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Behavioral Risk Factors for Non-Communicable Diseases (NCDs) among Adolescents in Mahalaxmi Municipality of Lalitpur District, Nepal: A School-Based Cross-Sectional Study

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ABSTRACT

Background: Non-communicable diseases (NCDs) are the leading causes of global mortality, with high prevalence in low- and middle-income countries. In Nepal, adolescents face rising NCD risk factors such as smoking, alcohol use, and poor diet.

Objective: To assess the prevalence of behavioural risk factors for non-communicable diseases and their association with socio-demographic characteristics among school-going adolescents of Mahalaxmi municipality of Lalitpur District, Nepal.

Methods: This cross-sectional descriptive study assessed the behavioural risk factors for non-communicable diseases among school adolescents in Mahalaxmi municipality, Lalitpur District. We used stratified random sampling to select 316 students from grades 11 and 12. We used Global school-based student health survey (GSHS) tools to collect data. We estimated prevalence of NCD risk factors among school adolescents. Binary logistic regression was applied to determine the factors associated with prevalence of NCDs risk factors.

Results: The prevalence of behavioural risk factors related to major non-communicable diseases including unhealthy diet, insufficient physical activity, alcohol consumption, and tobacco consumption are 99.4%, 94.3%, 7.9% and 6.6% respectively. The prevalence of at least two risk factors is 94.9%. The female school going adolescents were more likely to have prevalence of NCD risk factors (AOR: 6.12; 95% CI: 1.64, 22.80).

Conclusion: This study revealed a high prevalence of behavioural risk factors for non-communicable diseases (NCDs) among school adolescents, including unhealthy diets and insufficient physical activity. Majority of the participants had at least two NCD risk factors, which tends to persist into adulthood. To address this, the study recommends holistic, evidence-based interventions targeting these risk factors. Schools and local authorities should implement health education regarding healthy diet and physical activity, promotion of extracurricular activities, and nutritional programs in schools, and enforcement of laws against selling alcohol and tobacco to adolescents.

Keywords: Adolescents; Nepal; non-communicable diseases; risk factors

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BACKGROUND

Chronic diseases, sometimes referred to as non-communicable diseases (NCDs), are characterized by a protracted course and are brought on by a confluence of genetic, physiological, environmental, and behavioural factors. More than three quarters of all NCD fatalities worldwide (31.4 million) occur in low- and middle-income countries (LMICs), which are disproportionately affected by NCDs. Adults are at risk for developing NCDs due to risk factors such less nutritious food intake, physical inactivity,

exposure to tobacco use, and alcohol consumption which are detrimental to health (1).

The main public health issue in Nepal is currently shifting from infectious diseases to non-communicable diseases (NCDs). However, there is still gap in the concrete evidence in many parts of the country regarding the prevalence of NCDs and the underlying risk factors (2). People make harmful decisions during their adolescence and early adulthood that will impact many aspects of their lives in the future, including their longevity, health status, and expense of healthcare. The social and physical surroundings, as well as the way they live, learn, play, and work have a significant impact on these decisions (3). The main risk factors for NCD development in adolescence include negative behaviours and lifestyle, in particular, smoking, alcohol and drug use, unhealthy diet, and metabolic syndrome (4).

Adolescence is a transitional stage, and the health of adolescents is greatly influenced by their family, environment, and social environment (5). This makes this group a crucial target for early prevention (6) Schools are ideally situated to serve as role models, advocates, and reinforcers of good behaviors for kids and teenagers. Since the kids and teenagers spend most of their day in school, they can easily access the institutions health-related instructional activities. Schools serve as health hubs by disseminating knowledge on and encouraging healthy practices among students (7).

METHODS

Study design and participant selection

This was a descriptive cross-sectional study conducted among school students studying in grade 11 and 12 of Mahalaxmi Municipality of Lalitpur district. Lalitpur District was selected since there are limited studies conducted in this area. Out of total 12 schools in the municipality, 3 public and 3 private schools were selected randomly through lottery method. In both grades 11 and 12, an average of 48 Students from each public school and 58 students from each private school were chosen based on the proportionate distribution of the students in the selected public and private schools. Therefore, 45% students from public schools and 55% students from private schools were selected. Altogether, 316 students (142 from public schools and 174 from private schools) were randomly chosen based on the list of the students in the schools. In case of multiple sections in any grade, one section was randomly selected for the study.

