J Nepal Health Res Counc 2014 May-Aug;12(27):88-93

Gender Differences on Risk Factors of Non-communicable Diseases – A Community Based Cross-sectional Study in Central Nepal

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ABSTRACT

Background: Non-communicable diseases are the leading causes of death globally, killing more people each year than all other causes combined. As many other developing countries, Nepal is also facing double burden of diseases. The aim of present study was to assess gender wise differences on prevalence of risk factors of non-communicable diseases.

Methods: This was a community based cross sectional study which was based on WHO's STEP approach for surveillance risk factors of non-communicable diseases among males and females. Multi-staged sampling technique was used to get required study sample. Descriptive and inferential statistics were applied to compare the risk factors between two genders.

Results: More than two-fifth of male and one-fifth of female respondents were currently using tobacco. The proportion of current alcohol users was found higher among the male respondents (28.6%) than their female counterparts (13.6%) (P<0.001). Only 35 (5.3%) of males and 13 (2.3%) of females were found consuming adequate (≥5 serving) intake of fruits per day. Study revealed that hypertension was slightly higher in male 165 (24.8%) than their female counterparts 111 (19.3%) but differences between two genders were statistically not significant.

Conclusions: The findings of present study suggest that there is high prevalence of risk factors of non-communicable diseases among both sexes in central Nepal. The finding emphasises the need for a focused national strategies targeting to tackle this modern epidemic of non-communicable diseases by incorporating primordial prevention activities to all adult population irrespective to gender.

Keywords: Blood pressure; non-communicable diseases; risk factors; smoking; waist to hip ratio.

INTRODUCTION

Non-communicable diseases (NCDs) are the leading causes of death globally, killing more people each year than all other causes combined.[1] Of the 57 million deaths occurred globally in 2008, 36 million were due to NCDs.[2] Nearly 80% of NCD deaths occur in low-and-middle-income countries.[3]

Not only the burden of NCDs have unequally distributed among different social classes but their risk factors also show variation between genders.[4,5] For women, the rapid rise in NCDs not only affects their health directly, it can also severely impact on their assumed gender-role as unpaid carers of the sick. Gender also significantly influences susceptibility and exposure to specific risks to mental health.[6] Increased level of risk factors of NCDs have been reported from various studies conducted in Nepal.[7-11] Data on risk factors collected from both genders, disaggregated by sex, can be fruitful for making policies by addressing the different NCD prevention and treatment needs of men and women.

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METHODS

This was a community based cross sectional study among males and females from both urban and rural population designed to assess the prevalence of risk factors of non-communicable disease which was based on WHO's STEP wise approach for surveillance of NCD risk factors.[12] The household survey was conducted between 5th March to 4th June 2013.

The study was conducted in six urban and same numbers of rural wards from six randomly selected districts, from all three ecological belts viz. Mountain, Hill and Terai of Central Development Region (CDR). Multi-staged sampling technique was used to get study sample. Male and female individual between the age of 15 and 64 from both urban and rural setting constituted the study population. The proportion between two genders was established based on the proportion of male and female population (15-64 years) in the selected wards. For both urban and rural wards, a list was prepared by including all the names of the individuals (both sexes separately) between the age of 15 and 64 years from the administration records of concerned VDCs/Municipalities. The total study sample population (respondents) is comprised of 665 (53.64%) male and 575 (46.36%) female drawn from the selected urban 1009 (81.4%) and rural 231(18.6%) area. Urban-rural proportion of respondents was made according to selected individual ward's proportion to sum total of 15-64 population of total selected wards i.e. 12094. Finally at the household level, study respondents were contacted using systemic random sampling technique.

