.	Age	<0.0001*	0.417	0.341-0.510	0.360	
2.	Marital status	0.235	0.807	0.567-1.149		
3.	Education	0.266	0.925	0.806-1.061		
4.	Occupation	0.397	0.935	0.393-1.093		
5.	Socio economic status	0.556	1.058	0.877-1.276		
6.	Positive family history	0.117	1.343	0.929-1.944	Cox and snell r square value	
7.	Co morbidity	<0.0001*	2.516	1.806-3.505	0.240	
8.	Knowledge about hypertension	<0.0001*	2.712	1.958-3.756		

9.	BMI	<0.0001*	0.530	0.459-0.611
10.	Family type	<0.0001*	0.656	0.517-0.832

* P value <0.05 is significant at 95% CI

This study was done to assess the prevalence, determinants, treatment and control of hypertension among rural adults in the study area. The study was conducted in the Rural field practice area covered by our institution and included 1250 samples selected from the study area. Many interesting results were obtained from this study and were explained already. Findings of the study is discussed in comparison with similar studies done elsewhere.

DISCUSSION

In this study majority of the study participants i. e. 44. 2% belonged to 51 -60 years of age, 24.2% belonged to 20 -30 years of age and 20.8 % belonged to 31 -40 years of age. In a study by Todkar SS about 37. 1% of the study participants were between 19 - 28 years of age and 16. 6% were between 29 -38 years of age. 15

In this study there was female preponderance and about 57. 4% of the study participants were females and 42. 6% were males. This finding of the study was comparable to studies by Sathish Kumar, Avadaiammal Vimala, Francesco P Cappuccio in which the proportion of female participants were 60.7%, 56% and 62% respectively. 16-18

In this study 82.4 % are married and 5. 44% were unmarried. In the study done by Kalavathy MC 58.9% of the study samples were married. 1978.6 % of the participants were married in a study by Sathish Kumar. 19 Almost 18.7 % of the study samples had no formal education, 30.2 % had middle school education and 21.3% had high school education in the present study. Among the participants around 43.7% were unemployed, 32.2 % are engaged in unskilled occupation and 17.8% are involved in semiskilled occupation in this study. 3.7% were unemployed and 13.2 % were engaged in either skilled or semiskilled occupation in a study by Chandwani H. 20 Sharma SK conducted a study in which 15.9 % of the respondents were unemployed and 12.1% were involved in unskilled occupation. 21 In a study by Chinnakali P 49.5 % of the study population were unemployed and 50.5% were involved in some form of work. 22 11. 8% were doing unskilled work. 60. 3% were unemployed and 20.9% were doing skilled work in a study done by Bhagyalaxmi A. 23

In this study 66.2 % were physically inactive and only 33.8% were physically active as per the operational definition and this showed that majority of the study participants are following an unhealthy lifestyle habits. In this study central obesity was assessed based on the waist hip ratio. About 83.4 % of the study participants have central obesity. In a study by Isezuo SA 13% of the study participants had central obesity. 24 Aroor Bhagyalaxmi showed that central obesity was present in 38% of the samples. 12 15. 7% of the study participants has central obesity in AK Agarwal study.

In this study nearly 89.9% of the study participants were non vegetarian and 10.1 % were vegetarian. Among the non vegetarians 54.1 % had non vegetarian food once a week and 35. 1 had non vegetarian food twice a week. In Chataut J study 91.3% the m are were non vegetarian and 8.7% were vegetarian. 97 In a study by K. A. Maroof 86 .6 % were vegetarian and 13.4%

were non vegetarian. 25.28.6 % were vegetarian and 71.4% were non vegetarian in a study by Sathish Kumar.26- 28

