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# Prevalence of Non-Communicable Diseases and its Associate Factors among Government Employees in Biratnagar, Nepal

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## ABSTRACT

**Introduction:** Non-communicable diseases have along duration and slow progression. It is estimated that the attribution of NCDs in mortality has been rising gradually in Nepal. This study aimed to estimate the prevalence and factors associated with NCDs in Biratnagar, Nepal.

**Methods:** A cross-sectional study was conducted among government employees in Biratnagar, Nepal from August to December 2016. We used self-administrated modified WHO STEPS survey questionnaire and distributed to all government employees of Biratnagar Sub-Metropolitan. We used complete filled 323 questionnaires to analyze and draw the results.

**Results:** The prevalence of NCDs was found 72 (22.3%). Hence, 322 (99.6%) government employees had exposed at least one established risk factor of the NCDs. The prevalence of use of any type of tobacco products was 60 (18.5%) and consumption of alcoholic products was 187 (57.9%). More than two-thirds respondents answered that they consumed fruits once a week. Most government employees consumed vegetable regularly. The majority 193 (59.6%) respondents used motorcycle and electric rickshaw as means of transportation. Out of the total participants 60 (18.6%), 19 (5.9%), and 6 (1.9%) reported hypertension, diabetes, and cardiovascular diseases respectively.

**Conclusions:** Prevalence of Non-Communicable Diseases has been seen in Government Employees in Biratnagar, Nepal. Most of them had at least one associated factor related to NCD was found.

Keywords: government employees; non-communicable diseases; risk factors; WHO STEPS survey.

# **INTRODUCTION**

Non-communicable diseases (NCDs) are the leading cause of mortality and morbidity worldwide. Cardiovascular diseases, diabetes, cancers and chronic respiratory diseases are dominants.<sup>1</sup> It hits the hardest groups and decreased the productivity, prolong disability and diminish resources.<sup>2</sup> Globally, NCDs are estimated to cost more than US\$ 30 trillion over the next 20 years, representing 48% of global gross domestic product in 2010.<sup>1,2</sup>

Annually, NCDs kill 7.9 million people in South-East Asia Region (SEAR). The deaths are expected to be increased by 21% over the next decade.<sup>3,4</sup> The greatest increases

will be in Africa, SEAR and Eastern Mediterranean by over 20%.<sup>5,6</sup> Sixteen million NCD deaths occur before the age of 70; out of those deaths, 82% occurred in low and middle-income countries.<sup>7</sup>

In Nepal, the prevalence of chronic heart disease and hypertension was 5.7% and 22.7% in eastern Nepal in 2005.<sup>8</sup> This study aimed to estimate the prevalence and factors associated with NCDs in Biratnagar, Nepal.

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#### **METHODS**

A cross-sectional study was conducted among government employees of Biratnagar Sub-Metropolitan from August to December 2016. The study population of the study was all government employeesof Biratnagar Sub-Metropolitan. The validated WHO STEPS instrument version 2.2 translated in Nepali by Nepal Health Research Council (NHRC) was adopted for collecting the information.9 The ethical approval was obtained from the Institutional Review Committee of Pokhara University. Similarly, written permission was taken from District Administrative Office, Morang and informed consent were also mentioned in the self-questionnaire. Modified STEPS survey questionnaire was self-administrated on the census population 538 for the study. Out of total distributed, only 323 (60%) respondents returned the complete filled questionnaire. The collected data were entered into Epi-data 3.1 and analyzed using SPSS 16.0 version. We performed descriptive analysis considering thesocio-demographicstatus of the respondents and risk factors of the NCDs.We further applied chi-square test to examine the association between NCDs and its associated factors.

# RESULTS

Amongst 323 government employees, 92 (28.5%), 108 (33.4%), and 60 (18.6%) had the history of the NCDs: high blood pressure, diabetes and cardiovascular disease respectively. Similarly, among the health examined government employees 60 (18.6%), 11 (5.9%), and 1 (1.9%) had reported the NCDs: high blood pressure, diabetes and cardiovascular disease respectively. Similarly,nearly one-fifth (22.3%) had a prevalence of at least one NCDs among the government employees (Table 1, Figure 1).



Figure 1. Distribution number of risk factors of NCDs: not any factor, smoking, alcohol use, high salt intake, physically inactive and history of high blood pressure, diabetes and heart disease among government employees.

