Prevalence and Associated Factors of Hypertension among Nepalese Civil Servants

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Abstract

Background: Hypertension is one of the major global emerging health problems in this industrial world. Prevalence of is increasing daily. Overall awareness and modifying one's lifestyle could be beneficial to the reduction of hypertension. Majority of the hypertension cases are found in the developing countries. South Asian countries such as India, Bangladesh and Nepal have a higher risk of hypertension which is rapidly increasing.

Methods: Analytical cross-sectional study was conducted to determine the prevalence and associated factors of hypertension among civil servants in a Nepalese federal state. Structured questionnaire was used and face to face interview were carried out by the researcher himself. Blood Pressure (BP) was measured and hypertension was categorized, height and weight was measurements to attain the Body Mass Index (BMI). The participants were exclusively selected 247 (F= 68, M=179) civil servants who are working in Nepalese federal state number 5. Chi-square test has been carried out for comparing proportions in categorical variables. Logistic regression has been used to find out the adjusted odds ratio. All difference has been considered statistically significant at the $p < 0.05$ level.

Results: Study found 27.9% prevalence of hypertension (F= 8.8 %, M = 35.2%) with statistically significance with alcohol consumption ($p = 0.024$), known diabetes ($p = 0.026$). According to the logistic regression model result of the study, physical activity ($p = 0.218$) and its intensity ($p = 0.368$) with hypertension is not statistically significant. Similarly smoking also has not statistical significance with hypertension ($p = 0.121$). Study shows amount of salt intake in a day (<5gm=13.8%, >5-<10 gm. =51.4% and >10 gm. = 34.8%) that is higher amount than World Health Organization (WHO) recommendation (<5 gm.).

Conclusion: Prevalence of hypertension is higher among civil servant than ordinary people. Alcohol consumption, diabetes mellitus and age has significant association with hypertension among Nepalese civil servant.

Keywords: Prevalence; Obesity; Hypertension; Civil-servant; BP; BMI

Abbreviations: BP: Blood Pressure; BMI: Body Mass Index; HTN: Norm Tension and Hypertension; WHO: World Health Organization; NCDs: Non-Communicable Diseases; SPSS: Statistical Package for the Social Sciences; NHRC: Nepal Health Research Council; CVD: Cardio Vascular Disease; MET: Metabolic Equivalent.

Introduction

Blood pressure (BP) can be defined as pressure of blood against in the inner arterial wall. Hypertension is defined an increase in systolic blood pressure >140 mm of Hg and diastolic blood pressure>90 mm of Hg. Sir George Puckering first formulated the concept that blood pressure in a population is distributed continuously as a 'bell shaped curve' with no real separation between norm tension and hypertension (HTN) [1]. An estimate made by the World Health Organization (WHO) for 2025 is that 1.56 billion adults will likely have HTN [2]. According to recent estimates from the World Health Organization, two-thirds of hypertensive people live in developing countries. Africa has the highest prevalence of HTN (29.6%) followed by the Eastern Mediterranean (26.9%), South East Asia (24.7%), Europe (23.3%), the Western Pacific (18.7%), and America (18.2%). Among South Asian countries, Nepal reported the second highest proportion of hypertensive people (27.3%) after Afghanistan (29%) [3].

Nepal is one of the least developed countries, now trend of HTN prevalence is in increasing every year. WHO estimate deaths related to Non-Communicable Diseases (NCDs) in Nepal have increased from 51% in 2010 to 60% in 2014 [4]. Federal Democratic Republic of Nepal has more than thirty ministries and every ministry expanded their network from central level to local level. Civil servants are the liable people of government to implement the policy into action. More often than not, that key responsible person shows a higher prevalence of NCDs than the general public [5]. Literature found that lack of physical activity, use of alcohol and tobacco consumption, lack of fruits and vegetable consumption, negligence on regular health check-up, lack of satisfaction on job are the risk factors of obesity and HTN among the Nepalese population [5]. Prevalence of obesity has found to be higher in households those have a secure income and job security. Having a stable and good income allows for an easier access to various foods consumption, but majority of these people do not engage in any physical activity. Due to this reason, Cardio Vascular Disease such as HTN is highly prevalent among these people.

