

Original Research Article

Awareness and attitude towards major non-communicable diseases among undergraduate students in Dhaka, Bangladesh: a cross-sectional study

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ABSTRACT

Background: Non-communicable diseases (NCDs) are a major public health challenge in Bangladesh, and many modifiable risk factors begin during adolescence and early adulthood. Undergraduate students are therefore an important group for early health promotion. This study assessed awareness and attitude toward major NCDs among undergraduate students in Dhaka, Bangladesh.

Methods: A descriptive cross-sectional study was conducted among undergraduate students from Jagannath University and Bangladesh Maritime University. A total of 421 valid completed responses were analyzed. Data were collected using a semi-structured, self-administered Google Forms questionnaire covering sociodemographic characteristics, 12 awareness items, and 12 attitude statements. Awareness was scored from 0 to 12 and categorized as low, moderate, or high. Attitude was measured on a five-point Likert scale; seven negatively worded items were reverse-coded before calculating the global attitude score. Data were analyzed using SPSS version 25 with descriptive statistics, chi-square tests, ANOVA, correlation, and regression analyses.

Results: The mean awareness score was 7.58 ± 2.65 out of 12. Low, moderate, and high awareness were observed in 56 (13.3%), 185 (43.9%), and 180 (42.8%) students, respectively. Correct awareness was highest for smoking as an NCD risk factor (87.6%), dietary risk for obesity and type 2 diabetes (83.6%), sugary drink-related health risk (79.6%), and cardiovascular disease definition (79.3%). Important gaps remained for WHO physical activity recommendations (27.8%), organ involvement in type 2 diabetes (35.4%), and identification of malaria as not being an NCD (41.3%). The mean attitude score was 3.55 ± 0.49 out of 5; 52 (12.4%) students had low, 308 (73.2%) moderate, and 61 (14.5%) high attitude scores. Awareness and attitude were positively associated; mean attitude increased from 3.03 ± 0.48 in the low-awareness group to 3.77 ± 0.37 in the high-awareness group ($p < 0.001$), and the awareness-attitude correlation was moderate and positive ($r = 0.543$, $p < 0.001$).

Conclusions: Undergraduate students demonstrated moderate-to-high awareness and generally favorable attitudes toward NCD prevention, but important knowledge gaps and perceived behavioral barriers remained. The positive association between awareness and attitude supports university-based NCD education, but interventions should also address motivation, perceived barriers, and supportive campus environments.

Keywords: Non-communicable diseases, Awareness, Attitude, Undergraduate students, Bangladesh

INTRODUCTION

Non-communicable diseases (NCDs) are the leading contributors to global mortality and long-term disability.

Cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes account for most NCD-related deaths, and the burden extends beyond mortality through prolonged treatment needs, lost productivity, and

household financial pressure.^{1,2} This burden is especially important in low- and middle-income countries, where health systems must respond to chronic diseases while still managing communicable diseases and other public health priorities.^{1,2}

Bangladesh is undergoing the same epidemiological transition. National policy documents and population-based studies show increasing concern about hypertension, diabetes, obesity, tobacco exposure, dietary risk, and physical inactivity.³⁻⁷ These risks are not confined to older adults. Evidence from Bangladesh and other settings indicates that unhealthy diet, sedentary behavior, tobacco use, and other behavioral risks often begin during adolescence or young adulthood and may persist into later life.⁸⁻¹³ University students are therefore a strategic population for prevention because they are forming long-term habits while exposed to academic stress, digital screen time, urban food environments, and changing social norms.

Awareness is commonly understood as knowledge of disease causes, risk factors, symptoms, prevention, and control. Attitude reflects beliefs, perceived seriousness, perceived susceptibility, self-efficacy, and willingness to adopt preventive behavior.^{14,15} Awareness is necessary for prevention, but it does not automatically produce sustained behavior change. Studies among students and young adults in Bangladesh and comparable settings show uneven knowledge, with better recognition of highly publicized risks such as tobacco and unhealthy diet but weaker understanding of guideline-based physical activity, screening, and disease-specific concepts.¹⁶⁻²⁰

The relationship between knowledge and preventive attitude is therefore important. Educational interventions can improve knowledge and some lifestyle-related outcomes among university students, but behavior change also depends on motivation, perceived barriers, social support, and enabling environments.²¹⁻²⁴

In Bangladesh, evidence specifically examining both awareness and attitude toward major NCDs among undergraduate students remains limited. This study addresses that gap by assessing awareness and attitude toward major NCDs among undergraduate students in selected universities of Dhaka City.

