Original Article

Risk Factors of Cardiovascular Disease between Urban and Rural Adult Population

Bijukshe Sweta, RN, MSN
Lecturer, B & B Medical Institute (Nursing College), Gwarko, Lalitpur, Nepal

Bangdel devi Radha , RN, MSN
Professor, Patan Academy of Health Sciences, School of Nursing and Midwifery, (Lalitpur Nursing Campus), Sanepa, Nepal

Correspondence: Sweta Bijukshe, Lecturer, , B & B Medical Institute (Nursing College), Gwarko, Lalitpur, Nepal. Tel+977015202381; Mobile:9849180631 E-mail: swetabijukshe@gmail.com

Abstract

Background: Cardiovascular diseases (CVDs) are the number one cause of death globally which can be prevented by addressing behavioral risk factors and biological risk factors.
Objective: This study aimed to compare the cardiovascular risk factors between urban and rural adult population
Research method: A descriptive cross-sectional study design was applied. Purposive sampling technique was used to select 109 adults. Data was collected using questions based on WHO-NCD STEP wise approach interview schedule questionnaire. Analysis was done using descriptive and inferential statistics with SPSS version 20. Test of significance was set at .05 levels
Results: Findings revealed that current smoker were more likely in rural area compared with urban area (p =0.027). Majority of urban (78.9%) and rural (77.9%) adults were taking inadequate fruit and vegetables as recommended by WHO. Alcohol consumption was found to be more among rural adults. Urban adults had inadequate physical activity as compare with the rural adults (Odds Ratio = 3.413; p =0.002). The proportion of adults having overweight was 46.3% and 21.1% in urban and rural area respectively (OR=3.235, p =<0001). Hypertension was detected in 17.9% and 10.5% of urban and rural area respectively. There was significant association between smoking and sex between both urban and rural adults (p <0.05). Similarly, rural adults with lower education were more likely to smoke than those with higher education (p =0.014).Overweight was more likely among above 40 years of rural adults (p= 0.023).
Conclusion: The findings concluded that insufficient fruit and vegetables intake, inadequate physical activity, overweight and obesity, and hypertension were more common in urban adult population. Despite the higher prevalence of almost risk factors in urban areas, rural areas are also not far behind. Therefore, there is a need for comprehensive health promotion programs to encourage lifestyle modification.

(Key words: Cardiovascular disease, Risk factors, Urban and Rural ,adult population)

Background

The global burden of disease has dramatically shifted from communicable, maternal, prenatal, and nutritional causes to non-communicable diseases (NCDs) (Fuster, 2014). Cardiovascular diseases (CVDs) are the number one cause of death globally: more people die annually from CVDs than from any other cause. An estimated 17.5 million people died from CVDs in 2012, representing 31% of all global deaths or 48% of NCD deaths. Of these deaths, an estimated 7.4 million were due to coronary heart disease (World Health Organization , 2016a). The rapidly increasing CVD death toll is predicted to rise to 23 million by 2030 (Mathers & Loncar, 2006).

Of the 7.9 million deaths due to NCDs in 2008 in South-East Asian Region(SEAR), cardiovascular diseases alone accounted for a quarter (25%) of all deaths. In SEAR sedentary habits with little or no physical activity have resulted in increases morbidity and mortality from cardiovascular diseases which are becoming increasingly important causes of premature death. CVDs are showing an escalation among the Indian population with a trend of reaching the younger age groups (Chauhan & Aeri, 2015).

Cardiovascular diseases (CVDs) is emerging as a major killer even in Nepal where mortality attributed to CVD has swiftly increased from 22% to 25% between 2004 and 2008 (Alwan, 2011).CVDs are the most common cause of NCD admission that is 38 % according to a 2010 hospital-based study (Nepal Health Research Council (NHRC),2010). In Gangalal National Heart Centre, the main referral cardiac hospital in the capital Kathmandu, the number of patients doubled annually between 2005 and 2013 (Sahid Gangala National Heart Centre (SGNHC), 201).

Most cardiovascular diseases share four common major modifiable behavioral risk factors for CVDs: tobacco use, unhealthy diet, insufficient physical activity, and harmful use of alcohol. All four are prevalent in Nepal. These risk factors lead to four major metabolic conditions: overweight/obesity, high blood pressure, elevated blood sugar, and elevated lipids. In turn, these conditions cause increased incidence of coronary artery disease, stroke and congestive heart failure(WHO, 2011).

Among them, behavioral risk factors-unhealthy diet physical inactivity, tobacco use and harmful use of alcohol, alone contributes 80% of coronary heart disease and cerebrovascular disease(Alwan, 2011) .Smoking is estimated to cause nearly ten per cent of all CVD followed by physical inactivity (6%), and overweight and obesity (5%). Low fruits and vegetables intakes also caused death of approximately 16 million people (Mendis, Puska, & Norrving, 2011).

A National survey conducted in Nepal by Aryal, et al.(2015) showed - prevalence of current smoker were more in rural(19.9%) than urban(12.4%) population, 3.1% and 4.8% from rural and urban respectively had low physical activity, higher prevalence of overweight and obesity was observed among urban respondents (31%) compared to the rural (19%) (OR=1.39, p= <0.001), higher prevalence of insufficient fruit and vegetable intake in both urban (97%) and rural (99.3%) area. Overall, Urban population were 1.04 time more likely to have risk factors than rural population.

The majority of cardiovascular disease (CVD) are preventable up to 80% of heart disease, stroke could be prevented by eliminating shared risk factors, mainly tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol (Alwan, 2010). Study finding would be useful for identifying the extent of the problem and implementing CVD prevention programs among similar communities in Nepal.

Research questions

What are the behavioral risk factors among urban and rural adult population?

What are the biological risk factors among urban and rural adult population?

What is the association between selected socio-demographic variables and risk factors of cardiovascular diseases among adult population?

Operational Definitions

Cardiovascular Diseases: Represent Coronary artery disease which is the most the most common type of CVDs.

Behavioral risk factors: Physical inactivity, unhealthy dietary habits, tobacco use and alcohol consumption.

Biological Risks: It includes obesity and hypertension.

Current user: those reported smoking any tobacco product within last 30 days.

Past user: One who had not used any form of tobacco (smoked or chewed) in the past one month but had tried before.

Alcohol consumption: Respondents taking any form of alcohol such as beer, jaand, tongba, local raksi, whisky, vodka (spirits), rum, wine (red and white).

Physical inactivity: Those who will not meet the criteria of vigorous or moderate activity as given in the WHO steps manual i.e. less than 600 MET minutes per week.

Poor dietary habits: Consumption of less than 5 servings of fruits and vegetables per day.