Sample Size and sampling technique

Sample size was calculated by using the Cochrane's formula. We determined the sample size to be 316 under the following assumptions: finite population (N) of 1814, 95% confidence interval, a design effect of 2, an NCD prevalence (p) of 11.2% (8), allowable error (d) of 5% and a 10% non-response rate. We used cluster sampling to select the participants in which each school was considered as a cluster.

Variables and measures

The dependent variable for the study was the prevalence of NCD behavioural risk factors. It refers to the existence of at least two or more (out of the four) NCDs risk factors in an individual at the time of the data collection. The risk factors included: alcohol consumption, tobacco use, unhealthy diet, and physical inactivity (9). Alcohol consumption was defined as the current use of alcohol (at least one drink of alcohol on at least one day during the previous 30 days (9). Tobacco use was considered as currently using any tobacco product at least 1 day during the previous 30 days (9). Unhealthy diet includes having any of the following diet: Eating fruits and vegetables less than 5 times a day, eating from fast-food restaurants one or more days, and drinking carbonated soft drinks one or more times per day during the past 7 days (9). Sufficient physical activity was defined as being physically active at least 60 minutes per day during the past 7 days considering any type of physical activity that increased the heart rate and breathing of adolescents. Adolescents that practiced physical activities less than five times weekly were considered physically inactive (9).

The independent variables include socio-demographic characteristics which include age (in years; 15-17/18 or above), sex (male/female), grade (11/12), religion (Hindu/Buddhist/Christian/others), ethnicity (Brahmin/Chhetri/Janajati/Dalit/others), types of school (public/private), education of father and mother (uneducated/primary/secondary/higher secondary or above). Religion, ethnicity and education were re-categorized into dichotomous categories for carrying out logistic regression analysis.

Data collection technique and tool

After getting permission from the school authorities, informed written consent was obtained from the parents/guardians through class teachers and the forms were received back the following day. The next day, the self-administered questionnaire was provided to the students. Participants were made clear about the purpose of study and the value of their responses. Students were explained about importance to respond to each question and assured of maintaining confidentiality of the information and anonymity of the participant's identification. The seating arrangement

was made according to examination pattern to avoid information contamination. Any school's authority and teachers were not allowed to stay in the classroom while students were filling the given questionnaire. Students were given 15-20 minutes to complete the form. The data collection tool was adapted from the Global School-based Student Health Survey 2015 conducted by World Health Organization. The questionnaire has been validated for Nepal and is already used in Nepal in another study (9). The tool was revised and simplified to make it easy to understand by the participants.

Data analysis

The collected data were entered and analyzed in the IBM SPSS version 27 to make easy entry and appropriate data processing. It was carried out in two phases where univariate analysis was carried out at first to assess the frequency and percentage of each variable, and bivariate and multivariate binary logistic regression analyses were performed to understand the socio-demographic factors associated with the behavioral risk factors. We estimated the adjusted odds ratio along with a 95% confidence interval.

Ethical approval

Permission from the school authorities, voluntary written informed consent from the students aged 18 years and above, written consent from each parent of the participants aged below 18 years, and participant's assent for those students. The confidentiality of the information provided was strictly maintained. An ethical approval was obtained from the Institutional Review Committee of Tribhuvan University Institute of Medicine [275(6-11)E2080/081]. Onsite information about common NCDs, their common risk factors and guidance to avoid them was provided to the participants if needed after completing data collection.

RESULTS

Socio-demographic characteristics of school-going adolescents

In this study, altogether 316 adolescent students studying in grade 11 and 12 participated from public (142) and private schools (174). The mean age of the participants was 17.48 (±1.41) years. More than half of the participants were of 17-18 years age group (61.1%), female (56.3%), and studying in grade 11 (56.0%). Brahmin/Chhetri (51.9%) was the major ethnic group followed by Janajati (31.6%). Most of the participants were Hindu (84.8%) by religion. Majority of the fathers were educated up to at least higher secondary level (36.7%), whereas nearly half (43.3%) of the mothers were uneducated (Table 1).

