VIZSGÁLATOK

Knowledge about diabetes, hypertension, and patterns of physical activity, eating habits among Bangladeshi students: A cross-sectional study

A bangladesi diákok cukorbetegséggel, magas vérnyomással, fizikai aktivitással és étkezési szokásokkal kapcsolatos ismeretei: Egy keresztmetszeti vizsgálat

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2023 májusában a MEJ szerkesztősége pályázatot írt ki az egészség- és társadalomtudományok területén tanuló tehetséges és motivált hallgatók számára. A pályázat célja a tudományos pályára készülő hallgatók számára a publikációs tevékenységgel kapcsolatos ismeret- és tapasztalatszerzés lehetőségének biztosítása. A pályázatra a hallgatók PhD dolgozataikat, mesterszakos szakdolgozataikat vagy TDK munkák kivonatait nyújthatták be publikálására 2023. szeptember 30-ig.
A benyújtott dolgozatokat a szerkesztőség értékelte, és amelyiket közlésre alkalmasnak tekintette, annak szakbírálatát a szerkesztőség tagjai végezték el, ezzel is biztosítva a folyóiratban megjelenő publikációk magas minőségét.

Abstract

INTRODUCTION: Knowledge about non-communicable diseases among college students has not been explored in Bangladesh, which is a growing concern for the country. This study aims to explore the knowledge level of two common non-communicable diseases: diabetes and hypertension, among college students. This study also aimed to explore the patterns of physical activity, sedentary behaviour, and eating habits among them. The overall findings based on this study will provide a good source of information for implementing any intervention if required in the future.

METHODOLOGY: A cross-sectional survey was conducted among 651 students aged between 14 and 17 years with a self-administered questionnaire between March and May 2019 in Dhaka, Bangladesh. Descriptive studies, chi-square tests, and binary logistic regression analysis were done according to the association of the variables. All data were analyzed by using Statistical Package for Social Sciences (SPSS) software, version 20.

RESULTS: The study reported that 60.4% of students belonged to the older (16+ years) age group. 66.2% of students were from the science faculty. 51% of students had normal BMI though female BMI was slightly higher than male (51.1% vs. 50.8%). Underweight was more prevalent among females (30.6% vs. 24.6%) and overweight was more prevalent among male students (24.6% vs. 18.3%). Knowledge on diabetes was slightly higher compared to hypertension though most of the correct answers in both disease knowledge came from science faculty students. Binary logistic regression analysis showed diabetes knowledge of business faculty students was 60% less (OR = 0.4; 95% CI = 0.3-0.7; P = 0.001) and arts faculty students was 60% less (OR = 0.4; 95% CI = 0.2-0.9; P < 0.05) comparing with science faculty students. It was found that males were more likely to participate in outdoor physical activities such as walking (74.2% vs. 62.7%), cycling (17.8% vs. 1.7%), and sports (39.8% vs. 5.8%) compared to females. However, females were found to have a higher participation rate in household chores at 75.7% while males had a participation rate of 62.3%. Female students spent more time on sedentary behavior than male students: sitting (89.4% vs. 78%); using social media (88.2% vs. 74.2%); watching YouTube (96.1% vs. 87.3%). The breakfast intake rate was higher among male students than female students (73.3% vs. 51.5%) and the skipping rate was higher among female students (48.9% vs. 26.7%). The situation was the same for lunch and supper intake. However, the fast-food consumption rate was slightly higher among male than female students (78.4% vs. 73.5%).

CONCLUSION: In conclusion, the study reported overall knowledge of diabetes and hypertension was good among students though most of the correct answers came from science faculty students compared to the other group. Male involvement in outdoor physical activity was significantly higher than female students but, female students spent more time on sedentary behaviour. Male students had a higher prevalence of regular meal intake than female students. However, male students also showed more prevalence of fast-food consumption and overweight status. The findings of this study could be useful for designing appropriate health promotion interventions.

Absztrakt

BEVEZETÉS: A nem fertőző betegségekkel kapcsolatos ismeretek az egyetemisták körében nem kerültek feltárásra Bangladesben, ami egyre nagyobb aggodalomra ad okot az országban. E tanulmány célja, hogy feltárja a főiskolai hallgatók körében két gyakori, nem fertőző betegséggel, a cukorbetegséggel és a magas vérnyomással kapcsolatos tudásszintet. A tanulmány célja az is volt, hogy feltárja a fizikai aktivitás, a mozgásszegény magatartás és az étkezési szokások mintáit. A tanulmányon alapuló általános megállapítások jó információforrást nyújtanak a jövőben szükség esetén bármilyen beavatkozás végrehajtásához.