A pre-tested structured questionnaire was used to collect information regarding risk factors of NCDs. Anthropometric measurement were taken from all the respondents. Body mass index (BMI) was calculated and classified according to WHO's guideline. Blood pressure (BP) classification was done by following JNC-VII recommended criteria.[13] The level of physical activity was computed from walking (W), moderate intensity activities (M) and vigorous-intensity activities (V) and a combined total physical activity score. All continuous scores are expressed in MET-minutes/week. International physical activity questionnaire (IPAQ) guideline was followed in the current study to categorize the level of physical activity among participants.[14]

Sample size was determined by applying the formula $n=4pq/L^2$, p was taken as 26.2%, the minimum known overall prevalence of some of the risk factors under consideration, i.e. prevalence of current smokers among 15-64 years.[15] Collected data were coded and entered in SPSS software version 16. Descriptive statistics (percentage, mean,) along with inferential statistics (chi-squire) were calculated.

Ethical approval was sought before the commencement of data collection from the Nepal Health Research Council (NHRC). Respondents were fully informed about objectives of study and verbal consents were taken before data collection. The privacy and confidentiality were maintained. Nobody was forced to participate in the study without their interest and respondents were informed that they were free to opt not to participate in the survey.

RESULTS

Among the total 1240 respondents of 15-64 years, 665 (53.6%) were males and 575 (46.4%) were female. Nearly one third of all respondents 386 (31.1%) were currently using tobacco. Out of total respondents, 280 (42.1%) Male and 106 (18.4%) female respondents were currently using tobacco. Sex difference was statistically highly significant among the groups in terms of tobacco use (P=<0.001). Out of total 386 tobacco users majority of them 322 (85.4%) were found as daily users. Among total respondents, 268 (21.6%) were currently using alcohol whereas 31 (2.5%) had used alcohol in the past years. Among total alcohol users, 190 (28.6%) male and 78 (13.6%) female were daily alcohol users (P<0.001) (Table 1).

Table 1. Gender wise distribution of respondents by tobacco and alcohol use.

Variables	Gender		Total (%)	P
	Male(%)	Female(%)		
Currently using tobacco*				
Yes	280 (42.1)	106 (18.4)	386 (31.1)	<0.001
No	385 (57.9)	469 (81.6)	854 (68.9)	
Total	665 (53.6)	575 (46.4)	1240 (100.0)	
Age wise distribution of tobacco users*				
15-24	45 (16.1)	9 (8.5)	54 (12.3)	<0.001
25-34	19 (6.8)	8 (7.5)	27 (7.2)	
35-44	65 (23.2)	22 (20.8)	87 (22.0)	
45-54	64 (22.9)	44 (41.5)	108 (32.2)	
55-64	87 (31.1)	23 (21.7)	110 (26.4)	
Total	280 (42.0)	106 (18.4)	386 (31.1)	
Frequency of tobacco use among current users*				
Daily	227 (81.1)	95 (89.6)	322 (85.4)	<0.001
Occ-asionally	53 (18.9)	11 (10.4)	64 (14.6)	
Total	280 (72.5)	106 (18.4)	386 (100.0)	
Status of Alcohol use *				
Current users	190 (28.6)	78 (13.6)	268 (21.6)	<0.001
Past users	25 (3.8)	6 (1.0)	31 (2.4)	
Never user	450 (67.7)	491 (85.4)	941 (75.9)	
Total	665 (53.6)	575 (46.4)	1240 (100.0)	

* Significant The figures in the parenthesis denotes percentage.

Out of total respondents, only 48 (3.8%) of males and 114 (8.9%) of females were found consuming adequate level (>five servings) of fruits and vegetable per day respectively. There was significant difference on adequacy of vegetable consumption among two genders (P=0.001) (Table 2).

Table 2. Adequacy of fruits and vegetable consumption.

Gender	Adequate intake of fruits		Adequate intake of vegetable	
	Yes	No	Yes	No
Male	35 (5.3)	630(94.7)	87 (13.1)	578(86.9)
Female	13 (2.3)	562(97.7)	27 (4.7)	548(95.3)
Total	48 (3.8)	1192 (96.2)	114 (8.9)	1126 (91.1)

* Statistically significant (P<0.001) figures in the parenthesis denotes percentages

Majority of respondents 745 (60.1%) were involving in high level of physical activity followed by moderate level of physical activity 378 (30.5%). More proportions of male respondents 475 (71.4%) were found involving in high level of physical activities as compared to their female counterpart 270 (47%). Gender wise difference was statistically highly significant (<0.001) (Table 3).