Table 1: Socio-demographic characteristics of school-going adolescents (n=316)

Individual Characteristics	Number	Percentage (%)
Age (in years)		
15-17	176	5.7
18 or above	140	44.3
Sex		
Male	138	43.7
Female	178	56.3
School type		
Public School	142	44.9
Private School	174	55.1
Grade		
11	177	56.0
12	139	44.0
Ethnicity		
Brahmin/ Chhetri	164	51.9
Janajati	100	31.6
Dalit	34	10.8
Others	18	5.7
Religion		
Hindu	268	84.8
Buddhist	16	5.1
Christian	30	9.5
Others	2	0.6
Education of Father		
Uneducated	82	26.0
Primary level	73	23.1
Secondary level	45	14.2
Higher secondary level or above	116	36.7
Education of Mother		
Uneducated	137	43.3
Primary level	59	18.7
Secondary level	45	14.2
Higher secondary level or above	75	23.7

Prevalence of behavioural risk factors among school-going adolescents

In Figure 1, among the four behavioural risk factors related to major non-communicable diseases including unhealthy diet, insufficient physical activity, alcohol consumption and tobacco consumption, the most prevalent behavioural risk factors were unhealthy diet (99.4%) and insufficient physical activity (94.3%).

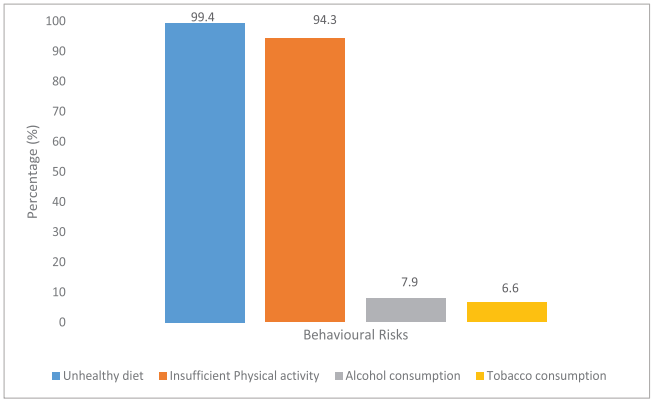

Figure 1. Prevalence of behavioural risk factors among school-going adolescents (n=316)

Prevalence of clustered behavioural risk factors among school-going adolescents

Occurrence of at least two behavioural risk factors is said to be clustering of behavioural risk factors. The study had shown that all of the participants had at least one risk factor, 94.9% had at least two risk factors and about three percent had all four behavioural risk factors (Figure 2).

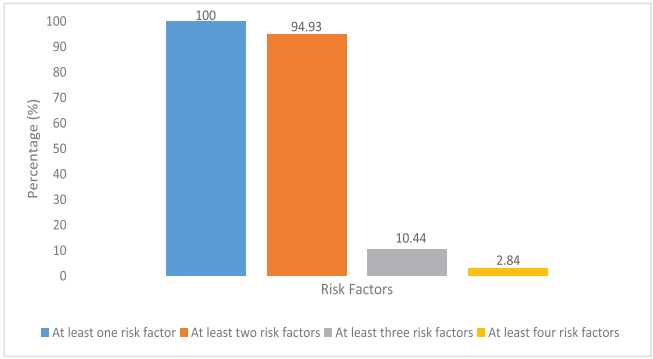

Figure 2. Prevalence of clustered behavioural risk factors among school going adolescents (n=316)

Behavioural risk factors associated with socio-demographic characteristics

Sex of the participants was significantly associated with the prevalence of NCD risk factors. The odds of prevalence of at least two risk factors was 6.12 (AOR: 6.12; 95% CI:1.64, 22.80) times higher among female students compared to male after adjusting for age, grade, religion and ethnicity (Table 2).

Table 2: Behavioural risk factors associated with socio-demographic characteristics

Socio-demographic characteristics	At least 2 risk factors n (%)	Less than 2 or no risk factors n (%)	COR (95% CI)	AOR (95%CI)
Age (in years)				
15-17	171 (97.2)	5 (2.8)	Ref	
18 or above	129 (92.1)	11 (7.9)	0.34 (0.11-1.01)	0.62 (0.19-1.99)
Sex				
Male	125 (90.6)	13 (9.4)	Ref	
Female	175 (98.3)	3 (1.7)	6.06 (1.69-21.73)	6.12 (1.64-22.80)
Grades				
11	172 (97.2)	5 (2.8)	Ref	
12	128 (92.1)	11 (7.9)	0.33 (0.11-0.99)	0.36 (0.11-1.16)
Religion				
Hindu	257 (95.9)	11 (4.1)	2.71 (0.89-8.20)	1.87 (0.55-6.31)
Others	43 (89.6)	5 (10.4)	Ref	
Ethnicity				
Brahmin/ Chhetri	160 (97.6)	4 (2.4)	3.42 (1.08-10.87)	3.24 (0.95-11.00)
Others	140 (92.1)	12 (7.9)	Ref	