Hypertension: It includes those who had high blood pressure according to JNC-VII classification during the time of data collection.

Overweight and obesity: Overweight BMI between 25-29.9 and obesity as BMI 30 or higher.

Adult: Both male and female of the age group of 20-59 years residing in selected wards of urban and rural area of Lalitpur district.

Urban: Sub-metropolitan city constitute urban area

Rural: Village Development Committees (VDCs) constitute rural area

Research Methodology

Research design

Descriptive, comparative cross sectional design was used for this study to compare the risk factors of cardiovascular disease among urban and rural adult population.

Research setting and population

Setting

Study was carried out in Lalitpur Sub metropolitan city as an urban area and in Bhardeu Village Development Committee (VDC) as rural area of Lalitpur district. Lalitpur is the 3rd largest city of Nepal which consist of one Sub metropolitan city ,four Municipalities and 16 VDCs. Bhardeu VDC located south from ring-road Satdobato in which many disadvantage people, Tamang, Newar are residing**.**

Population

The study population consisted of adult population having age group 20 -59 years residing permanently in Lalitpur Sub metropolitan city and in Bhardeu VDC.

Sample Procedure

Sampling technique:

Non probability purposive sampling technique was adopted to find out the cardiovascular risk factors between urban and rural adult population. From each household one respondent was selected.

Sample size

The total Sample size was calculated by standard formula on the basis of average prevalence of one risk behavior i. e. insufficient fruits and vegetables intake-94% (Dhungana, et al., 2014; Oli, et al., 2013) at 95% confident interval with 5% allowable error. Sample size when estimating a proportion:-

$n= (z^2pq/l^2)$ (Cochran, 1977)

Where,

z = 1.96 for 95 % of Confidence interval

p =0.94

q= 1-p =0.06

l= Allowable error (±5%) = 0.05

$= (1.96)^2 \times 0.94\times0.06/ (0.05)^2$

Sample size (n) =86

Non-response rate 10% was included in the sample size. The required sample size was 95.As the study is comparative in nature (2×95=190); researcher took 95 respondents from urban area and 95 respondents from rural area.

Inclusion and exclusion criteria

Both male and female adults' population whose age ranges from 20- 59years and willing to get participated were included in this study.

Those who were not permanent residence, those who could not understand the Nepali Language and pregnant women were not included in the study.

Research Instrument

We followed the WHO-NCD STEPwise approach to surveillance questionnaires for collecting demographic information, behavioural and anthropometric measurements.

Part I: Questions related to socio demographic characteristics (age, sex, and education level).

Part II: Questions related to behavioral risk factors on cardiovascular disease (smoking tobacco and smokeless tobacco, alcohol consumption, dietary pattern (included fruit intake, vegetables intake) and physical activity.

Part III: Questions related physical measurements (height, weight and blood pressure).

Validity and Reliability of the instrument:

The content validity of the instrument was established by consultation with advisors, three external subject matter experts (>80% rating score for content validity by three external subject experts) as well as peer review. Pre-testing of the instrument was done on 20 adults having inclusive criteria in similar setting (residing in Nallu VDC and Lagankhel of Lalitpur) and they were not included in main study. Reliability of the instrument was tested using Split-Half method which gave satisfactory value of 0.79.

The reliability of physical measurement instruments was maintained by making periodical cross check with the weighing scale, blood pressure measuring instrument and height scale that were used in Medical ward of Patan Hospital. Same weighing scale, blood pressure instrument and measuring tape were used. Pointer of the weighing scale and blood pressure instrument was calibrated to zero before taking weight and blood pressure. Researcher herself measured the height, weight and blood pressure.

Ethical approval

Ethical approval was obtained from Institutional Review Board of Tribhuvan University, Institute of Medicine. Before data collection written permission was taken from lalitpur Sub Metropolitan City, and Bhardeu VDC.

Data Collection Procedure

Door-to-door home visit was done for data collection. Informed consent (verbal and written) was obtained from each participant after the objectives of study had been explained. Data was collected through face to face interview technique by using semi structured Questionnaire schedule in Nepali version.

For measurement of BMI, weight was recorded in kilograms using a portable digital weighing scale (Simply Bathroom, China). Height was measured in centimeters by attaching the non-stretchable inch tape in wall. Doctor's Aneroid Sphygmomanometer (BP Set) was used for recording blood pressure. Researcher recorded two readings of systolic and diastolic pressure in five minutes interval over right arm and the later two were averaged for final score. Those who had pre-hypertension, hypertension, overweight were advised for physical exercise, healthy diet and hypertensive respondents were referred for health facility for checkup.

Data collection procedure took 25-30 minutes to fill each questionnaire and for the physical measurement. On an average 7-8 respondents were interviewed per day in friendly environment in their own home setting. Confidentiality was assured by coding questionnaire.

Adult's participants were assured of their participation in this study as voluntary. They were informed of being free to withdraw from the interview at any time during interview process if they felt uncomfortable. Data was collected for a period of 2016/12/10 to 2017/01/10. Data collection was done by the researcher only and obtained data was used for the research purpose only.

Data Analysis Procedure

The obtained data were checked for completeness, accuracy and out of range, scored immediately and were organized properly after each day of data collection and before entry. Then the data were entered into entered in Statistical Package for Social Science (SPSS) version 20 and were checked, cleaned, edited and recoded for further analysis. Classification of physical activity and blood pressure was done with reference value BMI was calculated as weight in kilograms divided by the square of the height in meter square.BMI was classified into underweight, normal weight, overweight and obesity *(WHO, 2006).*

The data was analyzed by using descriptive statistics such as frequency and percentage for categorical variables and mean, range and standard deviation for continuous variable. Inferential statistics (Pearson Chi square, likelihood ratio test) was used to reveal the association between urban and rural population regarding risk factors of cardiovascular disease, considering p-value <0.05 as a significant. The strength of association of risk factors between urban adults and rural adults was measured by odds ratio at 95% confidence intervals.

For ease in computing association, BMI>/25KG/M2 was treated as 'overweight'; it also included obesity. Systolic blood pressure≥ 140 mm of Hg and diastolic blood pressure ≥ 90 mm of Hg was treated as 'hypertension' (Aryal, et al., 2015). Similarly education was later sub-grouped into below primary (including illiterate and up primary) and above Secondary (Katel,2015).

Results

Table 1 shows the mean age of urban was 37.59 (±10.16) years whereas in the rural area it was 39.0(±12.63) years respectively. More than half of adults were belongs to less than 40 years age group in both urban (58.9%) and rural (52.6%) area. Three fifths (60%) of adults were male in urban area and more than half (53.7%) of adults were female in rural area. About one third (35.8%) had completed higher secondary level in urban while nearly half (45.3%) of adults were unable to read and write in rural area.