The prevalence of HTN also varies among the lifestyles of each person as well as their job duties. People who work in different field have different characteristics. Most of the civil servants do not engage in any physical activity during their leisure time [5]. The lack of physical activity is highly correlated to a higher risk of obesity and other NCDs. Civil servants are associated as one of the most influential person in the society, as they are the role models that possess the power and the influence over a community. With that said, Prevalence of obesity and HTN are increasing day by day among this group. Previous studies shows those who are in a senior position, married, and physical lifestyle rapidly increased the risk of visceral obesity and HTN [5]. This study was conducted upon the civil servants in Nepal to find out the prevalence and associated risk factor according to their behaviour and lifestyle patterns.

Methods

This was an analytical cross-sectional study, included all male and female civil servants working as administrative staff under different ministries of government of Nepal. An exclusive inclusion and exclusion criteria has made to select the respondents. A convenience sampling technique was applied to selected respondents. Nepal constructed its new constitution from elected constitutional assembly and applied this newly constructed constitution since Sept 20, 2015, replacing the Interim Constitution of 2007. According to the new constitution Nepal is divided into different federal states (State 1, State 2, State 3, State 4, State 5, State 6 and State 7) [6]. This study has conducted in Federal State Number 5, one of the 7 federal states of Federal Democratic

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Republic of Nepal, located in western part. The area of Federal State number 5 is 22,288 km² and population 4,891,028 and the topography of this province includes all part of ecological area like *Terai, Pahad* and *Himal.* This province has thirteen districts [7].

To assess the fruits and vegetables consumption; question was asked to the respondent with following threshold; 125 ml (half cup) cooked or chopped vegetables and 80grams (edible part of one whole medium size fruit like banana, apple or equivalent) consumption in a day [4,8]. Salt intake was measured by asking the questions on amount of salt consumed in a day and WHO recommendation of salt intake 5 gm. (1 Tea Spoon) in a day will be taken as a threshold for the measurement. For the measurement of physical activity, questions were asked to the respondent whether respondent accumulate physical activities <150 minutes or <500 Metabolic Equivalent (MET) in a week will be considered as sedentary lifestyle and similarly intensity of the activity. Walking, slow cycling, was considered as moderate intensity and fast walking, running, swimming, jogging was considered as vigorous intensity [9,10].

Ethical Considerations

Ethical approval for this study was obtained from North South University, Dhaka, Bangladesh. In addition, informed written consent was obtained from each and every respondent before the data collection. Permission was taken from the authority of the District Administrative Office of the respective districts. Privacy and confidentiality were strictly maintained and participants had rights to refuse or withdraw from the study at any time.

Data Analysis

Statistical Package for the Social Sciences (SPSS) version 21.0 was used to analyse the data. Appropriate statistics such as mean, median and standard deviation has been used. Chi-square test has been carried out for comparing proportions in categorical variables. Logistic regression was used to find out adjusted odds ratio. All difference has considered statistically significant at p <0.05 level.

Results

A total of 247 civil servants were recruited in this analytical cross sectional study. Different independent variables have been measured to find-out outcome. Table 1 shows the frequency of socio-demographic variables of the study population. Study found 18.6% of respondents were aged between 19 to 29 years, likewise 24.3% of respondents were 30 to 40 years, 30.4% of respondents were 41 to 51 years and 26.7% of respondents were 52 to 60 years of age. Majority of the participants (72.5 %) were male and only 27.5 % were female. Regarding their designation, majority of the respondent (54.7%) belongs to assistant level staff, 25.9 % were support staff, 15.0% were class III officer, 3.2% were class II officer and only 1.2% were class I officer. Table also shown the education, where 47 % respondents had intermediate level of education, 34 % had graduate level and 19 % post-graduate level of education. Most of the respondents (85.0%) were married, some of them (14.2 %) were never married and only few (0.8 %) were divorced. In terms of religion; 94.3 % respondents were Hindu, 4 % respondents were Buddhist and only few were Muslim (1.2 %) and Christian (0.4 %). Most of respondents (41.7) had their monthly income between 20,000 to 30,000 Nepali Rupees (NPR) per month, 21.5% had 30,000 to 40,000 NPR, 15.8% had 40,000 to 50,000 thousands and 21.1 % had 50,000 and above. Majority (62.3%) of the respondents were living in urban area, 20.6% were living in semi-urban area, 14.6% were in rural area and only 2.4% were living in urban slum area.