DISCUSSION

This study aimed to identify the behavioural risk factors related to NCDs among school-going adolescents in Mahalaxmi municipality of Lalitpur District, Nepal. The finding demonstrates the burden of behavioural risk factors and highlights the disproportionate distribution of those factors across socio-demographic factors including age, sex, grade, religion, ethnicity, school type, and parental education. The study considered four behavioural risk factors including unhealthy diet, tobacco consumption, alcohol consumption and insufficient physical activity.

We found the prevalence of insufficient physical activity 94.3% and unhealthy diet 99.4%, which are much higher than the earlier studies conducted in the similar population by Tandan K et. al. (72.3% and 41.1% respectively) (9) and Hallal PC et. al. (insufficient physical activity, 80.3%) (10). This might be an indication of the increasing prevalence which is attributed to changing life style, computerized technology, and shifting from outdoor to indoor games. In this study, prevalence of unhealthy diet is 99.4% which is more than twice the study conducted in Kathmandu district (41.1%) (9). The reasons behind such significantly high proportion could be shifting dietary habit towards ready-made food, difficulty in managing time for food and urbanization. In the same way, alcohol consumption remained another health risk behaviour. We found that 7.9% of the participants were current alcohol users, which was slightly higher compared to a nation-wide survey (5.0%) (8) and lower compared to the data of Kathmandu district (14.8%) (9). Southeast Asian countries, particularly Bangladesh

(1.4%), Indonesia (2.5%), and Myanmar (0.9%) had a lower percentage of alcohol users in adolescents, but the pooled prevalence among adolescents in low- and middle-income countries is remarkably higher (25%) than the current study (11). Our study showed that 6.6% of the adolescents consumed tobacco which is lower compared to other studies conducted in Kathmandu (7.8%) (9), Bara (25.3%) (12) and Nepal nationwide (15.1%) (13) . The reason for lower proportion of alcohol and tobacco users might be that being the socially unacceptable behaviour, the adolescents did not wish to express that they consume alcohol or tobacco.

The prevalence of two or more behavioural risk factors was highly prevalent in the study participants, that is, 94.9% had at least two risk factors and the most frequent behavioural risk factors were unhealthy diet (insufficient fruit and vegetable and processed food consumption) and insufficient physical activity which were found similar in a nationwide school survey (8). High occurrence of clustering of behavioural risk factors among the study participants highlights the need to design integrative intervention to tackle this behavioural risk. Female students were found to have higher odds for the NCD risk factors in this study. This finding is not supported by other study in Nepal (9). However, a study in Bangladesh found higher prevalence of behavioural risk factors among women than men, which is similar to our study (14). Unlike our study, higher age was the most significant factor for the prevalence of behavioural risk factors in other studies (9,11).

This study has certain limitations. Although most of the adolescents could be captured in schools, this school-based study may not represent those who are not in school during the study period or who do not go to school. Secondly, information on the behavioral risk factors of NCDs is self-reported which might have led to under or overestimation. The social desirability bias related to information on alcohol and tobacco consumption might have occurred.

CONCLUSION

The findings suggest that the behavioural risk factors, particularly unhealthy dietary behaviour (including insufficient consumption of fruit and vegetables and processed food consumption) and insufficient physical activity were highly prevalent among the school-going adolescents. This study has shown that the prevalence of behavioural risk factors were distributed across socio-demographic characteristics. Almost all the study participants had at least one of the NCD related behavioural risk factors. This is a serious issue, as many of these risky behaviours acquired during adolescence tend to persist in the adulthood and each additional risk factor leads to increased future health risks. Female adolescents had higher likelihood of having behavioural risk factors. This signifies the preventive interventions to the adolescents, especially targeting to the females.

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Conflicts of interest

No conflict of interest was declared in this study.

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