Table 2 shows smoking status of urban and rural adults. The current adult smoker in urban were nearly a quarter (23.2%) whereas in rural were 37.9%.In urban there was 0.494 times less likely to have current smoker than the rural area which is also significantly different (*p*=0.027).In urban, past smoker were just over one quarter (28.4%) whereas in rural were nearly half (45.3%).In urban there was 0.480 times less likely to have past smoker than at rural area which is also significantly different (*p*=0.016).

Table 3 reveals that slightly more than two-thirds (67.4%) of urban adults and more than half (58.9%) of rural adults had consumed alcohol. Among drinker's, 57.8% were urban adults who drink alcohol in past 12 months while 60.7 % were rural adults respectively .During past 30 days, almost two-fifth (39.1%) of urban adults and almost half (48.2%) of rural adults drink alcohol.

Table 4 depicts, in urban nearly 60% adults consumed fruits less than 3 days per week whereas, in rural almost all (94.7 %) adults consumed fruits less than 3 days per week. In urban there was 0.80 times less likely to consume fruits less than 3 days per week than the rural adults which is also significantly different at 5% significance level. Almost all of urban and rural adults (95.8% and 95.8% respectively) consumed vegetables more than 3 days per week .However in terms of vegetable serving per day, 88.4% of urban adults consumed less than equal to three servings of vegetables whereas in rural 70.5% adults consumed less than equal to three servings of vegetables which is also significantly different at 5% significance level. More than three-quarters (78.9% and 77.9%) of urban and rural adults consumed less than recommended five servings of fruits and vegetables daily.

Table 5 shows just over one fifth (22.1%) of urban adults were performing vigorous intensity work while in rural, more than half (55.8%) adults were performing vigorous intensity work. Urban adults were 0.225 times less likely to perform vigorous intensity work than rural adults which is also significantly different at 5% significance level. More than three-quarters (77.9%) of urban were engaged in moderate intensity work whereas more than four-fifths (87.4%) of rural adults were engaged in moderate intensity work. Most of urban adults (66.3%) uses vehicle for transportation whereas in rural most of them walk (68.4%).Urban adults were 0.234 times less likely to walk than rural adults which is also significantly different at 5% significance level. Regarding recreational activities, majority of urban and rural adults (81.1% and 84.2% respectively) were not engaged in vigorous intensity recreational activities Majority of urban and rural adults (80%) and 82.1% respectively) were not engaged in moderate intensity recreational activity.

Table 6 shows WHO recommendation for physical activity .Most of the urban and rural adults had adequate physical activity (i.e. >600MET).Around one quarter (26.3%) of urban and more than one-tenth (13.7%) of rural adults had inadequate physical activity (i.e. <600 MET). With compare to adequate physical activity, those who live in urban were 3.413times more likely to have inadequate physical activity which is significantly different at 5 % significance level (*p*=0.002).

Table 7 indicates body mass index and blood pressure of the urban and rural adults. About half (50.5%) of the urban had normal weight and more than two third (68.4 %) of rural had normal weight however regarding obesity, urban were more than double (16.8%) than rural adults (6.3%). Regarding systolic blood pressure, more than half (of urban 58.9%) adults and rural adult (61.1%) had normal reading. One third of urban and rural adults (31.6% and 34.7% respectively) were pre-hypertensive. About 9.5% of urban adults and 4.3% of rural adults had increase systolic hypertension followed by 14.8% of urban adults and 6.4% of rural adults had increase diastolic blood pressure. About half (50%) of the urban had normal diastolic blood pressure whereas in rural there was 63.2%.

Table 8 reveals that nearly half (46.3 %) of urban adults had BMI greater than equal to 25 kg/ m^2 (i.e. more over weight and obese) whereas majority (78.9%) of rural adults had BMI less than 25 kg/ m^2. urban adults were 3.235 times more likely to be overweight than rural adults which is also significantly different at 5% significance level (*p* value is <0.003).

Table 9 shows association between current tobacco smoking with demographic characteristics of urban and rural adults .In urban, male adults were 9.730 times more likely to be current smoker than female which is also significantly different at 5% significance level(i.e. *p* value is 0.001). Similarly in rural, male adults were 5.922 times more likely to be current smoker than female which is also significantly different at 5% significance level(i.e. *p* value <0.001). In rural, whose education up to primary level were 3.161 times more likely to be current smoker than those above secondary levels which is also significantly different at 5% significance level (i.e. *p*=0.014). However there was no significant association between age group with current smoking among both study population.

Table10 depicts the association between overweight with demographic characteristics of urban and rural adults. In rural, 40 and above age group were 3.312 times more likely to have overweight than less than 40 years of age group which is also significantly different at 5% significance level (i.e. *p* = 0.023).Whereas in urban, above age group were 2 times more likely to have overweight than less than 40 years of age group but the association is statistically insignificant at 5 % level. However there was no significant association between sex and educational status with overweight among both study population.

Table 11 depicts the association between hypertension with demographic characteristics of urban and rural adults .In urban, 40 and above age group were 1.800 times more likely to have hypertension than below 40 years of age group. Similarly, in rural 40 and above age group were 2.88 times more likely to have hypertension than below 40 years of age group. In urban, male were 2.51 times more likely to have hypertension than female .Similarly in rural, male was 1.179 times more likely to have hypertension than female. In urban, whose education up to primary level was 0.66 times less likely to have hypertension than those with education above secondary .But in rural, whose education up to primary level was 1.48 times more likely to have hypertension than whose education above secondary. However, there were no significant associations between age group, sex and educational status with hypertension among both study population.

Discussion

A descriptive cross sectional study was carried out to find out the status of risk factors on cardiovascular disease between urban and rural adults of Lalitpur district.

Findings Regarding Consumption of Tobacco Products

In present study current smoker were more among rural (43.2%) as compare to urban area (23.2%) and there was significant associations between rural and urban adults. This finding is supported by study conducted in Central India by Bhadoria et al. (2014) where significantly higher prevalence of tobacco smoking was found in rural subjects (24.9%) as compared to urban subjects (9.7%) .Similarly a study conducted by Noor, Norazman, Diana, Khairul and Rosnah (2016) in Malaysia showed that those residing in rural areas were significantly more likely to smoke cigarettes compared to adults in urban.

The present study showed association of smoking with sex and education in urban and rural adults. Male were more likely to smoke than female in both urban and rural area (*p*=0.001 and *p*=<0.001 respectively). Similarly rural adults with lower education were more likely to smoke than those with higher education (*p*=0.014).

