

Prevalence and Factors Associated with Hypertension among Elderly Population in Dhapasi VDC of Kathmandu District

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Abstract

Ageing is closely associated with the dynamic demographic and socio-economic transformation. In the elderly period hypertension is the problem related with the internal features of the body. The objective of the study was, to find out the prevalence and factors associated with hypertension among elderly population. The descriptive, cross-sectional study was carried out in Dhapasi VDC among 318 elderly people selected by systematic random sampling. Ethical approval was obtained from the institutional review committee of Chitwan Medical College, Chitwan, Nepal. Data were collected through face to face interview technique using semi-structured schedule and analysis was done in SPSS version 16.0. The results unveiled that 56.9% of the elderly people were hypertensive, among them 40.8% of the respondents were diagnosed during the study, 29.6% were diagnosed before the study and 13.5% were diagnosed before and during the study. The prevalence of hypertension among smokers was 63.4%, those who were not involved in regular physical exercise was 63.8%, among those who took fat containing food more than three times in a week were 61.7%, who have disturbed sleep were 62%, who were the patients of diabetes was 90.0% and among those who have other co-morbidities was 38.7%. The prevalence of hypertension was found to be higher among elderly people. So, the study suggests that hypertension should be controlled especially with a focus to elderly population.

Keywords: Elderly; Hypertension; Prevalence

Introduction

Ageing is a natural phenomenon and inevitable process. It is closely related with the dynamic process of demographic and socio-economic transformation [1]. The prevalence of hypertension increases with age, as does the incidence of the diseases caused by hypertension. Older people are more likely than younger people to have hypertension and to benefit from treatment to bring blood pressure at normal. Prevention and treatment of hypertension and target organ disease remain important public health challenges that must be addressed. An important area for improving the control of blood pressure is among older people. The results in the trials of antihypertensive therapy follow a common and consistent Pattern and the benefits are greater in studies which select older patients [2].

Blood pressure means the lateral pressure exerted by blood flowing in the arteries on the arterial wall. Systolic BP: when the heart is pushing blood through the arterial system; and diastolic BP: when the arteries are at rest and the heart is refilling.

Normal: Systolic 90-140 and Diastolic 60-90 mmHg

Hypertension is the term used to describe blood pressure equals to 140/90 or above [3]. Hypertension become more common with increased age and more than 50% of people over the age of 65 years suffer from it however majority of this hypertensive people are undiagnosed or uncontrolled [4].

According to Global status report on non-communicable diseases 2011, WHO, hypertension is a major risk factor for cardiovascular disease. Worldwide, raised blood pressure is estimated to cause 7.5 million deaths, about 12.8% of the total of all annual deaths. This accounts for 57 million DALYs or 3.7% of total DALYs. Raised blood pressure is a major risk factor for coronary heart disease and ischemic as well as hemorrhagic stroke [5].

Ageing population, rapid urbanization and transition from agrarian life to a wage-earning, modern city life are reported as major

contributors to increased blood pressure in urban areas. The prevalence of raised blood pressure in low, lower-middle and upper-middle income countries is higher (40%) than in high-income countries (35%). In high-income countries, strong public health policies, multisector preventive action and widely available diagnosis and treatment have led to a reduction in the prevalence of high blood pressure. In contrast, in many developing countries the disease burden caused by raised blood pressure has increased over the past decade [6].

The prevalence of Non-Communicable Disease is increasing in Nepal. In 2008, nearly 50% of total deaths in Nepal were estimated to be due to NCDs and Cardio Vascular Disease (CVD) accounted for 25% of these deaths. Hypertension, one of the major risk factor for CVD, was estimated to be present in 27.8% of Nepalese adults aged 25 years and above [7].

The first scientific hypertension survey in Nepal, done in 1981 by Mrigendra Samjhana Medical trust. The prevalence of hypertension according to the then used World Health Organization (WHO) a criterion (160/95mmHg) in the different geographical settings of the country indicates towards a high prevalence of hypertension in the Nepalese population [8].

As the number of older people increases, several old age related

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problems have emerged in our society. Out of total population of Nepal 27.8 million (2013, central bureau of statistics, Nepal) the population of 60 years and over is 21, 54,410 (8.14%) [9], the objective of the study was, to find out the prevalence and factors associated with hypertension among elderly population.