Variable		Frequency (n)	Percentage (%)
Age	19 - 29 Years	46	18.6
	30 - 40 Years	60	24.3
	41 - 51 Years	75	30.4
	52 - 60 Years	66	26.7
Gender	Male	179	72.5
	Female	68	27.5

	Supportive Staff	64	25.9
Designation	Assistant Level	135	54.7
	Class III Officer	37	15.0
	Class II Officer	8	3.2
	Class I Officer	3	1.2
Education	Intermediate Level	116	47.0
	Graduation Level	84	34.0
	Post-Graduation Level	47	19.0
Marital status	Never Married	35	14.2
	Married	210	85.0
	Separated or Divorced	2	0.8
Religion	Hindu	233	94.3
	Buddhist	10	4.0
	Christian	1	0.4
	Muslim	3	1.2
Monthly family income	20 to 30 Thousands Rupees	103	41.7
	30 to 40 Thousands Rupees	53	21.5
	40 to 50 Thousands Rupees	39	15.8
	50 Thousands Rupees and above	52	21.1
Residential area	Urban Area	154	62.3
	Urban Slum Area	6	2.4
	Semi Urban Area	51	20.6
	Rural Area	36	14.6

Table 1: Basic characteristics of the study participants.

Table 2 shows the frequency of clinical variables of the study. Among total 247 respondents, 27.9% had hypertension and 72.1 respondents were free from hypertension. Table also shows 9.3% were known diabetes mellitus, only 0.8% respondent had known renal disease, 1.2% of the respondents used hormonal methods of contraceptives as majority (72.5%) of the study participants are male.

Variables		Frequency (n)	Percentage (%)
Hypertension	Yes	69	27.9
	No	178	72.1
Known diabetes	Yes	23	9.3
	No	224	90.7
Known renal disease	Yes	2	0.8
	No	245	99.2
Known rheumatoid disease	Yes	5	2.0
	No	242	98.0
Use of hormonal contraceptives.	Yes	3	1.2
	No	67	27.1
	Not applicable	177	71.7

Table 2: Frequency table of clinical Variables.

Table 3 shows that majority (47.0%) of the respondent had normal weight, 35.6% were overweight, 13.8 % Class I obese, 2.8% class II obese however Class III obese and below normal weight were very minor that, both were only 0.4%. Table also shows the frequency regarding intensity of physical activities of the

respondents, where 5.3% respondents do not do any physical activities during week however 61.1% of respondents do moderate physical activities like slow walking, slow cycling, and 33.6% respondents do vigorous physical activates like fast walking, jogging, running. It was also found that 33.6% respondents have habit of alcohol drink, 11.3% were ex-smoker of the respondents. However, only 3.6% respondents were current smoker. According to this table, only 0.8% respondent do not consume vegetable every day, however 26.3% of respondents consumed less than ½ cup (125ml) cooked or chopped vegetable in a day, 72.9% respondent consumed ½ cup (125ml) cooked or chopped vegetable in a day. 36% of the respondents do not consume fruit daily, however 39.7% of respondents consume less than edible part of one whole medium size fruit or two small fruit/80 gm. and 24.3% of the respondents consume edible part of one whole medium size fruit or two small fruit/80gm or more in a day.

Variables		Frequency (n)	Percentage (%)
BMI	BMI< = 18.5: Below normal weight	1	0.4
	BMI>= 18.5 and < 25: Normal weight	116	47
	BMI>= 25 and <30: Overweight	88	35.6
	BMI>= 30 and < 35: Class I Obesity	34	13.8
	BMI>= 35 and < 40: Class II Obesity	7	2.8
	BMI >= 40: Class III Obesity	1	0.4
Intensity of physical activities	No Physical Activities	13	5.3
	Moderate Physical Activities like slow walking, slow cycling	151	61.1
	Vigorous Physical activities like fast walking.	83	33.6
Duration of physical activities	Less than 150 cumulative minutes.	83	33.6
	150 minutes or more cumulative minutes.	164	66.4
Habit of alcohol drink	Yes	83	33.6
	No	164	66.4
Ex - smoker	Yes	28	11.3
	No	219	88.7
Habit of smoking	Yes	9	3.6
	No	238	96.4
Habit of tobacco use	Yes	50	20.2
	No	197	79.8
Amount of vegetable consumption	No vegetable consumed daily	2	0.8
	Less than1/2 cup/(125ml) cooked or chopped in a day	65	26.3
	1/2 cup/ (125 ml) or more cooked or chopped in a day	180	72.9
Amount of fruits consumption	No fruit consumed daily	89	36
	Less than edible part of one whole medium size fruit or two small fruit/80 gm	98	39.7
	Edible part of one whole medium size fruit or two small fruit/80 gm or more	60	24.3
Amount of salt intake	< 5 gm/ 1 tea spoon.	34	13.8
	5 -10 gm/ 1- 2 tea spoon.	127	51.4
	> 10 gm/ 2 tea spoon.	86	34.8
Satisfaction scale on job	Dissatisfied	3	1.2