This finding is similar with the finding of Shan, Jump and Lancet (2012) which showed a significant positive association between smoking and sex among both urban and rural population (*p*<0.05) and there was positive association between smoking and educational status in rural population (*p*<0.01).

Findings Regarding Alcohol consumption

Current study showed the proportion of adults consuming alcohol was slightly higher in rural (48.2%) area compared to urban area (39.1%) but the association is statistically insignificant. Our finding was consistent with similar study conducted by Dhungana et al. (2014) were prevalence of current use of alcohol among rural adults was 47.8 %. Likewise the study conducted in urban slum of Kathmandu showed the prevalence of current alcohol consumption was 38.5 % (Oli, et al., 2013) which is similar to the finding of present study. Similar findings were reported by Bhadoriaet al. (2014) with the more proportion of rural (26.7%) population consuming alcohol compared to urban (21.7%) population. There was an insignificant difference in alcohol consumption.

Findings Regarding Dietary Pattern

Regarding fruit consumption in urban the mean days of fruit consumption in the present study was 3.28 days per week with a mean serving of fruit 1.24 per day while in rural it was 1.03 days per week with a mean serving of fruit 0 per day respectively. There was significant difference between rural and urban fruit consumption per week (P=<0.001). While the study conducted in urban area of Kathmandu by Katel (2015) revealed that mean days of fruit consumption was 3.15 per week with mean serving 1.75 per day which is closer with the present study. Present finding related to rural is contradictory to the findings of the study conducted in remote rural by Dhungana et al. (2014) showed that mean days of fruits consumed per week were 2.4 days and a mean fruits serving per day was 0.48.Complete reliance on seasonal fruits might be a reason.

Similarly a study conducted by Logaraj, Balaji, Jojn and Hegde (2014) with significant difference(*p*=<0.0001) in average consumption of fruits per week between rural and urban area and mean number of days when fruits were consumed was higher in case of urban (3.88 days per week) as compared to that rural population(2.70 days per week).

Regarding vegetable consumption, in urban the mean vegetable consumption of the present study was 6.60 days per week with mean serving of vegetables consumed on average day was 2.49 which is similar to the study done in Kathmandu by Katel (2015) showed that the mean vegetable consumption was 6.42 days per week with mean serving of vegetables consumed on average day was 2.71. Similarly, in rural the mean vegetable consumption of the present study was 6.62 days per week with mean serving of vegetables consumed on average day was 3.03. The findings of Aryal et al. (2014) shows the mean number of days of vegetables consumed was 4.8 and the mean serving of vegetables consumed on average per day was 1.4. The dissimilarity in the finding may be due to small sample size of the present study.

More than five servings of fruit and vegetables are recommended for healthy living, but higher (approximately 80%) prevalence of urban and rural adults consumed less than the recommended five servings of fruits and vegetables daily in the study, which was also consistent with results of Aryal et al. (2015) where both study population (urban and rural) had a higher prevalence of insufficient fruit and vegetable intake. Another study by Hall ,Moore, Harper and Lynch (2009) in low- and middle-income countries (77.6% of men and 78.4% of women) consumed less than the minimum recommended five daily servings of fruits and vegetables which also support the present findings. But there was comparatively lower prevalence in China conducted by Li et al. (2013) showed 47.7% from urban & 54.9 % from rural respondents were consuming insufficient intake of fruit and vegetables which is inconsistent with the finding of present study. Low consumption of fruits and vegetable might be due to low socioeconomic status, lack of knowledge which has to be changed with awareness of importance of fruits and vegetables.

Findings Regarding Physical Activity

This study revealed that 26.3 % of urban and 13.7 % of rural adults were inactive as they expended less than 600 MET per week. Similarly, the study done by Bhadoria, et al. (2014) in Central India showed the prevalence of physical inactivity among urban and rural respondents were 35% and 23.5% respectively (urban are more inactive than rural respondents)

Likewise the study conducted in Nepal by Aryal, et al. (2015) showed 3.1% and 4.8% from rural and urban respectively had low physical activity. This finding is lower than the present study. The higher prevalence of low physical activity in present study may be due to unplanned and rapid urbanization, high population density, and increased use of motorized vehicles and, modern technology could be predisposing factors for low physical activity among urban population and rural VDC is also nearer from the sub metropolitan city(Vaidya & Krettek, 2014).

Findings Regarding Overweight and Obesity

In this study the mean BMI of urban and rural adults were 25.69 (±4.17) and 22.41(±4.03) respectively. Urban residents had a significantly higher (46.3%) prevalence of being overweight or obese in comparison to rural (21.1%) residents (OR=3.235, *p*=<0001). Similar finding was shown in a cross sectional study conducted by Bhadoria, et al. (2014) showed that significantly higher mean values of BMI, were observed in urban 22.35 (±4.57) dwellers than in the rural subjects19.86(±3.65) and a significantly higher proportion of overweight and obesity were observed in urban with compare to rural area (*p*=<0001).

Another study conducted in Nepal by Aryal, et al. (2015) also supports the present findings, which revealed that a higher prevalence of overweight and obesity was observed among respondents who resided in the urban areas (31%) compared to those who resided in the rural areas (19%) (OR=1.39, *p*= <0.001).

In the present study overweight and obesity was more among the higher age group (40 and above) of rural adults showing statistical significance (*p*= 0.023). But there was no significant association in urban adults with regards to age. However in another study done by Doku and Neupane(2015) in Ghana, reported that older age(above 35 years age) was found to be associated with overweight/obesity among both rural and urban residents.

Findings Regarding Hypertension

In this study the mean systolic blood pressure of urban and rural adults were 114.37 mm of Hg and 110.42 respectively and mean diastolic blood pressure were 75.34 mm of Hg and 73.61 mm of Hg respectively which is different to the findings of Okpechi et al.(2013) which showed the mean systolic blood pressure of urban and rural population were 133.7 and 134.9 mm of Hg respectively whereas mean diastolic blood pressure were 77.45 and 77.95 mm of Hg respectively. This disparity in findings might be due to differences in the study populations or could be small sample size of the present study as that study included 2,983 populations.

The prevalence of hypertension in the study was 17.9% and 10.5% in urban and rural area respectively i.e more in urban area and there was no significance difference between them. This finding is similar with the study conducted in South India by Ismail, Kulkarni, Meundi, and Amruth (2016) reported that among 300 adults, there was higher prevalence of hypertension in urban (23.7%) area than rural and (18.3%) area .This difference might be due to based on the difference in the methodology used and place of study. But present rural prevalence of hypertension was similar to those given by the Office of the Register General of India (10.0%)(Puram et al., 2010).There was no significant difference in the frequency of hypertension in urban and rural areas (Okpechi, et al., 2013).

