



## Prevalence and determinants of behavioral risk factors of non-communicable diseases among a selected slum population in Bangladesh

Rajib Mondal<sup>1,2</sup>, Rajib Chandra Sarke<sup>3</sup>, Palash Chandra Banik<sup>3</sup>

1 Department of Public Health, Hamdard University Bangladesh (HUB), Gazaria, Munshiganj, Bangladesh

2 Center for Noncommunicable diseases Prevention Control Rehabilitation & Research (CeNoR), Dhaka, Bangladesh

3 Department of Non-communicable Diseases, Bangladesh University of Health Sciences (BUHS), Dhaka, Bangladesh

### Original Article

#### Abstract

**BACKGROUND:** Low and middle income countries and also the underprivileged population both are susceptible for the increased burden of non-communicable diseases (NCDs), and the practice of their behavioral risk factors (BRFs) is the main cause. However, these BRFs and their determinants among the slum population of Bangladesh weren't adequately evaluated. The present study was carried out with the aim to find out the prevalence and determinants of BRFs of NCDs among a selected slum population in Bangladesh.

**METHODS:** This cross-sectional study was conducted in purposively selected Rayerbazar slum of Dhaka city, Bangladesh, in 2017. A total of 192 adult (aged 18 to 65 years) residents were enrolled in this study using the convenient sampling method. A semi-structured questionnaire, adopted version of World Health Organization (WHO) STEPS instrument was used for data collection. Ascertainments of the risk factors were conducted as per the WHO STEPS guideline. Both descriptive and multivariate statistics were performed using the SPSS software.

**RESULTS:** The majority of the respondents (72.4%) were men, and the mean  $\pm$  standard deviation (SD) of the ages was  $37.0 \pm 13.6$  years. Half (50%) of the respondents were tobacco users. Almost all (98.4%) reported insufficient fruit and vegetables (FAVs) intake. Almost 7 out of 10 (67.7%) of the respondents reported to perform inadequate level of physical activity (PA). However, very negligible (2.6%) proportion of the respondents reported alcohol consumption. The group of the respondents with the age above the mean age ( $\geq 35$  years) reported higher use of tobacco whereas, the group of the respondents with the age below the mean age ( $< 35$  years) reported a higher level of inadequacy of PA.

**CONCLUSION:** BRFs of NCDs were substantial among the selected slum population of Bangladesh, where age was the major determinant. Health promotion and health education measures are recommended for slum population of Bangladesh to aware them of the BRFs of NCDs.

**KEYWORDS:** Non-Communicable Diseases, Behavioral Risk Factors, Slum Population

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### Introduction

Non-communicable diseases (NCDs), mainly cardiovascular diseases (CVDs), cancers, chronic respiratory diseases, and diabetes mellitus (DM) are the leading causes of deaths

globally. Statistics shows that 41 million (equivalent to 71%) of global deaths are caused by the NCDs.<sup>1,2</sup> This massive burden of disease is potentially contributed by few identified behavioral risk factors (BRFs), such as tobacco use, harmful use of alcohol, inadequate level of physical activity (PA), unhealthy diet [insufficient fruit and vegetables (FAVs) intake] and excessive dietary salt intake.<sup>1</sup>

#### Corresponding Author:

Rajib Mondal

Email: [rajibmondaluday@gmail.com](mailto:rajibmondaluday@gmail.com)

Tobacco alone causes death of over 7.2 million people annually worldwide, and 4.1 million deaths have been attributed to excess salt/sodium intake followed by 1.6 million to inadequate level of PA.<sup>3</sup> Moreover, approximately 3.3 million annual deaths (5.9% of global deaths) are attributable to alcohol consumption<sup>4</sup>.

Low and middle income countries of the world are victimized more due to NCD burden. Over 85% of all NCD induced global premature deaths (aged between 30 to 69 years) are taking place in low and middle income countries.<sup>1</sup> In Bangladesh, NCDs are attributed to the 67% of all deaths, and there is 22% risk of premature death from target NCDs.<sup>2</sup> CVDs alone cause 30% of all deaths in this country followed by 12% and 10% due to cancer and chronic respiratory diseases, respectively.<sup>5</sup> Moreover, in terms of prevalence of BRFs, 44% people use any form of tobacco, 93% consume insufficient FAVs, 38% are involved in inadequate level of PA, 25% are overweight and obese, 21% are hypertensive, and 5% suffer from DM based on a national survey. When these risk factors were clustered, it was found that three-quarter (76%), nearly 4 out of 10 (37%), and 1 out of (12%) had two or more, three or more, and four or more risk factors, respectively.<sup>6</sup> Furthermore, 60% of Bangladeshi people are used to add extra salt to their meal.<sup>7</sup>

The burden of NCDs as well as their potential risk factors are supposed to be more alarming among the slum population as they are the underprivileged group in society and have poor level of health education and practice.<sup>8</sup> However, there was no clear statistics reporting the prevalence of NCDs among the slum population in Bangladesh. Furthermore, the extents of prevalence of BRFs along with their determinants among slum population in Bangladesh were not adequately studied. The current study was designed to explore specifically the prevalence of BRFs

of NCDs as well as their determining factors among the selected slum population in Bangladesh.