Materials and Methods

A cross sectional study was conducted in Dhapasi VDC of Kathmandu District, Nepal, from 14th September to 21st October, 2013. The study population were people who were 60 years of age and above. Systematic random sampling method was adopted during the study. The total household of the VDC were obtained from the VDC profile which was the sampling frame for the study. There were total nine wards in this VDC. Sampling frame was the list of total households in VDC. A list of total household of the VDC (N=3,154). The sampling unit was obtained using systematic random sampling assuming every household have elderly person and if elderly person was not found in that household a nearby house in front of that house was taken as sample. The first household was selected randomly and other households were selected at an interval of 10 households, ($K^{\text{th}} \text{ item} = 3,154/318 = 9.91824 = 10^{\text{th}}$ item) until the required sample size was met.

The study design was cross-sectional and descriptive in nature. The study site was Dhapasi VDC of Kathmandu District, Nepal. The different criteria that were used for the estimation of the sample size were as follows:

Desired confidence limit-95%

Total elderly population in the VDC=11,022

Total households in that VDC=3,154

Allowable error=15%

Taking above criteria in consideration, total number of sample, required for this study was determined by using the formula:

$n = \text{required sample size}$

$z = 1.96$ for 95% confidence level

$p = \text{prevalence of hypertension among elderly population (32.5\%)}$
“Prevalence and determinants of hypertension and diabetes among elderly population in the Kathmandu valley of Nepal” [10].

$d = \text{precision or error allowed in the study} = 15\% \text{ of } p = 0.15 \text{ of } p = 0.04875$

$q = (1-p), n = z^2 \times pq / d^2 = (1.96)^2 \times (0.325 \times 0.675) / 0.04875^2 = 354$

$N = 3,154$ (Total household in Dhapasi VDC)

Sample size $(n) = n_0 / 1 + n_0 / N$

Desired sample size $= 354 / 1 + 354 / 3154 = 318$

Sample size of each ward was calculated by formula = Total sample size / Total household of the VDC \times Total household of that ward. Dhapasi VDC was selected purposively. Face-face interview was used as a technique for data collection. Data were collected through semi-structured questionnaire by direct interview. Collected data were entered and analyzed in the SPSS version 16.0.

Height of the respondents was measured by using non-stretch TR13 Tailors Tape with 1/2 inch width. Weight of the respondents was taken by weighing machine. Blood pressure was measured two times by cuff-

mounted aneroid sphygmomanometer 0-300 mmHg / vaquez-lauby classic and stethoscope, following WHO JNC, VII criteria. Pretesting was done in 10% of sample size in Shivanagar VDC of Chitwan District, Nepal.

Results

Socio-demographic and behavioral characteristics, food habit and personnel health of study population

Among total, 48.1% of the respondents are in the age group 60-69 and 78.3% are married. About 19.8% of the respondents have smoking habit, 24.2% have alcohol drinking habit, 44.3% have habit of doing regular physical exercise, 87.1% slept more than 8 hours and 67% experienced disturbed sleep. About 90.3% of the respondent takes carbohydrate containing foods daily, 32.7% takes fruits sometimes, 27% takes fat containing foods daily, 41.5% have never taken meat and 5.3% takes vegetables daily. About 16% of the respondents have suffered from any type of disease, 6.3% have suffered from diabetes, 2.5% have suffered from asthma, 2.8% have suffered from knee arthritis, 2.2% have suffered from heart disease, 0.6% has suffered from TB and 1.6% has suffered from incontinence of urine. Among total 36.2% of the respondents who were suffered from hypertension at present. Respondents suffering from hypertension and taking medicine at present ($n=115$) (old hypertensive number) was 81.7%, it was found that 40.9% were hypertensive and 59.1% were non-hypertensive, 59.1% were found to be non-hypertensive, Respondents who were diagnosed as hypertensive before the survey and during the survey too were 13.5%, Respondents who are diagnosed as hypertensive during the survey only were 27.3%, Respondents who are diagnosed as hypertensive before the survey only were 16.1%, Proportion of total Hypertensive Elderly People ($n=318$) is 56.9%, Proportion of total Non-Hypertensive Elderly People ($n=318$) is 43.1%, Proportion of Hypertension among male ($n=152$) is 50.3%, Proportion of Hypertension female ($n=166$) is 49.7%, 2% of the respondents have Family members suffered from hypertension in the family of respondents before the survey, 11% of the respondents have family members suffered from hypertension during the survey, hypertension while measuring BMI (Basic Metabolic Index) ($n=318$) it was found that 17.9% were overweight, 12.6% were obese, 67% have normal BMI and 2.5% were under weight for age.