Conclusion

Based on the findings it can be concluded that participants in urban area are more likely to have higher CVD risk factors compared to rural population. Insufficient fruit and vegetables intake, inadequate physical activity, overweight and obesity and hypertension were more common in urban adult population whereas use of smoking and alcohol consumption was found to be more among rural adults. Similarly, in both urban and rural area male were more likely to smoke tobacco than female and in rural area overweight were higher in 40 and above years likewise, use of smoking was higher among those with education up to primary level .Despite the higher prevalence of almost risk factors in urban areas, rural areas are also not far behind. Therefore, there is necessary to raise awareness regarding CVD risk factors and develop guidelines for screening CVD and promote preventive programmes related to CVD.

Limitations

Could not study other proven cardiovascular risk factors, such as stress, waist circumference, lipid profiles and blood glucose levels

The assessment of blood pressure measurements have been performed in a single day, which may overestimate the prevalence of high blood pressure.

Non- probability purposive sampling technique was used for selection of sample, which lacks randomization. Hence, sampling selection bias might occur.

References

Adhikari, K., & Gupta, N. (2014). Tobacco use: A Major Risk Factor for Non-Communicable Diseases in Central Nepal. Research Journal of Pharmaceutical, Biological and Chemical Sciences, 5(2). Available at: http://www.rjpbcs.com/pdf/2014_5 (2)/ [3].pdf [Accessed 12 Nov. 2016]

Alwan, A. (2011). Global status report on noncommunicable diseases 2010 Geneva, Switzerland: World Health Organization. Available at: http://apps.who.int/iris/bitstream/10665/44579/1/9789240686458_eng.pdf [Accessed 18 Nov. 2016]

American Heart Association (2015). Smoking: Do you really know the risks? Available at: http://www.heart.org/HEARTORG/HealthyLiving/QuitSmoking/QuittingSmoking/Smoking-Do-you-really-know-the-risks_UCM_322718_Article.jsp#.WMC25_l97IU [Accessed 18 Nov. 2016]

Aroor, B., Trivedi, A., & Jain, S. (2013). Prevalence of risk factors of non-communicable diseases in a District of Gujarat, India. Journal of Health, Population and Nutrition, 31(1), 78-85.

Aryal, K., Neupane, S., Mehata, S., Vaidya, A., Singh, S., Paulin, F., Lohani, G. (2014). Non communicable diseases risk factors: STEPS Survey Nepal 2013. Kathmandu: Nepal Health Research Council.

Aryal, K. K., Mehata, S., Neupane, S., Vaidya, A., Dhimal, M., Dhakal, P., . . . Paulin, F. H. (2015). The burden and determinants of non communicable diseases risk factors in Nepal. PLoS One, 10(8), e0134834. doi: 10.1371/journal.pone.0134834

Bhadoria, A. S., Kasar, P. K., Toppo, N. A., Bhadoria, P., Pradhan, S., & Kabirpanthi, V. (2014). Prevalence of hypertension and associated cardiovascular risk factors in Central India. Journal of Family and Community Medicine, 21(1), 29. doi: 10.4103/2230-8229.128775

Bloom, D. E., Cafiero, E., Jané-Llopis, E., Abrahams-Gessel, S., Bloom, L. R., Fathima, S., Mowafi, M. (2012). The global economic burden of noncommunicable diseases.Geneva: World Economic Forum.

Central Bureau of Statistics (2012). National population census 2011 household and population_by_sex_ward level. Available at: http://cbs.gov.np/image/data/Population/Ward%20 Level/25Lalitpur_WardLevel.pdf [Accessed 20 Oct. 2016]

Chauhan, S., & Aeri, B. T. (2015). The rising incidence of cardiovascular diseases in India. Journal of Preventive Cardiology 4(4), 735-739. Available at: http://www.journalofpreventivecardiology.com/pdf/Lastpdp/rising_incidence_4_2015.pdf [Accessed 18 Nov. 2016]

Cochran W. (1977), Sampling technique (3 rd ed.), New York: John Wiley & Sons.

Dhungana, R. R., Devkota, S., Khanal, M. K., Gurung, Y., Giri, R. K., Parajuli, R. K., Shayami, A. (2014). Prevalence of cardiovascular health risk behaviors in a remote rural community of Sindhuli district, Nepal. BMC cardiovascular disorders, 14(1), 92. doi: 10.1186/1471-2261-14-92

Doku, D. T., & Neupane, S. (2015). Double burden of malnutrition. BMC public health, 15(1), 670. doi: 10.1186/s12889-015-2033-6

Fuster, V. (2014). Global Burden of Cardiovascular Disease :Time to Implement Feasible Strategies and to Monitor Results. Journal of the American College of the Cardiology, 64(5), 520. doi: doi.org/10.1016/j.jacc.2014.06.1151

Hall, J. N., Moore, S., Harper, S. B., & Lynch, J. W. (2009). Global variability in fruit and vegetable consumption. American journal of preventive medicine, 36(5), 402-409. e405. doi: 10.1016/j.amepre.2009.01.029

Holmes, M. V., Dale, C. E., Zuccolo, L., Silverwood, R. J., Guo, Y., Ye, Z., Wong, A. (2014). Association between alcohol and cardiovascular disease: Mendelian randomisation analysis based on individual participant data. British Medical Journal, 349, g4164. doi: 10.1136/bmj.g4164

Ikehara, S., Iso, H., Yamagishi, K., Kokubo, Y., Saito, I., Yatsuya, H., Group, J. S. (2013). Alcohol consumption and risk of stroke and coronary heart disease among Japanese women. Preventive medicine, 57(5), 505-510.

Ismail, I. M., Kulkarni, A. G., Meundi, A. D., & Amruth, M. (2016). A community-based comparative study of prevalence and risk factors of hypertension among urban and rural populations in a coastal town of South India. Sifa Medical Journal, 3(2), 41. doi: 10.4103/2148-7731.182001

Katel, B. (2015). Behavioural Risk Factors of Non-Communicable Diseases Among Adult Women in Kathmandu. Available at:http://www.grin.com/en/e-book/306178/behavioural-risk-factors-of-non-communicable-diseases-among-adult-women [Accessed 18 Jan. 2017]

Koju, R. (2013). Cardiovascular Professionals for Services Provision in Nepal. Nepalese Heart Journal 8(1). Available at: http://www.csn.org.np/journalpdf/nhj2012.pdf [Accessed 18 Jan. 2017]

Kumar, A. (2014). Changing trends of cardiovascular risk factors among Indians: a review of emerging risks. Asian Pacific Journal of Tropical Biomedicine, 4(12), 1001-1008.