MÓDSZERTAN: A keresztmetszeti felmérést 651, 14-17 éves diák körében végeztük el 2019 márciusa és májusa között, önkitöltős kérdőívvel. Leíró vizsgálatokat, chi-négyzet teszteket és bináris logisztikus regressziós elemzést végeztünk a változók összefüggéseinek megfelelően. Minden adatot a Statistical Package for Social Sciences (SPSS) szoftver 20-as verziójának használatával elemeztünk.

EREDMÉNYEK: A tanulmány arról számolt be, hogy a diákok 60,4%-a az idősebb (16 év feletti) korcsoportba tartozott. A hallgatók 66,2%-a a természettudományi karról érkezett. A hallgatók 51%-ának volt normális BMI-je, bár a nők BMI-je valamivel nagyobb volt, mint a férfiaké (51,1% vs. 50,8%). Az alultápláltság a nők körében volt gyakoribb (30,6% vs. 24,6%), a túlsúly pedig a férfi hallgatók körében (24,6% vs. 18,3%). A cukorbetegséggel kapcsolatos ismeretek valamivel jobbak voltak, mint a magas vérnyomással kapcsolatosak, bár a legtöbb helyes válasz mindkét betegséggel kapcsolatos ismeretek terén a természettudományi kar hallgatóitól származott. A bináris logisztikus regresszióelemzés azt mutatta, hogy a diabéteszről való tudás az üzleti kar hallgatói körében 60%-kal (OR = 0,4; 95% CI = 0,3-0,7; P = 0,001), a művészeti kar hallgatói körében pedig 60%-kal (OR = 0,4; 95% CI = 0,2-0,9; P < 0,05) volt kisebb a természettudományi kar hallgatóihoz képest. Megállapították, hogy a férfiak nagyobb valószínűséggel vettek részt olyan szabadtéri fizikai tevékenységekben, mint például a gyaloglás (74,2% vs. 62,7%), a kerékpározás (17,8% vs. 1,7%) és a más sportok (39,8% vs. 5,8%), mint a nők. A háztartási munkákban azonban a nők nagyobb arányban, 75,7%-ban, míg a férfiak 62,3%-ban vettek részt. A női diákok több időt töltöttek ülő testmozgással, mint a férfi diákok: ülve (89,4% vs. 78%), a közösségi média használatával (88,2% vs. 74,2%) és a YouTube nézésével (96,1% vs. 87,3%). A reggeli fogyasztásának aránya a férfi diákok körében nagyobb volt, mint a nőknél (73,3% vs. 51,5%), és a reggeli kihagyásának aránya is nagyobb volt a nőknél (48,9% vs. 26,7%). Ugyanez volt a helyzet az ebéd- és vacsorafogyasztás esetében is. A gyorséttermi ételek fogyasztásának aránya azonban valamivel nagyobb volt a férfi diákok körében, mint a nőknél (78,4% vs. 73,5%).

KÖVETKEZTETÉS: Összefoglalva, a tanulmány szerint a diabétesszel és a magas vérnyomással kapcsolatos általános ismeretek jók voltak a diákok körében, bár a legtöbb helyes választ a természettudományi kar hallgatói adták a többi csoporthoz képest. A férfiak részvétele a szabadtéri testmozgásban szignifikánsan magasabb volt, mint a női hallgatóké, de a női hallgatók több időt töltöttek ülő testmozgással. A férfi hallgatók körében magasabb volt a rendszeres étkezés előfordulása, mint a női hallgatóknál. A férfi hallgatóknál azonban a gyorséttermi ételek fogyasztása és a túlsúlyos állapot is nagyobb arányban fordult elő. A vizsgálat eredményei hasznosak lehetnek a megfelelő egészségfejlesztési beavatkozások megtervezéséhez.

Key messages

This paper discusses the public health challenges to promote better health practices among students. It enhances global understanding of the significance of health literacy in preventing and managing chronic diseases. This paper also provides valuable data for developing effective interventions to enhance health outcomes in this population.