Table 3. Sex wise distribution of level of physical activity.

Physical activity level	Male (%)	Female (%)	Total (%)
Low	38 (5.7)	79 (13.7)	117 (9.4)
Moderate	152 (22.9)	226 (39.3)	378 (30.5)
High	475 (71.4)	270 (47.0)	745 (60.1)
Total	665 (53.6)	575 (46.4)	1240 (100.0)

P<0.001 The figures in the parenthesis denotes percentage.

Higher proportion of pre-obese was found among males 94 (14.1%) than their female counterpart 77 (13.4%). There were high proportion of male respondents under 1st and 3rd grade obesity than their female counterpart but the reverse trend was observed between male and female respondents in terms of 2nd grade obesity. Gender wise difference was found statistically highly significant (Figure 1).

Based on JNC-7 criteria of BP classification, only 215 (32.3%) of males and 239 (41.6%) females fall under the category of Normal BP whereas 285 (42.8%) males and 225 (39.1%) fall under the pre-hypertension category. Comparatively high proportions of male respondents were classified as stage-1 hypertension 154 (23.2%) than their female counterpart 84 (14.6%). There were 11 (1.6%) of males and 27 (4.7%) of females who fall under stage-2 hypertension category (Table 4).

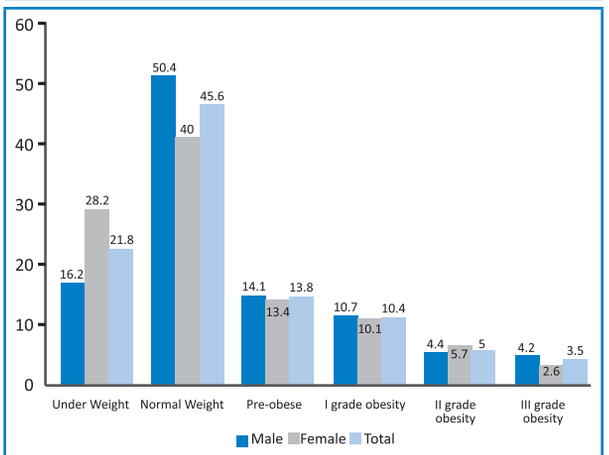

Figure 1. Weight classification by gender based on BMI criteria.

Table 4. Overall BP status of respondents by sex based on JNC-7 criteria.

BP category	Gender		Both genders (%)
	Male (%)	Female (%)	
Normal	215 (32.3)	239 (41.6)	454 (36.6)
Pre-hypertension	285 (42.8)	225 (39.1)	510 (41.1)
Stage-1 hypertension	154 (23.2)	84 (14.6)	238 (19.2)
Stage-2 hypertension	11 (1.6)	27 (4.7)	38 (3.1)
Total	665 (53.6)	575 (46.4)	1240 (100.0)

P=0.185 The figures in the parenthesis denotes percentage.

DISCUSSION

In the present study, nearly one third of all respondents were currently using tobacco. Out of total respondents, more than two-fifth of male and one-fifth of female respondents were currently using tobacco. Sex difference was statistically highly significant among two genders in relation to tobacco use (P=<0.001). This finding is higher as compared to a national risk factors survey of Nepal where 27.0% of male and 10.3% of female respondents were recorded as current smoker,[11] but smaller as compared to a study conducted in Chitwan District of Nepal.[16] Higher prevalence of current smokers in later study may be due to including respondents only from Chitwan district and among teenagers which is a fragile stage to try any substances. A similar study from western Nepal reported the prevalence of current smoker as 17%.[17] Among a total of 280 smoking tobacco users, majority (four-fifth) were daily smokers. The rate is quite high as compared to some other studies.[18-20] This increased proportion of current smoker in the current

study may be due to inclusion of comparatively older respondents. More than one-fifth of respondents (21.6%) were found currently using alcohol. The proportion of current alcohol users was found significantly higher among the male respondents i.e. 28.6% than their female counterparts i.e. 13.6%. This figure is similar for male as compared to recent National risk factors survey of Nepal where 28.0% of males and 7.1% of females were found as current alcohol users.[11]