Lima, M. C. P., Kerr-Côrrea, F., & Rehm, J. (2013). Alcohol consumption pattern and coronary heart disease risk in metropolitan São Paulo. Revista Brasileira de Epidemiologia, 16(1), 49-57.

Li, Y., Wang, L., Jiang, Y., Zhang, M., & Wang, L. (2013). Risk factors for noncommunicable chronic diseases in women in China.. Bulletin of the World Health Organization, 91(9), 650-660.

Logaraj, M., Balaji, R., John, K. R., & Hegde, S. K. B. (2014). Comparative Study on Risk Factors for cardiovascular Diseases between Urban and Rural Population in Tamil Nadu .National Journal of Research in Community Medicine, 3(2), 103-112. http://www.commedjournal.in/article/Volume3Issue2Apr Jun2014/fulltext/3Loguraj_corrected.pdf

Mansikkaniemi, K., Juonala, M., Taimela, S., Hirvensalo, M., Telama, R., Huupponen, R., Benessiano, J. (2012). Cross-sectional associations between physical activity and selected coronary heart disease risk factors in young adults.Annals of medicine, 44(7), 733-744.

Marmot, M. (2011). Fruit and vegetable intake reduces risk of fatal coronary heart disease. European heart journal, 32(10), 1182-1183.

Mathers, C. D., & Loncar, D. (2006). Projections of global mortality and burden of disease from 2002 to 2030. Plos med, 3(11), e442. doi: http://dx.doi.org/10.1371/journal.pmed.0030442

Mendis, S., Puska, P., & Norrving, B. (2011). Global atlas on cardiovascular disease prevention and control. Available at: http://apps.who.int/iris/handle/10665/44701

Mishra, S. R., Neupane, D., Bhandari, P. M., Khanal, V., & Kallestrup, P. (2015). Burgeoning burden of non-communicable diseases in

Nepal.Globalization and health, 11(1), 32. doi: 10.1186/s12992-015-0119-7

Nadeem, M., Ahmed, S. S., Mansoor, S., & Farooq, S. (2013). Risk factors for coronary heart disease in patients below 45 years of age. Pakistan Journal of Medical Sciences, 29(1), 91. doi: 10.12669/pjms.291.2828

National Health Research Council. (2010). Prevalence of non-communicable diseases in Nepal, Hospital based study. Kathmandu: Nepal Health Research Council.

Noor, H. I., Norazman, M., Diana, M., Khairul, H. Y., & Rosnah, I. (2016). Cardiovascular risk assessment between urban and rural population in Malaysia. The Medical journal of Malaysia, 71(6), 331.

Okpechi, I. G., Chukwuonye, I. I., Tiffin, N., Madukwe, O. O., Onyeonoro, U. U., Umeizudike, T. I., & Ogah, O. S. (2013). Blood pressure gradients and cardiovascular risk factors in urban and rural populations in Abia State South Eastern Nigeria using the WHO STEPwise approach. PLoS One, 8(9), e73403. doi: http://dx.doi.org/10.1371/journal.pone.0073403

Oli, N., Vaidya, A., & Thapa, G. (2013). Behavioural risk factors of noncommunicable diseases among Nepalese urban poor. Epidemiology Research International, 2013. doi: 10.1155/2013/329156

Park, J.-E., Choi, T.-y., Ryu, Y., & Cho, S.-I. (2015). The relationship between mild alcohol consumption and mortality in Koreans. BMC public health, 15(1), 918. doi: 10.1186/s12889-015-2263-7

Pender, N. J. (1996). Health promotion in nursing practice (3rd ed.). Stamford ,CT: Appleton & Lange Stanford.

Puram, R. K., Sikri , D., Chandramouli, C., Sethi, R., Mishra, B., Jain , S., . . . Banthia , J. (2010). Report on Causes of Deaths in India 2001-2003 (pp. 42-45). New Delhi: Ministry of Health and Family Welfare

Shahi, M., Rai, L., Adhikari, R. D., & Sharma, M. (2013). Prevalence and factors associated with obesity among adult women of Nepal. Global Journal of Medicine and Public, GJMEDPH, 2(4), 1-9.Available at:: http://citeweb.info/20132953546

Shahid Gangalal National Heart Centre. (2014). Annual Report 2013. Available at: http://www.sgnhc.org.np/wp-content/uploads/2016/12/Annual-Report-2014-final.pdf

Shahid Gangalal National Heart Centre. (2015). Annual Report 2015. Available at: http://www.sgnhc.org.np/wp-content/uploads/2016/12/Annual-Report 2015.pdf

Shakya, S., Timilsina, M., Timilsina, K., Lamsal, M., Dhakal, S., & Neupane, P. (2012). Hypertension among Young Adults in the Shopping Malls of Kathmandu. Nepalese Heart Journal, 9(1). Available at:: www.nepjol.info/index.php/NHJ/article/view/8346

Shan, M., Jump, Z., & Lancet, E. (2012). Urban and rural disparities in tobacco use. National Conference on Health Statistics. Available at:_https://www.cdc.gov/nchs/ppt/nchs2012/SS-33LANCET.pdf

Sharma, P., Murthy, P., & Shivhare, P. (2015). Nicotine quantity and packaging disclosure in smoked and smokeless tobacco products in India. Indian journal of pharmacology, 47(4), 440. doi: 10.4103/0253-7613.161273

Tamrakar, R., Bhatt, Y. D., Kansakar, S., Bhattarai, M., Shaha, K. B., & Tuladhar, E. (2013). Acute Myocardial Infarction in Young Adults.Nepalese Heart Journal, 10(1), 12-16.Available at::http://www.nepjol.info/index.php/NHJ/article/viewFile/9740/8002

The Heart Foundation. (n.d). Heart Disease: Scope and Impact. Rerived from http://www.theheartfoundation.org/heart-disease-facts/heart-disease-statistics/

Vaidya, A., Aryal, U. R., & Krettek, A. (2013). Cardiovascular health knowledge, attitude and practice/behaviour in an urbanising community of Nepal. BMJ open, 3(10), e002976. doi: 10.1136/bmjopen-2013-002976

Vaidya, A., Oli, N., Aryal, U. R., Karki, D., & Krettek, A. (2014). Disparties in fruit and vegetable intake by Socio-demographic characteristics in peri-urban Nepalese adults.Journal of Kathmandu Medical College, 2(1), 3-11. doi: http: //dx.doi.org/10.3126/jkmc.v2i1.10512

Vaidya, A., & Krettek, A. (2014). Physical activity level and its socio-demographic correlates in a peri-urban Nepalese population. International journal of behavioral nutrition and physical activity, 11(1), 39. doi: 10.1186/1479-5868-11-39