The general objective was to assess the level of awareness and attitude toward major NCDs among undergraduate students in selected universities of Dhaka City.

The specific objectives were: to determine the level of awareness regarding major NCDs among undergraduate students; to examine attitudes toward prevention and control of major NCDs; and to analyze the association between awareness and attitude toward major NCDs.

METHODS

Study design and setting

A descriptive cross-sectional study was conducted over a 12-month study period among undergraduate students from two public universities in Dhaka, Bangladesh: Jagannath University and Bangladesh Maritime University. Jagannath University represents a large multidisciplinary public university, while Bangladesh Maritime University represents a specialized public university with a technical and maritime-focused academic environment.

Study population, sample size, and sampling

The study population comprised actively enrolled undergraduate students at the two selected universities. The final target sample size was 421 students, calculated using Cochran's formula with an additional allowance for non-response. The universities were selected purposively to include two different academic settings. At the participant level, eligible students in university academic communication systems were invited through official channels, and voluntary response sampling was used. The final analysis included 421 valid completed responses: 321 from Jagannath University and 100 from Bangladesh Maritime University.

Inclusion criteria were enrollment as an undergraduate student at either selected university, presence in university academic communication systems during the study period, willingness to participate, and provision of informed consent. Exclusion criteria were non-consent, academic or medical leave during data collection, and incomplete questionnaire responses.

Data collection instrument and procedure

Data were collected over a two-month period using a semi-structured, self-administered online questionnaire prepared in Google Forms. The questionnaire contained three sections: sociodemographic information, awareness of major NCDs, and attitude toward NCD prevention and control. Electronic informed consent was obtained before participants accessed the survey. Only fully completed questionnaires submitted within the data collection period were included in the analysis.

Measurement and scoring

The awareness section contained 12 factual items on NCD classification, risk factors, symptoms, prevention strategies, and WHO physical activity recommendations. Each correct answer was assigned 1 point, and each incorrect or "don't know" response was assigned 0. Total awareness scores ranged from 0 to 12 and were categorized as low (0-4), moderate (5-8), and the high (9-12).

Attitude was assessed using 12 Likert-type statements scored from 1, strongly disagree, to 5, strongly agree. Seven negatively worded items were reverse-coded before analysis so that higher scores consistently represented a more favorable, prevention-oriented attitude. The global attitude score was calculated as the mean of all 12 items after reverse coding. Scores were categorized as low (<3.0), moderate (3.0-3.9), and high (≥ 4.0).

Statistical analysis

Data were cleaned and analyzed using SPSS Statistics version 25. Frequencies and percentages summarized categorical variables, while means and standard deviations summarized continuous awareness and attitude scores. Chi-square tests examined associations between categorical variables.

One-way ANOVA compared mean scores across awareness and attitude categories, with statistical significance set at $p \leq 0.05$. Correlation and regression analyses were used to assess the relationship between awareness and attitude scores.

Ethical considerations

Ethical clearance was obtained from Bangladesh University of Professionals, Dhaka, Bangladesh. The exact approval number should be inserted from the ethical clearance certificate before submission. Participation was voluntary, informed consent was obtained electronically, and no identifiable personal information was collected. Data were kept confidential and used only for research purposes.

RESULTS

Sociodemographic characteristics

A total of 421 undergraduate students were included in the final analysis. Most respondents were aged 21-23 years (67.9%), followed by 18-20 years (22.6%) and more than 23 years (9.5%).

The sample included 209 males (49.6%) and 212 females (50.4%). First-year students formed the largest group (35.4%), followed by third-year (27.6%), fourth-year (19.2%), and second-year students (17.8%).