INTRODUCTION

The term non-communicable disease (NCD) stands for certain diseases such as cardiovascular diseases (stroke, and heart attacks), diabetes, cancer, and chronic respiratory diseases (chronic obstructive pulmonary disease, and asthma). This upward trend of NCDs all over the world has a great burden on lives (Tsolekile, 2007). According to the WHO, NCDs are responsible for 41 million deaths globally, of which about 15 million people die between the ages of 30 and 69 in low- and middle-income countries where children, adults, and the elderly are all at risk (WHO, 2018a). Unhealthy eating habits are strongly linked to the emergence of non-communicable diseases (NCDs) and related mortality. Approximately 1.7 million deaths (2.8%) worldwide are attributed to low consumption of fruits and vegetables. Moreover, low intake of fruits and vegetables jeopardizes the risk of cardiovascular diseases, stomach cancer, and colorectal cancer (WHO, 2009). As physical inactivity and poor eating habits are often established during childhood, they are interrelated, increasing the risk of non-communicable disease, which affects life as well as their healthy professional life (Eaton et al., 2010).

Bangladesh is a South Asian country with a population density of 1 265 inhabitants per square kilometer and is ranked 10th in the world (World Population Review, 2020). NCDs account for about 59% of total deaths in Bangladesh, and there were 7.1 million cases of diabetes in 2015, where 3.7 million cases remain undiagnosed. In Bangladesh, it was also found that around 20% of men and 32% of women had elevated blood pressure, according to a report by the International Centre for Diarrheal Disease Research, Bangladesh (icddr'b, 2020). Though NCDs tend to be revealed in adulthood, their origins are often adopted during childhood and adolescence through unhealthy activities (UNICEF, 2019).

Moreover, NCDs threaten progress against the 2030 Agenda for Sustainable Development, which has a target to reduce premature deaths from this fatal condition by one-third in 2030 (WHO, 2016). Again, in low-resource settings, healthcare costs for NCDs rapidly drain household resources, along with the lengthy and expensive treatment that forces millions of people into poverty every year, which suppresses development (WHO, 2018a). The adolescent phase of life is crucial, as it includes significant life events (Gordon-Larsen et al., 2004). They may develop unhealthy habits such as decreased physical activity, excessive drinking and smoking (Kwan et al., 2012). Another study found that during this time, adolescents are more likely to use alcohol and tobacco, and form poor eating habits (Perera et al., 2009). These are the priority health risk behaviours, which contribute to morbidity and mortality in youth and adults (Eaton et al., 2010).

According to UNICEF, there are more than 32 million adolescents in Bangladesh, which constitutes 21% of the total population (UNICEF, 2016). As they grow up, they become aware of more responsibilities, experiment with innovative ideas, and also push for independence, which may lead to action in preventing risk factors for non-communicable diseases by raising awareness with adequate knowledge (Gamage & Jayawardana, 2017). Information on knowl-

edge about NCDs has not been explored among adolescents in Bangladesh previously, which could immensely help both the health and education sectors. School health education has a great impact on improving attitudes as well as preventing NCDs by changing health practices (Bartlett, 1981).
Therefore, the present study aimed to explore the knowledge or health literacy of two common non-communicable diseases in Bangladesh: diabetes and hypertension, along with the patterns of physical activity, and eating habits among students aged between 14 and 18 years. This study will be the first data source on the mentioned issues, which might help to implement an effective health education program among students based on their knowledge status if necessary.

METHODOLOGY

Study design and participants

A cross-sectional study was conducted between March and May 2019 among three colleges in Dhaka, Bangladesh. Three colleges were purposefully selected, considering the diverse socio-economic backgrounds of the participants and the accessibility of the research team.

Study size and settings

The sample size was determined based on this formula:

$$n = \frac{z^2 \times \mathrm{p} \times (1 - \mathrm{p})}{d^2}$$

Where z = standard normal deviation at 95% confidence level (1.96), p = percentage picking a choice or response (0.5), and d = confidence interval (0.05). Hence, the calculated sample size was 384. However, our sample size was larger than the estimated sample size. With the permission of the college authority, the research team went to the classroom and explained the rationale of the study to the students. After receiving confirmation from the students, they were given the questionnaire and informed consent form to complete the survey. Data were collected by using a pre-tested questionnaire that included socio-demographic information, knowledge on diabetes, hypertension, patterns of physical activity, sedentary behavior, and eating habits.

Variables

Socio-demographic data was obtained through open and close-ended questions including age, gender, group of study, living place, monthly expenditure, parent's education, occupation, and their income. Participants were asked to mark statements on diabetes and hypertension with three options: 1 = correct, 2 = incorrect, and 3 = don't know. These questions were taken from a study conducted in Thailand and for physical activity, only simple questions were taken based on the study participant's age (Armstrong & Bull, 2006; Husain & Ashkanani, 2020). They were asked about different types of physical activity: household chores, walking, cycling, and sports involvement. For sedentary behaviour, students were asked whether they watched television or YouTube and spent time on the internet. Recreational screen time >2 hours/day was considered high which is consistent with a widely used screen time recommendation (Wu et al., 2015). Sleep duration for the age group (13–19) was categorized as short sleep duration (<8 hours), and long sleep duration (>10 hours) according to National Sleep Foundation (Hirshkowitz et al., 2015). For eating habits, students were asked frequency and place of daily meal consumption based on a study conducted in Sudan (Musaiger et al., 2016a).