Factors associated with hypertension

Crude odds ratio and 95% confident interval were calculated to measure the strength of association between hypertension and its associated factors (Table 1).

Bivariate analysis

Table 2 shows crude odds ratio with 95% confidence interval of hypertension across different variables.

Multivariate analysis

To identify the independent effect of each of the independent variables and to identify the most significant predictor of the hypertension, multiple regression analysis was done (Table 3).

Logistic regression equation is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n$$

Where, Y=dependent variable, β_0 =constant. β_1, β_2, \dots
 β_n =Regression coefficient for explanatory variables, X_1 and X_2 =explanatory variables

Characteristics (n=318)	Non-Hypertensive N (%)	Hypertensive N (%)	P-Value
Marital Status			
Married	118(47.4%)	131(52.6%)	
Widow/Widower	19(27.5%)	50(72.5%)	0.003
Smoking Habit			
Non Smoker	77(50%)	77(50%)	
Smoker	60(36.6%)	104(63.4%)	0.016
Habit of Exercise			
No	64(36.2%)	113(63.8%)	
Yes	73(51.8%)	68(48.2%)	0.005
Habit of taking Fat Containing Foods			
≤ 3 times a week	57(52.3%)	52(47.7%)	
>3 times a week	80(38.3%)	129(61.7%)	0.017
Disturbed Sleep			
No	56(53.3%)	49(46.7%)	
Yes	81(38%)	132(62%)	0.010
Co-Morbidity(n=51)			
Other than Diabetes	19(61.3%)	12(38.7%)	
Diabetes	2(10%)	18(90%)	<0.001
BMI			
Normal	103(48.4%)	110(51.6%)	
Over Weight	19(33.3%)	38(66.7%)	
Obese	7(17.5%)	33(82.5%)	0.001

Table 1: Factors associated with hypertension.

Characteristics (n=318)	Non-Hypertensive N (%)	Hypertensive N (%)	OR	95% CI
Marital status				
Married	118(47.4%)	131(52.6%)	1	
Widow/Widower	19(27.5%)	50(72.5%)	2.370	1.322-4.250
Smoking habit				
Non Smoker	77(50.0%)	77(50.0%)	1	
Smoker	60(36.6%)	104(63.4%)	1.733	1.107-2.713
Habit of Exercise				
Yes	73(51.8%)	68(48.2%)	1	
No	64(36.2%)	113(63.8%)	1.895	1.208-2.975
Habit of taking Fat containing foods				
≤ 3 times a week	57(52.3%)	52(47.7%)	1	
>3 times a week	80(38.3%)	129(61.7%)	1.768	1.107-2.823
Disturbed Sleep				
No	56(53.3%)	49(46.7%)	1	
Yes	81(38.0%)	132(62.0%)	1.862	1.161-2.988
Co-Morbidity				
Other than Diabetes	19(61.3%)	12(38.7%)	1	
Diabetes	2(10%)	18(90%)	17.100	3.286-88.985
BMI				
Normal	103(48.4%)	110(51.6%)	1	
Over Weight	19(33.3%)	38(66.7%)	1.873	1.015-3.456
Obese	7(17.5%)	33(82.5%)	4.414	1.870-10.418

Table 2: Bivariate analysis of factors associated with hypertension.

So, the final multiple binary logistic regression models are given by: Hypertension = $-2.591 + 2.778$ (being patient of diabetes) $+ 2.292$ (taking fat containing foods more than three times in a week).

Discussion

The mean BMI of the subjects in our study population was 23.12 kg/m², with a standard deviation of 3.4. The mean age of the respondents in this study is 70.62 years. This study revealed that of the 318 elderly people (female=166 and male=152), 181 were found to be hypertensive (male=91(50.3%) and female=90 (52.6%) and among the hypertensive population, 51(29.6%) of them were diagnosed before the survey and 87(40.8%) of them were diagnosed during the survey and 43 (13.5%) of them diagnosed before and after the survey.

A similar study was conducted in Kathmandu valley, “Prevalence and determinants of hypertension and diabetes among elderly population in the Kathmandu Valley of Nepal”. The total number of participants randomly selected for the study were 1633 aged 60 years and above (female=899, male=734), (mean age=66 years) in urban and rural areas of the Kathmandu valley. Which showed that the prevalence of hypertension was 32.5% diagnosed before the study and 22.4% diagnosed during the study. The prevalence of hypertension among male is 54.1% and among female 55.5% [10].