	Some satisfied	157	63.6
	Strongly satisfied.	87	35.2
Means of transport used	On foot	129	52.2
	By private vehicle (Car/Motorcycle/Scooter etc.)	71	28.7
	By public transportation.	47	19
Time of health check-up	Never	80	32.4
	Once in a year	98	39.7
	2 times in a year. (6 months interval)	45	18.2
	3 times in a year or more. (At least 4 months interval or less.)	24	9.7

Table 3: Frequency table of predisposing variables.

Table 4 shows that gender is strongly associated with hypertension (p=<0.01). It has been also found that alcohol consumption is statistically significant with hypertension (p=0.02). Study also found that who have been suffering from diabetes mellitus also significantly associated with hypertension (p=0.03). Other factors such as marital status, smoking, previous habit of smoking, duration of physical activity and means of transport were not statistically significant.

Variables		> 150 cumulative minutes	61	117	
		Hypertension			p-value
			Yes	No	
Gender		Male	63	116	<0.01
		Female	6	62	
Marital status		Never married	5	30	0.09
		Married	64	146	
Habit of alcohol consumption		Yes	31	52	0.02
		No	38	126	
Habit of smoking		Yes	5	9	0.12
		No	64	174	
Means of transport used to go to the office.		On foot	34	95	0.37
		By private vehicle	18	53	
		By public transport	17	30	
Known diabetes mellitus		Yes	11	12	0.02
		No	58	166	
Ex-smokers		Yes	10	18	0.33
		No	59	160	
Duration of physical activities		<150 cumulative minutes	22	47	0.72

Table 4: Association between socio-economic and hypertension related variables.

Table 5 presents the results of univariate and multivariate logistic regression analysis. In univariate analysis, it shows that male gender is more prone to develop hypertension (OR = 5.61, 95% CI = 2.29 – 13.69). After adjustment byage, Body Mass Index (BMI), level of education, marital status, religion, monthly family income and residential area in multivariate analysis, the association still remain significant. Similarly, habit of alcohol consumption found to be statistically significant (OR = 1.97, 95% CI = 1.11 – 3.51) but after adjustment by same variables, it becomes marginally insignificant (OR = 1.76, 95% CI = 0.95 – 3.26). Also known diabetes mellitus has to be found significantly associated with hypertension (OR = 2.62, 95% CI = 1.10 – 6.27). After adjustment in

multivariate logistic regression model, the association still remain same (OR = 2.59, 95% CI = 1.02 – 6.55).

Characteristics	Univariate model		Multivariate model	
	Unadjusted odds ratio	95% CI	Adjusted odds ratio	95% CI
Gender	5.61	2.29 – 13.69	*4.44	1.66 – 11.88
Habit of alcohol consumption	1.97	1.11 – 3.51	*1.76	0.95 – 3.26
Diabetes Mellitus	2.62	1.10 – 6.27	2.59	1.02 – 6.55

*Adjustment was done by age, BMI, level of education, marital status, religion, monthly family income and residential area.
Table 5: Univariate and multivariate logistic regression analysis to confirm the association of hypertension and related variables

Discussion

This analytical cross-sectional study was designed with the justification regarding prevalence of hypertension and its associated factors among Nepalese civil servants. This study has used different types of variables; these are socio-demographic, clinical and predisposing factors. In this study 247 subjects were enrolled (179 male and 68 female) among them most of the staffs were assistant level staff (54.7 %). In this study prevalence of HTN was 27.9%, a very similar study on same topic in different study subjects (urban area of Kathmandu) has found a bit higher prevalence (32.5 %) [3]. Likewise, a study which conducted among aged over 50 years found that, the prevalence of HTN is 44.9 % [11]. However, according to the Nepal Health Research Council (NHRC), the only national reliable government organization for authentic data has published 20 % prevalence of HTN among ordinary population [1]. However result shows smoking habit, salt intake, means of transportation used were not statistically significant with HTN. Previous study shows that smoking is one of the powerful risk factor for Cardio Vascular Disease (CVD), somewhat surprisingly this study found that participants who have hypertension only few of them are smoker [12].