In II Meshram study among hypertensive about 10% were aware about the condition and about 8 % were on treatment. The level of awareness and treatment seeking behaviour was more among women and among educated subjects. 21 In this study by Univariate analysis the variables that are significantly associated with hypertension are age, marital status, education , occupation , socio economic status , family type ,positive family history , co morbidity, knowledge about hypertension and BMI .The variables that are significant in multivariate analysis are age, co morbidity, knowledge about hypertension, family type and BMI. In a study by Sathish Kumar increasing age, male gender, increasing BMI levels, tobacco, alcohol, WHR were found to be significant independent predictors of hypertension and on multivariate analysis of these significant variables age, male gender, increasing BMI levels, were found to be significant after adjusting for other variables. 28 In hypertension study group multicentric study multiple logistic regression analyses identified a higher body mass index, higher education status and prevalent diabetes mellitus as important correlates of the prevalence of hypertension. 1 Jonas JB conducted a study in which prevalence of hypertension was associated with higher age, higher body mass index, body height, Higher blood haemoglobin levels and elevated blood urea concentration. 29

CONCLUSION

This study assessed the prevalence, determinants, treatment and control of hypertension among the rural adult population of Kancheepuram District, Tamil Nadu.1250 was the sample size used and the study was conducted in the rural field practice area of Sree Balaji Medical College and Hospital.

The study reveals that, Among the study participants, 44.2% belonged to 51 - 60 years of age and About 57.4% of the study participants were females. As far as marital is concerned nearly 82.4% are married. According to the modified BG Prasad socio economic classification, 49.6% belonged to lower middle socio economic category.

From the findings of the study, it can be concluded that the prevalence of hypertension and prehypertension are high in the study area. The burden of undiagnosed case is also quite high. There is no sex difference in the prevalence of hypertension. This study also shows that there is still gaps in the diagnosis and treatment of hypertension in the study area. Among those treated also adherence, incidence of complications and co morbidities are worrisome. The level of awareness among the study participants about this disease is lower than expected which is quite alarming. Though there is an existing program to address this disease there is few lacunae identified in this study which prevents the program from reaching the needful. All these lacunae must be bridged by effective interventions.

Funding: No funding sources

Ethical approval: The study was approved by the Institutional Ethics Committee

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGMENTS

The encouragement and support from Bharath University, Chennai is gratefully acknowledged. For provided the laboratory facilities to carry out the research work.

BIBLIOGRAPHY

- [1] Hypertension Study Group. Prevalence, awareness, treatment and control of hypertension among the elderly in Bangladesh and India: a multicentre study. *Bulletin of the World Health Organization*. 2001;79(6): 490.
- [2] United Nations world population projections to 2150. *Population and Development Review*, 1998, 24: 183 –189.
- [3] Kumar V. Ageing in India —an overview. *Indian Journal of Medical Research*, 1997, 106: 257 –264.
- [4] National High Blood Pressure Education Program Working Group. National High Blood Pressure Education Program Working Group Report on Hypertension in the Elderly, *Hypertension*, 1994, 23: 275 –285.
- [5] World Health Organization. *The world health report: making a difference*. Geneva: World Health Organization. 1999.
- [6] Tunstall- Pedoe H. Preventing Chronic Diseases. A Vital Investment: WHO Global Report. Geneva: World Health Organization, 2005. pp 200, available at http://www.who.int/chp/chronic_disease_report/en, accessed on 15 April 2018.
- [7] Park K. Epidemiology of Chronic Non communicable diseases and condition; p-362. *Park's Textbook of Preventive and Social Medicine*. 23rd ed. Jabalpur: Bhanot; 2015.
- [8] Global Health Estimates 2013: deaths by cause, age and sex; estimates for 2000 –2012. Geneva: World Health Organization; 2014, available at http://www.who.int/healthinfo/Global_burden_disease/en, accessed on 15 April 2018.
- [9] World health organization (WHO) statistics 2016 available at www.who.int/gho/publications/world_health_statistics/2016/en/, accessed on 15 April 2018.
- [10] World health organization (WHO) report 2015 available at <http://indiatoday.intoday.in/education/story/who-non-communicable-diseases/1/720306.html>, accessed on 15 April 2018.
- [11] World health organization cardiovascular disease report 2016 available at <http://www.who.int/mediacentre/factsheets/fs317/en/>, accessed on 15 April 2018.
- [12] Gupta R, Joshi P, Mohan V, Reddy KS, Yusuf S. Epidemiology and causation of coronary heart disease and stroke in India. *Heart*. 2008 Jan 1; 94(1):16 -26.
- [13] World Health Organization 2012 hypertension report available at <http://www.who.int/mediacentre/factsheets/fs317/en/index.html>, accessed on 15 April 2018.
- [14] Park K. Epidemiology of chronic non-communicable diseases and conditions. *Park's Textbook of Preventive and Social Medicine*. 18th ed. Jabalpur, India: Banarasidas Bhanot Publishers; 2005; p. 293.
- [15] Bhadoria AS, Kasar PK, Toppo NA, Bhadoria P, Pradhan S, Kabirpanthi V. Prevalence of hypertension and associated cardiovascular risk factors in Central India. *Journal of family & community medicine*. 2014;21(1):29.