Table 1. Prevalence of NCDs (high bloo	d pressure,			
diabetes and CVD) among government en	nployees.			
Prevalence of NCDs	n (%)			
Hypertension	60 (18.6)			
Hypertension and diabetes mellitus	11 (3.4)			
Hypertension, diabetes mellitus and	1 (0.3)			
cardio vascular diseases				
Any type NCDs	72 (22.3)			

Table 2. Association of the risk factors for hypertension among government employees.					
Risk factors	Hypertension		Total	χ² Value	P value
	Yes n (%)	No n (%)			
Smoking					
Yes	16 (30.8)	36 (69.2)	52	6.092	< 0.05*
No	44 (16.2)	227 (83.8.)	271		
Alcohol use					
Yes	45 (54.1)	142 (75.9)	187	8.845	< 0.01 <sup>+</sup>
No	15 (11)	121 (89)	136		
Hard exercise					
Yes	33 (17.5)	156 (82.5)	189	0.375	0.540
No	27 (20.1)	107 (79.9)	134		
Medium exercise					
Yes	50 (16.8)	248 (83.2)	298	6.759 <sup>±</sup>	< 0.05*
No	10 (40)	15 (60)	25		
Sitting duration in a day					
Median and below	29 (19.1)	123 (80.9)	152	0.094	0.759
Above the median	30 (17.8)	139 (82.2)	169		
History of high blood pressure					
Yes	18 (19.6)	74 (80.4)	92	0.083	0.773
No	42 (18.2)	189 (81.8)	231		

\* P value significant at a < 0.05, †at a < 0.01, ‡Likelihood ratio

Out of six common risk factors: smoking, alcohol use, hard exercise, medium exercise, history of hypertension, sitting duration in a day, three factors were found significantly associated (P value: <0.05) with hypertension. Smoking, alcohol use and medium exercise were to be foundstatistically associated (P

value < 0.05) with high blood pressure (Table 2). Similarly, those factors also found to be associated (P<0.05) with diabetes (Table 3). But none of those factors were found statistically associated (P<0.05) with cardio-vascular diseases (Table 4).

Table 3. Association of risk factors for diabetes among government employees.					
Risk factors	Diabetes		Total	χ² Value	P value
	Yes n (%)	No n (%)			
Smoking					
Yes	7 (13.5)	45 (86.5)	52	6.431	< 0.05*
No	12 (4.4)	259 (95.6)	271		
Alcohol use					
Yes	16 (8.6)	171 (91.4)	187	5.735	< 0.05*
No	3 (2.2)	133 (97.8)	136		
Hard exercise					
Yes	10 (5.3)	179 (94.7)	189	0.288	0.592
No	9 (6.7)	125 (93.3)	134		
Medium exercise					
Yes	15 (5)	283 (95)	298	3.635	< 0.05*
No	4 (16)	21 (84)	25		
Sitting duration in a day					
Median and below	9 (5.9)	143 (94.1)	152	< 0.001	0.999
Above the median	10 (5.9)	159 (94.1)	169		
History of hypertension					
Yes	8 (7.4)	100 (92.6)	108	0.682	0.409
No	11 (5.1)	204 (94.9)	215		

\* *P* value significant at a <0.05, *†*-Likelihood ratio

Table 4. Association of the risk factors forcardiovascular diseases among government employees.					
Risk factors	Cardiovascular disease		Total	χ² Value	P value
	Yes n (%)	No n (%)			
Smoking					
Yes	1 (1.9)	51 (98.1)	52	0.001	0.970
No	5 (1.8)	266 (98.2)	271		
Alcohol use					
Yes	4 (2.1)	183 (97.9)	187	0.198	0.657
No	2 (1.5)	134 (98.5)	136		
Hard exercise					
Yes	4 (2.1)	185 (97.9)	189	0.171	0.679
No	2 (1.5)	132 (98.5)	134		
Medium exercise					
Yes	6 (2.0)	292 (98)	298	0.976	0.323
No	0	25 (100)	25		
Sitting duration in a day					
Median and below	3 (2.0)	149 (98)	152	0.017	0.896
Above the median	3 (1.8)	166 (98.2)	169		
History of high blood pressure					
Yes	3 (5.0)	57 (95)	60	3.090	0.079
No	3 (1.1)	260 (98.9)	263		

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Behavioral characteristics (smoking and alcohol use) of the government employees.