A study found that 55.40% of the hypertensive patients have sedentary type of lifestyle and among them most of was overweight [1]. Physical exercise is a key component of life style modification factor to reduce HTN. Numerous studies suggested that there is positive association to reduce both systolic and diastolic blood pressure [13]. Evidence based experimental study found that physical activity has favourable effect on blood pressure reduction that is with HTN [14]. Nevertheless this study found that there is no significant association between physical activities and the HTN. Likewise study result sows surprisingly BMI has no association with HTN though many of research showed that BMI is one of the major associated factor of CVDs.

Similarly, amount of salt intake was not significant with HTN in this study. However previous study shows intake of salt consumption in Nepali community is quite higher [15]. Accordingly, this study showed consumption of salt intake is higher in Nepali community according to WHO recommendation. Study report that 51.4% respondent consume between 5-10 gm. salt per day, 34.8% consume more than 10 gm. per day and only 13.8% consume less than 5 gm. in a day.

Despite the well-recognized associated factor, alcohol consumption is statistically significant with HTN (p=0.02). Previous study also found that alcohol consumption had a statistically positive signification (p = 0.035) with HTN [3]. Likewise, the study found that respondent who has diabetes mellitus is strongly significant with HTN (p=0.03). Diabetes mellitus is one of well recognized associated factor of the HTN. A community based cross sectional study found that one in every ten participants (10.7%) had diabetes mellitus [3]. Likewise, this study also found almost similar result, 9.3 % of respondents have known diabetes mellitus. This study also found association between gender and HTN (*p<0.01)*. Male participants were more prevalent than female participants.

According to the study only 24.3% participants consume recommended amount of fruit (>80gm) per day. Likewise consumption of vegetable is quite good, 72.9% consume recommended amount (>=125ml) per day. However study shows there are no significant between fruits and vegetable consumption with HTN. A study from

national survey found that intake of fruits and vegetables consumption are insufficient than WHO recommendation, likewise it showed consumption in rural area is slightly in higher amount than urban area [4].

This study notify that there is no association between marital status and HTN (*p=0.9).* In spite of similar study found there is a strong association between marital status and HTN (*p= <0.001)* [16].

This study notices Prevalence of HTN is higher in civil servants of Nepal than ordinary population. Similarly, this study identifies some of major associated factors of HTN among Civil Servants of Nepal. A study showed one a third of all hypertensive were under treatment, likewise only 11.7% were under the control of blood pressure [17]. These factors could be targeted to improvement the health status of this group to reduce mortality from NCDs. Consumption of alcohol is one of the example it is positive significant with hypertension. Similarly, consumption of alcohol is quite high in this group (33.6%). Alcohol control mechanism should indorse to reduce the prevalence of NCDs. Implementation the mandatory physical exercise at office is recommended to reduce the NCDs among Civil Servant.

Limitations of the study

As this study has been conducted in a particular group, results of this study can't be generalized. Moreover, study could not use any biological samples.

Conclusion

Prevalence of HTN is increasing daily in lower middle income country like Nepal. This study was conducted with justification of prevalence and associated factors with hypertension. Study has justified most of associated variables with HTN. Study found that alcohol consumption and diabetes is major risk factor of hypertension. BCC regarding periodic health check-up, healthy habits and periodic screening program for the detection of diabetes is recommended to early detection which can control NCDs. Ministry of Public Administration has responsibility to manage the administrative staff in Nepal. On the other hand, amount of salt intake; means of transportation used to go to office were not statistical significance with HTN. This analytical cross-sectional study is the first ever study in Nepal among the government employee (civil servants) with the justification of prevalence and associated factors of

hypertension. This study will be useful for policy makers, stakeholders and further scientific evidence based studies in the field of CVDs and obliviously NCDs.

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