- [16] Forouzanfar MH, Liu P, Roth GA, Ng M, Biryukov S, Marczak L, Alexander L, Estep K, Abate KH, Akinyemiju TF, Ali R. Global burden of hypertension and systolic blood pressure of at least 110 to 115 mm Hg, 1990 -2015. *Jama*. 2017; 317(2): 165 - 82.
- [17] Govt of India (2011). National Health Report 2011, Ministry of Health and Family Welfare, New Delhi.
- [18] Qadir DH. Factors Affecting Treatment Compliance of Hypertensive Patients in Erbil City. *Kufa Journal for Nursing Sciences*. 2015 ;3; 5(2).
- [19] Kishore J, Gupta N, Kohli C, Kumar N. Prevalence of hypertension and determination of its risk factors in rural Delhi. *International journal of hypertension*. 2016;2016.
- [20] World Health Organization. Non communicable Diseases and Mental Health Cluster. Surveillance Team. Summary: surveillance of risk factors for non-communicable diseases: the WHO STEP wise approach. Geneva: World Health Organization, Noncommunicable Diseases and Mental Health, 2001.11 p.
- [21] Suryakantha. Social science. Text book of community medicine with recent advances. M/ S Jaypee Brothers Medical Publishers, 2010 Jan; p 702 - 7.
- [22] General R. Classification of occupations. London: HMSO. Ricketts MN (2004) Public health and the BSE epidemic. *Curr Top Micro- biol Immunol*. 1980; 284: 99119.
- [23] Vasudevan J, Mishra AK, Singh Z. An update o n BG Prasad’ s socioeconomic scale: May 2016. *International Journal of Research in Medical Sciences*. 2016; 4(9):4183 - 6.
- [24] Sathish T, Kannan S, Sarma PS, Razum O, Thankappan KR. Incidence of hypertension and its risk factors in rural Kerala, India: a community- based cohort study. *Public health*. 2012; 126(1): 25 -32.
- [25] Vijayakarhikeyan M, Krishnakumar J, Umadevi R. Cross - sectional study on the prevalence of risk factors for non - communicable disease in a rural area of Kancheepuram, Tamil Nadu. *International Journal of Community Medicine and Public Health*. 2017; 4(12):4600 - 7.
- [26] Snehalatha C, Viswanathan V, Ramachandran A. Cutoff values for normal anthropometric variables in Asian Indian adults. *Diabetes care*. 2003;26(5): 1380 - 4.
- [27] Kaur P, Rao SR, Radhakrishnan E, Rajasekar D, Gupte MD. Prevalence, awareness, treatment, control and risk factors for hypertension in a rural population in South India. *International journal of public health*. 2012;57(1): 87 - 94.
- [28] Ganesh SK, Deivanai NS. Prevalence and risk factors of hypertension among bank employees in urban Puducherry, India. *The international journal of occupational and environmental medicine*. 2014;5(2): 94 -100.
- [29] Joshi SV, Patel JC, Dhar HL. Prevalence of hypertension in Mumbai. *Indian journal of medical sciences*. 2000; 54(9):380 - 3.