Most participants were unmarried (92.2%). Nearly half lived in hostels (45.8%), 32.1% lived with family, and 20.2% lived in rented accommodation.

A family history of NCDs was reported by 202 students (48.0%). The internet was the most common primary health information source (52.5%), followed by mixed sources (18.5%).

Awareness of NCDs

The mean awareness score was 7.58 ± 2.65 out of 12. Overall, 56 students (13.3%) had low awareness, 185 (43.9%) had moderate awareness, and 180 (42.8%) had high awareness. Correct responses were highest for smoking as an NCD risk factor (87.6%), dietary risk for obesity and type 2 diabetes (83.6%), sugary drinks as a risk for dental cavities and type 2 diabetes (79.6%), and cardiovascular disease as disease of the heart and blood vessels (79.3%).

The weakest areas were WHO-recommended physical activity (27.8%), the pancreas as the organ primarily affected in type 2 diabetes (35.4%), and identification of malaria as not being an NCD (41.3%).

Attitude toward NCD prevention

The reverse-coded global attitude score showed a generally favorable preventive orientation, with a mean of 3.55 ± 0.49 out of 5. Most respondents were in the moderate attitude category (73.2%), while 14.5% had high attitude scores and 12.4% had low attitude scores. Favorable responses were common for perceived seriousness, confidence in making healthy choices, willingness to change diet, belief in public awareness campaigns, and stress management.

However, substantial barriers remained, especially the difficulty of being physically active while balancing academic and social life and the difficulty of sustaining a healthy lifestyle as a student.

Relationship between awareness and attitude

Awareness and attitude were positively associated. Mean attitude score increased from 3.03 ± 0.48 among students with low awareness to 3.49 ± 0.45 among those with moderate awareness and 3.77 ± 0.37 among those with high awareness ($p < 0.001$). Conversely, mean awareness score increased across attitude categories, from 4.69 ± 2.48 in the low attitude group to 7.78 ± 2.41 in the moderate attitude group and 9.02 ± 2.11 in the high attitude group ($p < 0.001$). Correlation and regression results also showed a moderate positive awareness-attitude relationship ($r = 0.543$, $p < 0.001$), with awareness explaining approximately 29.5% of variance in attitude.

Sociodemographic associations

In chi-square analyses, awareness category differed significantly by sex ($p < 0.001$), year of study ($p = 0.031$), and monthly family income ($p < 0.001$), but not by age group, marital status, current residence, or family history of NCDs. Attitude category differed significantly by year of study ($p = 0.027$), current residence ($p = 0.011$), monthly family income ($p = 0.001$), and family history of NCDs ($p = 0.003$), but not by age group, sex, or marital status.

Table 1: Sociodemographic characteristics of respondents, (n=421).

Variables	Category	N	%
Age group (in years)	18-20	95	22.6
	21-23	286	67.9
	>23	40	9.5
Sex	Male	209	49.6
	Female	212	50.4
Year of study	1st year	149	35.4
	2nd year	75	17.8
	3rd year	116	27.6
	4th year	81	19.2
Marital status	Unmarried	388	92.2
	Married	32	7.6
	Others	1	0.2
Current residence	Hostel	193	45.8
	With family	135	32.1
	Rented	85	20.2
	Others	8	1.9
Monthly family income (BDT)	≤30,000	137	32.5
	30,001-40,000	120	28.5
	40,001-43,000	60	14.3
	>43,000	104	24.7
Family history of NCDs	Yes	202	48.0
	No	176	41.8
	Don't know	43	10.2
Primary health information source	Internet	221	52.5
	Mixed sources	78	18.5
	Health workers	42	10.0
	Television	35	8.3
	Friends	25	5.9
	University	20	4.8

*Percentages may not total exactly 100 because of rounding.

Table 2: Awareness items and correct responses, (n=421).