Table 5. Smoking and use of alcohol among government employees.					
Risk factors	Yes n (%)	No n (%)	Total		
Smoking					
Currently smoking any tobacco products	59 (18.3)	264 (81.7)	323		
Currently smoking any tobacco products daily	37 (62.7)	22 (37.3)	59		
Tried to stop smoking in past 12 months	21 (35.6)	38 (64.4)	59		
Ever smoke any tobacco products in past	53 (16.4)	270 (83.6)	323		
Ever smoke any tobacco products daily in past	37 (69.8)	16 (30.2)	53		
Currently, use any smokeless any tobacco products	98 (30.3)	225 (69.7)	323		
Currently use any smokeless any tobacco products daily	94 (95.6)	4 (4.4)	98		
Ever use any smokeless any tobacco products in past	98 (30.3)	225 (69.7)	323		
Alcohol use					
Ever consumed alcohol products	187 (57.9)	136 (42.1)	323		
Ever consumed any alcohol products in past 12 months	153 (81.8)	34 (18.2)	187		
Consumption of any alcoholic drink within past 30 days	135 (88.2)	18 (11.8)	153		

Table 6. Physical activities of the government employees.						
Type of exercise (n = 323)	Yes n (%)	No n (%)	Minimum	Maximum	Median	IQR*
Hard exercise	189 (58.5)	134 (41.5)	1	7	3	2
Medium exercise	298 (92.3)	25 (7.7)	1	7	5	2
Heavy recreational exercise	169 (52.3)	154 (47.7)	1	7	2	3
Medium recreational exercise	175 (54.2)	148 (45.8)	1	7	3	3
Medium sitting hours in a day (n=321)			2 hrs.	10hrs.	7 hrs.	3

\*Interquartile range

NCDs conditions and care seeking among government employees.

Table 7. NCDs condition and care seeking among					
government	employees.				
Conditions	High blood pressure	Diabetes n (%)	Cardiovascular diseases n (%)		
History	92(28.5)	108(33.4)	60(18.6)		
Check-up	244(75.5)	165(51.1)	94(29.1)		
Presence	60(18.6)	19(5.9)	6(1.9)		
Traditional check up	14(23.3)	8(42.1)	2(33.3)		
Traditional medication	14(23.3)	7(36.8)	2(33.3)		

Among 323 government employees, more than thirdfourths (80.5%) were male whereas less than one fourth (19.5%) were female. Nearly half (44%) were of age group 30-44 and second highest (40%) were of age group 45-59 with a median age of 40 (IQR-17), the mean age of 40.74 (SD-9.82) with 22 and 58 minimum and maximum age respectively. More than two-thirds (68.1%) were upper caste groups whereasminimum (1.2%) were religious minorities. out of the total participants, 97.8% were Hindu and remaining were Muslim and Christians.

The majority (62.8%) of government employees were gazette with more than one-third (37.2%) were non-gazetted. Nearly (31.9) were from middle-income quintile group and one-fifth (24.7%) were from the highest income quintile group. More than two-thirds (67.5%) completed college education and less than one-third (23.5%) completed high school. The median schooling year was 15.7 (IQR-2). Most (86.1%) were married and few (10.2%) were unmarried.

# DISCUSSION

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The findings of this study show that the overall prevalence of NCDs (high blood pressure, diabetes and cardiovascular diseases) is 22.3% and 99.6% government employees had exposed at least one established risk factor of the NCDs.

Most risk factors, such as current smoking, alcohol consumption, high blood pressure, and low physical activity were prevalent among men than women and both in gazetted and non-gazetted government employees which were similar to the results of Nepal STEPS survey 2013.<sup>9</sup> A study among the urban poor in Kathmandu, Nepal found a high prevalence of behavioral risk factors.<sup>10</sup>

The study showed the prevalence of smoking (18.3%) among government employees which consistent with the NCD risk factor survey of Nepal 2007/08 and 2013 where the prevalence was 24% and 19% respectively.<sup>9</sup> The prevalence of NCDs is high in Nepal compared with neighbors: India (14%) and Sri Lanka (15%).<sup>11</sup> However, it is lower than that in China (28%), Bangladesh (23%), Vietnam (24%), Thailand (24%) and Russia (39%) <sup>11</sup> in the STEPS survey. This highlights the importance of strong implementation and monitoring of the comprehensive Tobacco Control Law 2011. Due to tobacco industry litigation, implemented only in 2014.<sup>9</sup>

Among the government employees, 18% (21.9% male and 3.2% female) currently used any tobacco products. Tobacco consumption was high among male compared to female, which could be due to the social unacceptability.9 Tobacco used in Nepal is less than in Bangladesh and Myanmar, where around 32% and 30% of the adult population used tobacco respectively. Among the tobacco consumer, more than half used smokeless tobacco, and others consumed any types of tobacco.<sup>3,12</sup> The global targets are to bring tobacco consumption down to less than five percent by 2040 which was declared from the United Nations high-level meeting on NCDs in 2011.13 Nepal seems to be far from it. This presents the need for improving people's behavior as it appears to be not changing even when the law exists on the banon the use of tobacco in public places including workplaces and at home.