Wang, X., Ouyang, Y., Liu, J., Zhu, M., Zhao, G., Bao, W., & Hu, F. B. (2014). Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer. BMJ, 349, g4490. doi: https://doi.org/10.1136/bmj.g4490

Warburton, D. E., Nicol, C. W., & Bredin, S. S. (2006). Health benefits of physical activity: the evidence. Canadian medical association journal, 174(6), 801-809. doi:10.1503/cmaj.051351

World Heart Federation. (2011). Quick Facts on physical inactivity. Available at::http://www.world-heart-federation.org/heart-facts/fact-sheets/cardiovascular-disease-risk-factors/quick-facts-on-physical-inactivity/ World Health Organization. (2006). BMI Classification. Available at: http://apps.who.int/bmi/index.jsp?introPage=intro_3.html

World Health Organization. (2011). Non-communicable Diseases in the South-East Asia Region. Available at::http://www.searo.who.int/nepal/mediacentre/2011_non_communicable_diseases_in_the_south_east_asia_region.pdf?ua=1

World Health Organization. (2012).Global Strategy on Diet,Physical Activity and Health. Available at: : http://www.who.int/dietphysicalactivity/fruit/en/

World Health Organization. (2013). A global brief on hypertension: silent killer, global public health crisis. Available at:: http://ish-world.com/downloads/pdf/global_brief_hypertension.pdf

World Health Organization. (2016a). Cardiovascular diseases (CVDs). Available at:: http://www.who.int/mediacentre/factsheets/fs317/en/

World Health Organization. (2016b). Noncommunicable diseases. Available at:: http://www.who.int/mediacentre/factsheets/fs355/en/

Table 1: Demographic Characteristics of Urban and Rural adults

Demographic characteristics	Urban (n=95)		Rural (n=95)	
	Number	Percentage	Number	Percentage
Age Group (In Years)				
Less than 40	56	58.9	50	52.6
40 and above	39	41.1	45	47.4
Mean ±SD	37.59 ±10.16	39.0 ±12.63		
Sex				
Male	57	60.0	44	46.3
Female	38	40.0	51	53.7
Educational Status				
Unable To Read And Write	6	6.3	43	45.3
Able To Read And Write	7	7.4	8	8.4
Primary Level	2	2.1	8	8.4
Secondary Level	20	21.1	25	26.3
Higher Secondary Level	34	35.8	8	8.4
Bachelor And Above	26	27.4	3	3.2

Table 2: Smoking Status of Urban and Rural adults

Variables	Urban (n=95) n (%)	Rural (n=95) n (%)	OR (95%CI)	*p*-value
Current Smoker				
Yes	22(23.2)	36(37.9)	0.494(0.212-0.742)	**0.027**
No	73(76.8)	59(62.1)	(Reference)	
Past Smoker				
Yes	27(28.4)	43(45.3)	0.480(0.263-0.876)	**0.016**
No	68(71.6)	52(54.7)	(Reference)	

p-value significant at<0.05,OR:Odds Ratio, CI: Confidence Interval

Table 3: Alcohol consumption of Urban and Rural Adults

Variables	Urban(n=95) n (%)	Rural(n=95) n (%)	OR (95% CI)	*p*-value
Ever drink				
Yes	64(67.4)	56(58.9)	1.438(0.795-2.600)	0.229
No	31(32.6)	39(41.1)	Reference	
Drink in past 12 months				
Yes	37(57.8)	34(60.7)	0.689 (0.333-1.423)	0.313
No	27(42.2)	22(39.3)	Reference	
Drink in past 30 days				
Yes	25(39.1)	27(48.2)	0.8870.427-1.841	0.747
No	39(60.9)	29(51.8)	Reference	

OR: Odds Ratio, CI: Confidence Interval

Table 4: Consumption of Fruits and Vegetables of Urban and Rural adults

Variables	Urban (n=95) n (%)	Rural (n=95) n (%)	OR (95% CI)	*p*-value
Fruit Consumption (Days/week)				
≤3	56(58.9)	90(94.7)	0.80 (0.30-0.214)	**<0.001**
>3	39(41.1)	5(5.3)	Reference	
Mean ±SD	3.28±2.16	1.03±1.12		
Fruit Serving/ day				
≤3	94(98.9)	95(100.0)	- -	0.316[1]
>3	1(1.1)	0(0.0)		
Mean ±SD	1.24±0.73	0.65±0.58		
Vegetables Consumption (Days/week)				
≤3	4(4.2)	4(4.2)	1.000 (0.243-4.11)	1.000[1]
>3	91(95.8)	91(95.8)	Reference	
Mean ±SD	6.60±1.06	6.62±1.13		
Vegetable Servings/ day				
≤ 3	84(88.4)	67(70.5)	3.191 (1.481-6.87)	**0.002**
>3	11(11.6)	28(29.5)	Reference	
Mean ±SD	2.49±0.76	3.03±0.92		
Combined Fruits and vegetables Consumption /day				
< 5	78.9 (78.9)	74(77.9)	1.064 (0.533-2.15)	0.860
≥ 5	20(21.1)	21(22.1)	Reference	
Mean±SD	3.74±1.13	3.68±1.11		

p-value significant at<0.05, OR: Odds Ratio, CI: Confidence Interval l: linear by linear association

Table 5: Status of Physical Activities of Urban and Rural adults

Variables	Urban(n=95)	Rural (n=95)	OR (95% CI)	*p*-value
	n (%)	n(%)		
Vigorous Intensity Work				
Yes	21(22.1)	53(55.8)	0.225 (0.120-0.423)	**<0.001**
No	74(77.9)	42(44.2)	Reference	
Moderate-Intensity Work				
Yes	74(77.9)	83(87.4)	0.509 (0.235-1.106)	0.85
No	21(22.1)	12(12.6)	Reference	
Use Of Transportation				
Walking	32(33.7)	65(68.4)	0.234 (0.128-0.430)	**<0.001**
Vehicle	63(66.3)	30(31.6)	Reference	
Vigorous Intensity Recreational Activity				
Yes	18(18.9)	15(15.8)	1.247 (0.587-2.648)	0.566
No	77(81.1)	80(84.2)	Reference	
Moderate-Intensity Recreational Activity				
Yes	19(20.0)	17(17.9)	1.147 (0.555-2.372)	0.711
No	76(80.0)	78(82.1)	Reference	

p-value significant at<0.05, OR: Odds Ratio, CI: Confidence Interval

Table 6: Physical activity according to WHO recommendation of Urban and Rural Adults