Awareness items	Correct response	Correct n/N (%)
Condition not classified as an NCD	Malaria	174/421 (41.3)
Lifestyle behavior most strongly associated with NCD risk	Smoking	369/421 (87.6)
Common term for hypertension	High blood pressure	301/421 (71.5)
Organ primarily affected in type 2 diabetes	Pancreas	149/421 (35.4)
Long-term second-hand smoke exposure increases risk of	Chronic respiratory disease	292/421 (69.4)
Common symptom of uncontrolled diabetes	Increased thirst and frequent urination	256/421 (60.8)
Cardiovascular disease primarily refers to diseases of the	Heart and blood vessels	334/421 (79.3)
Regular sugary drink consumption primarily increases risk of	Dental cavities and type 2 diabetes	335/421 (79.6)
WHO-recommended moderate-intensity activity per week	At least 150 minutes	117/421 (27.8)
Diets high in processed food, sugar, and unhealthy fats raise risk for	Obesity and type 2 diabetes	352/421 (83.6)
Primary cause of most lung cancer cases	Tobacco smoking	280/421 (66.5)
NCDs are mainly caused by infectious agents	False	231/421 (54.9)

Table 3: Distribution of awareness and attitude scores, (n=421).

Measures	Category or statistic	N	% or value
Awareness score	Low (0-4)	56	13.3
	Moderate (5-8)	185	43.9
	High (9-12)	180	42.8
	Mean±SD		7.58±2.65
Attitude score	Low (<3.0)	52	12.4
	Moderate (3.0-3.9)	308	73.2
	High (≥4.0)	61	14.5
	Mean±SD		3.55±0.49

*Awareness categories were based on a 0-12 score; attitude categories were based on reverse-coded mean score, range 1-5.

Table 4: Attitude item responses collapsed by direction, (n=421).

Domains	Attitude statement	Favorable response, N (%)	Neutral, N (%)	Unfavorable response, N (%)
Risk perception	NCDs are serious health risks for young people	344 (81.7)	23 (5.5)	54 (12.8)
	NCDs will not affect me because I am young and healthy	275 (65.3)	44 (10.5)	102 (24.2)
	Public awareness campaigns help change habits	339 (80.5)	46 (10.9)	36 (8.6)
	Managing stress is important in preventing NCDs	301 (71.5)	87 (20.7)	33 (7.8)
Personal efficacy	I am confident I can make healthy choices	339 (80.5)	36 (8.6)	46 (10.9)
	I am willing to significantly change my diet	342 (81.2)	42 (10.0)	37 (8.8)
Barriers and misconceptions	Smoking sometimes is not harmful if I do not do it regularly	284 (67.5)	23 (5.5)	114 (27.1)
	A healthy lifestyle is too difficult to maintain as a student	184 (43.7)	39 (9.3)	198 (47.0)
	Regular check-ups are not important if I feel well	170 (40.4)	95 (22.6)	156 (37.0)
	It is hard to be physically active with academics and social life	83 (19.7)	48 (11.4)	290 (68.9)
	Eating fast food regularly is acceptable for students	247 (58.7)	54 (12.8)	120 (28.5)
	Family history makes prevention pointless	296 (70.3)	49 (11.6)	76 (18.0)

*For positively worded items, favorable response means agreement or strong agreement. For negatively worded items, favorable response means disagreement or strong disagreement.

Table 5: Awareness-attitude relationship, (n=421).

Analysis	Groups	Mean±SD or statistic	P value
Attitude score by awareness level	Low awareness (0-4)	3.03±0.48	<0.001
	Moderate awareness (5-8)	3.49±0.45	<0.001
	High awareness (9-12)	3.77±0.37	<0.001
Awareness score by attitude level	Low attitude (<3.0)	4.69±2.48	<0.001
	Moderate attitude (3.0-3.9)	7.78±2.41	<0.001
	High attitude (≥4.0)	9.02±2.11	<0.001
Correlation/regression	Awareness score with attitude score	r=0.543; R ² =0.295	<0.001

*P values shown for mean comparisons refer to overall one-way ANOVA; correlation and R² summarize the continuous score relationship.

Table 6: Sociodemographic factors associated with awareness and attitude categories.