In our study we found that there is significant association between hypertension and diet containing fat. After adjusting with other independent variables it was found that elderly people who consume fat containing foods more than three times in a week were ten times more likely to be hypertensive than those who consume fat containing foods less than or equal to three times a week with (AOR=10.023), (CI=1.048-95.890) and p-value 0.017. A similar study was conducted in two regions of central Nepal: Kathmandu and Dhulikhel of Kathmandu valley. “Dietary factors associated with Hypertension in Nepal”. The study revealed that, the respondents who takes whole dairy products once a month/seldom were more likely to be hypertensive than who never takes whole dairy products with odds ratio 1.85 and CI (0.62-4.83). Respondents who take whole dairy products once a week were more likely to be hypertensive than who never takes whole dairy products with odds ratio 4.08 and CI (0.52-30.60). The p-value is 0.92 [11]. This study revealed that the participants who were the patients of diabetes were 16 times more likely to be hypertensive than who were the patients of other diseases with (AOR=16.322) and CI (2.321-114.771).

A similar study was conducted in India and Bangladesh, “Evaluate the prevalence, awareness, treatment and control of hypertension among elderly individuals in Bangladesh and India”. A Community-based sample of 1,203 elderly individuals (670 women; mean age, 70 years) was selected using a multistage cluster sampling technique from two sites in Bangladesh and three sites in India. The study revealed that, the overall prevalence of hypertension (WHO-International Society for Hypertension criteria) was 65% (95% confidence interval = 62-67%). 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. Physical activity, rural residence, and current smoking were inversely related to the prevalence of hypertension [12].

Conclusion

The result unveiled that the prevalence of hypertension was 27.3%, diagnosed during the study only and 16.1% diagnosed before the study only and 13.5% of the respondents were diagnosed during the study and before the study too. Regular physical exercise, consuming vegetables

Characteristics (n=318)	Non-Hypertensive N (%)	Hypertensive N (%)	Crude Odds Ratio (95%CI)	Adjusted Odds Ratio (95%CI)
Marital Status				
Married	118 (47.4%)	131(52.6%)	1	1
Widow/Widower	19 (27.5%)	50 (72.5%)	2.370(1.322-4.250)	0.429 (0.062-2.966)
Smoking Habit				
Non Smoker	77(50.0%)	77(50.0%)	1	1
Smoker	60(36.6%)	104(63.4%)	1.733(1.107-2.713)	2.304 (0.294-18.049)
Habit of Exercise				
Yes	73(51.8%)	68(48.2%)	1	1
No	64(36.2%)	113(63.8%)	1.895 (1.208-2.975)	0.547 (0.067-4.435)
Habit of taking fat Containing Foods*				
≤ 3 Times a day	57(52.3%)	52(47.7%)	1	1
>3 Times a day	80(38.3%)	129(61.7%)	1.768(1.107-2.823)	10.023 (1.048-95.890)
Disturbed Sleep				
No	56(53.3%)	49(46.7%)	1	1
Yes	81(38.0%)	132(62.0%)	1.862(1.161-2.988)	1.547 (0.157-15.207)
Co-morbidity*				
Other than Diabetes	19(61.3%)	12(38.7%)	1	1
Diabetes	2(10.0%)	18(90.0%)	17.100(3.286-88.985)	16.322 (2.321-114.771)
BMI				
Normal	103(48.4%)	110(51.6%)	1	1
Over Weight	19(33.3%)	38(66.7%)	1.873(1.015-3.456)	0.502 (0.020-12.375)
Obese	7(17.5%)	33(82.5%)	4.414(1.870-10.418)	0.267 (0.008-8.872)

Note: 1-Reference Category, * significant, Nagelkerke R Square (0.556), Cox & Snell R Square (0.411), Hosmer and Lemeshow test-0.200

Table 3: Multivariate analysis of factors associated with hypertension.

and fruits in the daily diet, not smoking, having undisturbed sleep and maintaining balanced sugar level in the blood are found to be the best measures for controlling hypertension.

So, intervention should be directed towards the health of elderly people from national level. Greater emphasis needs to be placed on promoting good health across the course of a lifetime, rather than on episodic care.

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Author Contributions

Dhakal S: Technicalities of the study, Singh R: Article preparation, Yadav UN: Additional support.

Disclosure

The author reports no conflicts of interest in this work.

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