## Materials and Methods

**Study design, setting, and population:** This was a cross-sectional study conducted in Rayerbazar slum in Dhaka city of Bangladesh in 2017. The slum was situated in Mohammadpur area of Dhaka North City Corporation. The slum was selected purposively considering as one of the largest slums in Dhaka city. A total of 192 adult (aged 18 to 65 years) residents were enrolled in this study using the convenient sampling method according to their availability during the data collection period. Those who had a history of any major NCD were excluded from the study.

**Data collection instrument and process:** A semi-structured questionnaire suggested by the World Health Organization (WHO), namely the STEPS instrument was used and it was modified to be appropriate.<sup>9</sup> The questionnaire comprised of socio-demographic information (sex, age, education, occupation, and monthly income) as well as the history of BRFs of NCDs (current tobacco use, insufficient FAVs intake, inadequate level of PA, and alcohol consumption). Data were collected by face-to-face interviews. The respondents were inquired about their socio-demographic background and BRFs status. The respondent's FAVs intake was assessed in serving size using WHO STEPS show-card (1 standard serving size = 80 g of fruit and vegetables). FAVs intake was defined as insufficient when it was < 5 servings/day. PA was assessed in metabolic equivalent of task (MET) technique which was calculated for the two domains of moderate PA (walking and moderate working and/or exercise) and vigorous PA (running and vigorous working and/or exercise) as per the WHO STEPS guideline. The level of PA was defined as inadequate when it was < 600 MET/week.<sup>9</sup>

**Statistical approach:** Data were analyzed by SPSS software (version 21, IBM Corporation, Armonk, NY, USA). Descriptive statistics was performed to illustrate the respondent's socio-demographic factors as well as BRFs. Binary logistic regression analysis was carried out considering the BRFs as dependent variables and socio-demographic factors (adjusted) as independent variables in order to identify the determinants.

Both verbal and written informed consents were taken from each respondent prior to data collection.

## Results

Men respondents were in majority (72.4%). The mean age of all respondents was  $37.0 \pm 13.6$  years and majority (53.6%) were 35 years old and above. Half (50.5%) of them were illiterate. The majority of the subjects were employed (72.4%) and had monthly family income of 15000 and above in Bangladeshi currency (61.5%) (Not presented in table).

Half (50%) of the respondents were tobacco users (Table 1). Among them, three-quarters (75.0%) and one-fifth (18.8%) were smoking tobacco users and smokeless tobacco users, respectively, and the rest used to take both forms. The mean duration of tobacco use was  $10.4 \pm 4.7$  years (not shown in table). Almost all (98.4%) were habituated to take insufficient FAVs (Table 1). The total mean of the FAVs intake among the subjects was  $2.4 \pm 0.8$  servings per day (not shown in table). Nearly 7 out of 10 (67.7%) were habituated to perform inadequate level of PA (Table 1). The total mean of MET of the PA of the participants was  $792 \pm 1511$  per week (not shown in table). However, the prevalence of alcohol consumers was negligible (Table 1). When the prevalence of these risk factors were clustered, the investigations revealed that all (100%) of the respondents had at least one risk factor, and 9 out of 10 (91.1%) and one-

quarter (26.0%) had at least two risk factors and three risk factors, respectively.

**Table 1. Prevalence of behavioral risk factors (BRFs) of non-communicable diseases (NCDs) among a selected slum population in Bangladesh (n = 192)**

Non-communicable diseases risk factors	n (%)
Tobacco use (current)	96 (50.0)
Insufficient FAVs intake (< 5 servings/day)	189 (98.4)
Inadequate level of PA (< 600MET/week)	130 (67.7)
Alcohol consumption (current)	5 (2.6)

FAVs: Fruit and vegetables; PA: Physical activity; MET: Metabolic equivalent technique

Yes responses were counted for all risk factors. One serving = 80 g

Moreover, binary logistic regression model revealed a middle-to-higher age ( $\geq 35$  years) and the lower age (below 35 years) as the significant determinants of tobacco use and inadequate level of PA, respectively. Other socio-demographic factors had not been found to be as the significant determinants of any BRFs among the population, but the educational status, occupational status, and monthly family income also had little influence on inadequate level of PA; whereas monthly income had a minor effect on the tobacco use (Table 2).