Use of alcohol, low physical activity and diabetes and hypertension as well as family history of the disease have been also observed as the risk factors NCDs in the government employees of Biratnagar, Nepal. We found about 58% of the total government employees consumed alcohol which was more among those aged 30 years and above compared to those aged below 30. Similarly, alcohol consumption was high among gazetted employees than non-gazettedwhich was higher than the prevalence of NCD survey 2013 (two percent) of Nepal.<sup>9</sup> The proportion of the total population with the use of alcohol was not available in a previous national survey of Nepal. However, in Nepal, the proportion of the current alcohol user male had dropped from 32.3% in 2007/08 to 11.1% in 2012/13.14 The factors affecting the high prevalence of alcohol consumption in government employees warrants further examination, by analyzing the determinants of alcohol use. In comparison to geographical neighbors, this is higher than the prevalence of current alcohol used in Kerala, India where about majority of the population were found to be used alcohol in 2008.<sup>15</sup> Alcohol consumption among government employees was high which could be due to the practices of providing expensive drinks as a gift from the service takers and also the party with drinks in several meetings, workshops, and conference and hence appears to be a big challenge ahead to reduce its consumption and preventing the population from its adverse effects.14,16

The findings of this study showed that more than onethird government employees did not perform the required physical activity. A similar finding was the world health survey where physical inactivity was found to be less prevalent in populations of low socio-economic status, especially in low-income countries<sup>17</sup> and Nepal NCD survey 2013.9 The reason behind it could be due to their busy working hours and sedentary lifestyles. Nearly one in every four government employees had high blood pressure which was similar to results Nepal STEPS survey 2013.9 Recent evidence of the high prevalence of hypertension in the government employees and results from another study<sup>18</sup> underscores that this is a key risk factor and increasing the burden. In 2010, high blood pressure was one of the three leading risk factors for global disease burden and was the leading risk factor for most countries in Asia, North Africa, and the Middle East.<sup>19</sup> Tobacco smoking, alcohol use, and high blood pressure were more frequent in males than females among government employees which is consistent with findings from a STEPS Survey conducted in Malawi.<sup>20</sup>

The self-reported prevalence of raised blood glucose levels (diabetes) in the current study was 5.9%, which was slightly higher (4%) the results of Nepal STEPS Survey 2013<sup>9</sup> and which is less than overall estimates of South Asia (8%).<sup>21</sup> This indicates that health services, including primary care services, should be equipped to manage the diabetes cases including screening, diagnosis, treatment and follow up services. Similarly, 1.9% of the government employees self-reported the prevalence of cardiovascular diseases. Government employees of Biratnagar self-reported that they having high blood pressure, diabetes and cardiovascular disease 28.5%, 33.4% and 18.6% respectively and Neupane et al. Prevalence of Non-Communicable Diseases and its Associate Factors among Government Employees in Biratnagar, Nepal

most of them reported the family history of the same diseases.

Less than one percent of the study population was found to be free of all studied NCD risk factors in the study. This indicates that the burden of NCDs is likely to increase in the future if it is not addressed promptly by the Government of Nepal and other stakeholders. Considering the various risk factors: smoking, alcohol use, physical inactivity, salt intake, high blood pressure, raised blood glucose and family history of NCDs this STEPS survey suggests that NCD risk factors are quite prevalent among the gazetted and non-gazetted government employees. The estimated proportion of deaths due to NCDs in Nepal has been rising from 51% in 2010 to 60% in 2014.<sup>3,7</sup>

This was population-based census study. We used standardized tools for collecting the required information. However, this study covered only quantitative information. Most data were based on the reported information. The human behavior itself is a complex phenomenon. It may need observational empirical information for the precise assessment of the prevalence of risk factors of NCDs among government employees.

# CONCLUSIONS

Almost all government employees were not found to be free of the established risk factors of NCDs and nearly one-fourth government employees were suffered from any NCDS. This indicates that the burden of NCDs is likely to be unbearable burden among the government employees in Biratnagar, Nepal. The behavioral change intervention could be the best solution to minimize the prevalence and associated risk factors of NCDs and its burden in future. Preventing and controlling of the risk factors of NCD may easier and cost-effective strategy in such study population than treatment of NCDs.

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### Conflicts of Interest: None.

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