Variables	Awareness category, p value	Attitude category, p value	Interpretation
Age group (in years)	0.201	0.087	Not statistically significant
Sex	<0.001	0.102	Associated with awareness only
Year of study	0.031	0.027	Associated with both outcomes
Marital status	0.970	0.943	Not statistically significant
Current residence	0.121	0.011	Associated with attitude only
Monthly family income	<0.001	0.001	Associated with both outcomes
Family history of NCDs	0.406	0.003	Associated with attitude only

*P values are from chi-square tests comparing categorical awareness or attitude levels across sociodemographic groups.

DISCUSSION

This study assessed awareness and attitude toward major NCDs among undergraduate students in two public universities in Dhaka. The findings show that most students had moderate or high awareness and a generally favorable attitude toward NCD prevention. However, knowledge was uneven, with stronger recognition of common behavioral risks than of guideline-based or disease-specific concepts.

The mean awareness score of 7.58 out of 12 indicates moderate awareness. This is consistent with student-focused evidence from Bangladesh and other settings, where respondents commonly recognize tobacco and unhealthy diet as risks but often have weaker knowledge of physical activity recommendations, disease mechanisms, or preventive screening.¹⁶⁻²⁰ In the present study, only 27.8% correctly identified the WHO-recommended weekly duration of moderate-intensity physical activity. This gap is important because clear knowledge of actionable recommendations is more useful for prevention than general recognition that inactivity is harmful.

The attitude findings suggest that students were generally receptive to NCD prevention, but that favorable beliefs coexisted with perceived barriers. More than 80% gave favorable responses for perceived seriousness, healthy-choice confidence, willingness to change diet, and belief in public awareness campaigns. At the same time, 68.9% reported difficulty being physically active while balancing academics and social life, and 47.0% reported difficulty maintaining a healthy lifestyle as a student. These findings support the view that awareness and positive attitude alone may be insufficient unless the student environment also supports healthier routines.²¹⁻²⁴

The central finding was the positive association between awareness and attitude. Mean attitude scores rose steadily across awareness levels, and awareness explained nearly one-third of the variance in attitude. This supports the Knowledge-Attitude framework, where better knowledge can contribute to more favorable preventive beliefs, while still leaving room for other determinants such as self-

efficacy, perceived control, social norms, and institutional support.^{14,15}

The sociodemographic associations indicate that undergraduate students should not be treated as a uniform group. Awareness varied by sex, academic year, and family income, while attitude varied by academic year, residence, income, and family history of NCDs. These differences may reflect variation in exposure to health information, lived experience with chronic disease, campus routines, family resources, and perceived vulnerability. University-based programs should therefore be tailored rather than relying on generic messaging alone.

The findings have practical implications for health promotion in universities. Educational sessions should emphasize areas where knowledge was weak, especially physical activity recommendations, correct classification of NCDs, and diabetes-related concepts. However, education should be paired with practical supports, such as accessible physical activity opportunities, healthy food environments, stress management programs, peer-led campaigns, and routine screening or counseling services. Such combined approaches are more likely to translate awareness into sustained preventive behavior.²¹⁻²⁴

Limitations

This study has several limitations. First, the cross-sectional design prevents causal inference between awareness and attitude. Second, the universities were selected purposively and participant recruitment used voluntary response sampling, which may introduce self-selection bias and limit generalizability beyond the selected institutions. Third, data were collected through a self-administered online questionnaire, so responses may be influenced by recall bias, social desirability bias, internet access, and differences in engagement with online forms. Fourth, the study measured awareness and attitude, but it did not objectively measure preventive practices or clinical outcomes. Finally, the distribution between universities was unequal, reflecting voluntary participation rather than proportional allocation.

CONCLUSION

Undergraduate students in selected universities of Dhaka demonstrated moderate-to-high awareness and generally favorable attitudes toward NCD prevention. Important knowledge gaps remained in physical activity recommendations, type 2 diabetes organ knowledge, and correct classification of NCDs. Awareness and attitude were positively associated, indicating that improved knowledge may support stronger preventive attitudes. However, interventions should also address perceived barriers, student routines, and campus environments. University-based health promotion should combine structured NCD education with practical support for physical activity, healthy diet, stress management, and preventive health-seeking behavior.

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