In the current study, very dissatisfactory level of fruits consumption was observed where only 3.9% of respondents were found who consumes fruits as recommended by WHO (five servings per day). This finding of present study is quite identical to another study conducted in Nepal where 2.1% of study population were found consuming adequate amount of fruits and vegetables.[11,21] But this finding is very smaller as compared to many other similar studies.[22-24] The findings of current study on fruits and vegetable consumption is identical to a study where 2.2% of men and 1.97% of women were found consuming adequate servings of fruits including vegetables.[25]

Physical activity level of respondents was found satisfactory as compared to many other risk factors in the present study. Nearly two-third and one-third of respondents fall under the category of high and moderate physical activity respectively and nearly 10% under the low physical activity category. Comparatively high proportion of female respondents (13.7%) falls under the category of low level of physical activity than their male counterparts (5.7%) (P<0.001). Similar gender wise variation was observed in the study conducted among the Saudi adolescents.[26]

Among total respondents, 13.8% were traced as pre-obese and nearly one-fifth were as obese. About 10%, 5% and 3.5% of respondents were found under the category of 1st grade, 2nd grade and 3rd grade obesity respectively. Similar study conducted in Dharan city of Nepal recorded the prevalence of overweight and obesity as 32.9% and 7.2% respectively.[27] The higher prevalence of overweight (pre-obese) and obesity in the Dharan study may be due to taking respondents only from city duelling. Identical finding was observed on obesity from the National Risk factors survey of Nepal where 4% of respondents fall under the obesity category (male: 3.1%; female: 4.8%).[11]

Based on JNC-7 criteria of BP classification, only one-third of males and two-fifth of females fall under the category of Normal BP whereas 42.8% males and 39.1% females fall under the pre-hypertension category. Comparatively high proportions of male respondents were classified as stage-1 hypertension (23.2%) than their female counterpart (14.6%). There were 1.6% of males and 4.7% of females who fall under stage-2 hypertension category. Overall, 22.3% of respondents were found hypertensive. The finding of present study is quite small as compared to some hypertension related studies in Nepal where hypertension was observed among 33.8% (male: 38.3 and female: 30.8) of respondents in a study by Vaidya et al,[28] 2007; 44.9% (male: 47.75% and female: 42.73%) of respondents in a study by Manandhar et al,[29] 2012 and 33.9% by Sharma et al,[30] 2011. The high prevalence of hypertension in mentioned studies may be because of enrolling comparatively older population compared to present study. But the finding of present study in this regard is identical with some other studies conducted in Nepal: 22.7% by Vaidya et al,[28] 2007; 21.5% by WHO STEP survey,[15] 2008; 22.4% by Chataut et al,[31] 2011 and in India: 19.4% by Kokiwar et al,[32] 2012. Present study revealed that hypertension is slightly higher in male (male: 24.8%; female: 19.3%) but differences between these two groups were statistically not significant. Somewhat similar finding was found from the recent national risk factors survey of Nepal where 28.7% of males and 18.5% of females were categorised as raised BP.[11] Various studies have shown that hypertension is more prevalent in men as compared to women.[33-36] However, some other studies showed female preponderance.[37-40] Present study was conducted over only one development region and it has small sample size so the finding may not be generalized to whole Nepal.

CONCLUSIONS

The findings of present study suggest that there is high prevalence of risk factors of NCDs among the population of Central Development Region. There are some variations regarding the magnitude of the risk factors among two genders. Significantly high level of tobacco and alcohol use was found among male respondents as compared females whereas high proportion of female were found having the risk factors related to low fruits and vegetable consumption. The finding emphasises the need for a focused national strategies targeting to tackle this modern epidemic of NCDs by incorporating primordial prevention activities to general population with considerable emphasis to both genders.

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