## Discussion

In Bangladesh, NCDs related burden as well as their contributing risk factors among the underprivileged slum population were not explored sufficiently, although they are the most vulnerable group for these diseases. Available data also did not reflect the determining factors of BRFs of NCDs adequately. In the current study, the BRFs were evaluated specifically with and without clustering along with their determinants among the underprivileged population of one of the larger slums in Dhaka city. The study revealed that these risk factors were posed remarkably among the population with potential socio-demographic determinants.

**Table 2. Binary logistic regression model considering behavioral risk factors (BRFs) of non-communicable diseases (NCDs) as dependent variables and socio-demographic factors (adjusted) as independent variables among a selected slum population in Bangladesh (n = 192)**

Socio-demographic factors	Non-communicable diseases risk factors (p; OR; 95% CI)			
	Tobacco use	Insufficient FAVs intake	Inadequate level of PA	Alcohol consumption
Sex				
Women	0.320; 0.6; 0.2-1.7	0.939; 0.9; 0.1-39.7	0.264; 0.5; 0.2-1.6	0.997; 0.0; 0.0
Age (years)				
35 and above	< 0.001; 3.8; 2.0-7.1	0.742; 0.6; 0.1-8.0	0.002; 0.3; 0.2-0.7	0.153; 5.3; 0.5-53.5
Educational status				
Illiterate	0.890; 0.9; 0.5-1.8	0.619; 0.5; 0.1-6.5	0.361; 1.4; 0.7-2.7	0.107; 0.1; 0.1-1.5
Occupational status				
Unemployed	0.863; 0.9; 0.3-2.7	0.911; 0.8; 0.1-35.5	0.169; 2.3; 0.7-7.2	0.997; 0.0; 0.0
Monthly income (BDT)				
15,000 and above	0.474; 1.3; 0.7-2.4	0.809; 0.7; 0.1-8.9	0.188; 1.5; 0.8-3.0	0.629; 0.6; 0.1-4.3

OR: Odds ratio; CI: Confidence interval; FAVs: Fruit and vegetables; PA: Physical activity; BDT: Bangladeshi Taka (currency); MET: Metabolic equivalent technique; The outcomes for the men sex, age below 35 years, literate and employed respondents, and monthly income below 15,000 BDT were the references for respective socio-demographic factors. Insufficient FAVs intake = < 5 servings/day; Inadequate level of PA = < 600 MET/week

The prevalence of almost all of the BRFs was found to be noticeably higher among the current study population in comparison to the data from Bangladeshi national level survey.<sup>6</sup> Tobacco users were found to be remarkably higher among the population in this study compared to the medical and nonmedical undergraduate level students of the country revealed by another study, whereas FAVs intake behavior and level of PA were almost symmetrical.<sup>10</sup> The lower socio-economic status along with low level of education of this slum population might be the main reason for this disproportionately higher prevalence of BRFs than these two studies.<sup>6,10</sup>

Moreover, tobacco users and inadequate level of PA performers were found higher in this study than the other relevant studies conducted among the slum population in Dhaka city, although the scenario of FAVs intake behavior was similar.<sup>11,12</sup> The higher proportions of men sex, illiteracy, and unemployment status of the population of this study than the slum population of other studies of the country might be the responsible factors for these dissimilar findings.<sup>11,12</sup> The prevalence of alcohol consumption was negligible similar to the other studies, and this scenario was actually the reflection of proper

restricting strategies of culture, society, religion as well as the positive controlling role of the Bangladeshi government. Furthermore, available studies reported that nearly 60% of the slum population in Bangladesh are used to practice added salt during their meal that indicates an alarming situation.<sup>11,13</sup> However, the disproportionate men and women respondents as well as purposively selection of a single slum and conveniently selection of the study subjects can be considered as the notable limitations of this study. Yet, in this study, the specific remarkable clustered prevalence of the BRFs of NCDs has been explored among the slum population, indicating the higher possibility of future NCD burden among them.

### Conclusion

In a conclusion, BRFs of NCDs were found to be substantial among the selected slum population in Bangladesh. The respondent's age was the significant determinant of tobacco use and inadequate level of PA. Proper health promotion and health education measures are recommended in order to control the BRFs of NCDs among the slum population.

### Conflict of Interests

Authors have no conflict of interests.

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