Variables	Urban (n=95)	Rural (n=95)	OR (95% CI)	*p*-value
	n (%)	n (%)		
WHO recommended physical activity				
Inadequate (< 600 MET)	25(26.3)	13(13.7)	3.413 (1.496-7.785)	**0.002**
Adequate (≥600 MET)	70(73.7)	82(86.3)	Reference	

p-value significant at<0.05,OR: Odds Ratio, CI: Confidence Interval, MET= Metabolic Equivalent

Table 7: Physical Health Characteristics of Urban and Rural Adults

Variables	Urban (n=95)		Rural (n=95)	
	Number	Percentage	Number	Percentage
BMI Status				
Under Weight	2	2.1	14	14.7
Normal Weight	48	50.5	65	68.4
Over Weight	29	30.5	10	10.5
Obesity	16	16.8	6	6.3
Mean ±SD	25.69±4.17		22.41±4.03	
Range	18-35.87		15-34.34	
Systolic Blood Pressure				
Normal	56	58.9	58	61.1
Prehypertension	30	31.6	33	34.7
Hypertension Stage 1	6	6.3	3	3.2
Hypertension Stage 2	3	3.2	1	1.1
Mean ±SD	114.37±17.19		110.42±18.15	
Range	80-170		50-160	
Diastolic Blood Pressure				
Normal	48	50.5	60	63.2
Prehypertension	33	34.7	29	30.5
Hypertension Stage 1	11	11.6	5	5.3
Hypertension Stage 2	3	3.2	1	1.1
Mean ±SD	75.34±10.95		73.61±10.26	
Range	60-110		50-100	

BMI: Body Mass Index

Table 8: Overweight and Blood Pressure Status of Urban and Rural adults

Variables	Urban(n=95)	Rural(n=95)	OR (95%CI)	*p*-value
	n (%)	n (%)		
BMI status				
$\geq 25 kg/m^2$	44(46.3)	20(21.1)	3.235(1.711-6.118)	**<0.001**
$< 25 kg/m^2$	51(53.7)	75(78.9)		
Blood Pressure				
Hypertensive	17(17.9)	10(10.5)	1.853(0.800-4.289)	0.146
Non-hypertensive	78(82.1)	85(89.5)		

p-value significant at<0.05, OR: Odds Ratio CI: Confidence Interval, overweight: BMI ≥ 25(includes obesity)

Table 9: Association between Current Tobacco Smoking with Demographic Characteristics of Urban and Rural Adults

Study Population	Characteristics	Tobacco Smoking No n (%)	Tobacco Smoking Yes n (%)	OR (95% CI)	*p*-value
	Age group (in years)				
Urban(n=95)	Less than 40	44(78.6)	12(21.4)	(Reference)	0.632
	40 and above	29(74.4)	10(25.6)	1.264(0.484-3.306)	
Rural (n=95)	Less than 40	35(70.0)	15(30.0)	(Reference)	0.095
	40 and above	24(53.3)	21(46.7)	2.042(0.880-4.738)	
	Sex				
Urban(n=95)	Female	36(94.7)	2(5.3)	(Reference)	**0.001**
	Male	37(64.9)	20(35.1)	9.730(2.119-44.676)	
Rural (n=95)	Female	41(80.4)	10(19.6)	(Reference)	**<0.001**
	Male	18(40.9)	26(59.1)	5.922(2.370-14.801)	
	Education status				
Urban(n=95)	Above Secondary	61(76.2)	19(23.8)	(Reference)	0.749 (L)
	Up to Primary	12(80.0)	3(20.0)	0.803(0.205-3.146)	
Rural (n=95)	Above Secondary	28(77.8)	8(22.2)	(Reference)	**0.014**
	Up to Primary	31(52.5)	28(47.5)	3.161(1.238-8.071)	

p- value significant at<0.05L-Likelihood Ratio, OR: Odds Ratio CI: Confidence Interval

Table 10: Association between Overweight with Demographic Characteristics of Urban and Rural Adults

Study Population	Characteristics	Overweight No n (%)	Overweight Yes n (%)	OR (95% CI)	*p*-value
	Age group (in years)				
Urban(n=95)	Less than 40	34(60.7)	22(39.3)	(Reference)	0.100
	40 and above	17(43.6)	22(56.4)	2.00 (0.872-4.585)	
Rural (n=95)	Less than 40	44(88.0)	6(12.0)	(Reference)	**0.023**
	40 and above	31(68.9)	14(31.1)	3.31(1.146-9.569)	
	Sex				
Urban(n=95)	Female	17(44.7)	21(55.3)	(Reference)	
	Male	34(59.6)	23(40.4)	0.54(0.239-1.256)	0.153
Rural (n=95)	Female	41(80.4)	10(19.6)	(Reference)	
	Male	34(77.3)	10(22.7)	1.20(0.449-3.237)	0.710

	Education status				
Urban(n=95)	Above Secondary	43(53.8)	37(46.2)	(Reference)	
	Up to Primary	8(53.3)	7(46.7)	1.01(0.337-3.072)	0.976
Rural (n=95)	Above Secondary	31(86.1)	5(13.9)	(Reference)	
	Up to Primary	44(74.6)	15(25.4)	2.11(0.695-6.424)	0.181

p-value significant at<0.05, OR: Odds Ratio ,CI: Confidence Interval

Table 11: Association between Hypertension with Demographic Characteristics of Urban and Rural Adults

Study Population	Characteristics	Hypertension		Odd ratio (95% CI)	*p*-value
		No n (%)	Yes n (%)		
	Age group (in years)				
Urban(n=95)	Below 40	48(85.7)	8(14.3)	(Reference)	0.271
	40 and above	30(76.9)	9(23.1)	1.80(0.626-5.175)	
Rural (n=95)	Below 40	47(94.0)	3(6.0)	(Reference)	0.126(L)
	40 and above	38(84.4)	7(15.6)	2.88(0.699-11.921)	
	Sex				
Urban(n=95)	Female	34(89.5)	4(10.5)	(Reference)	0.116(L)
	Male	44(77.2)	13(22.8)	2.51(0.751-8.394)	
Rural (n=95)	Female	46(90.2)	5(9.8)	(Reference)	0.805
	Male	39(88.6)	5(11.4)	1.17(0.318-4.376)	
	Education status				
Urban(n=95)	Above Secondary	65(81.2)	15(18.8)	(Reference)	0.605(L)
	Up to Primary	13(86.7)	2(13.3)	0.66(0.136-3.273)	
Rural (n=95)	Above Secondary	33(91.7)	3(8.3)	(Reference)	0.58(L)
	Up to Primary	52(88.1)	7(11.9)	1.48(0.358-6.133)	

p-value significant at<0.05,OR:Odds Ratio, L-Likelihood Ratio; CI: Confidence Interval