Statistical analysis

Descriptive analysis was performed to present socio-demographic information using frequencies and percentages. Chi-square tests were used to assess the relationships between the study variables. Binary logistic regression models were used for assessing the associations between knowledge of diabetes and hypertension as outcome variables, and socio-demographics as explanatory variables. In the unadjusted model, only one explanatory variable was used while in the adjusted model, all the socio-demographic variables were used. The odds ratio and its 95% confidence interval (95%CI) were reported for adjusted and unadjusted logistic regression. The level of significance was set at $p < 0.05$. All data were analyzed by using the Statistical Package for the Social Sciences (SPSS) software for Windows version 20.

Results

A total of 651 students from selected colleges completed the study. Over 60% of them were 16 years or older, and two-thirds were from the science faculty [Table 1]. Close to 30% were underweight, half of them had a normal BMI, more than 20% were overweight, and there were no obese students after calculating the BMI among students. Nearly everyone lived with their parents and two-thirds came from different parts of the country. The underweight rate was more common among female students, normal BMI was slightly higher in females, but the overweight rate was more common among males ($P < 0.05$). Most of the female students lived with family and hostel staying was more prevalent among male students ($P < 0.001$).

Table 1. Socio-demographic characteristics of study participants according to gender

Characteristics	Total (% total)	Male (% within gender)	Female (% within gender)	P value[a]
	N (%)	N (%)	N (%)	
Age				
≤15years	258 (39.6)	78 (33.1)	180 (43.4)	0.010*
≥16 years	393 (60.4)	158 (66.9)	235 (56.6)	
Group				
Science	431 (66.2)	175 (74.2)	256 (61.7)	<0.001*
Arts	74 (11.4)	14 (5.9)	60 (14.5)	
Commerce	146 (22.4)	47 (19.9)	99 (23.9)	
BMI				
Underweight	185 (28.4)	58 (24.6)	127 (30.6)	0.017*
Normal	332 (51.0)	120 (50.8)	212 (51.1)	
Overweight	134 (20.6)	58 (24.6)	76 (18.3)	
Living place				
With family	581 (89.2)	195 (82.6)	386 (93.0)	<0.001*
Hostel	70 (10.8)	41 (17.4)	29 (7.0)	

Migration				
Yes	431 (66.2)	177 (75.0)	254 (61.2)	<0.001*
No	220 (33.8)	59 (25.0)	161 (38.8)	
Monthly expenditure (in BDT)[b]				
≤5000	50 (7.7)	24 (10.2)	26 (6.3)	<0.001*
5001-10000	386 (59.3)	159 (67.4)	227 (54.7)	
>10000	215 (33.0)	53 (22.5)	162 (39.0)	

[a] P value for no association between sex and the variables; [b] BDT: Bangladeshi taka (currency)
* P < 0.05

Among the total participants, almost two-thirds of students gave the correct answer about diabetes being a non-communicable disease [Table 2]. Most of the science students provided correct answers for all the statements (range 52–87%) followed by art students (range 38–84%) and commerce students (range 46–82%). There were significant differences between students in different faculties for all but one of the correct answers to the statements.

Half of the students from the total study participants agreed hypertension is a non-communicable disease [Table 3]. For all the statements, the correct response rate among students was between 50% and 75%. However, the correct answers given by students among the three groups were diverse such as hypertension is a non-communicable disease (P < 0.001); elder people have more risk (P < 0.05).

Among the total participants, over 70% were involved in household chores, two-thirds preferred walking, less than 10% used bicycles, and close to one-fifth were involved in sports every day [Table 4]. Male involvement in outdoor physical activity was more common than female: walking (P < 0.001), cycling (P < 0.001), and sports (P < 0.001) except the household chores where the female was more active (P < 0.001).
Regarding sedentary behaviour, a greater proportion of female students spent time sitting more than 7 hours per day (P < 0.001), but males spent more than 2 hours per day using social media (P < 0.001) and watching YouTube (P < 0.001).

Regarding eating habits, among the total participants, more than half took breakfast, and more than two-thirds took lunch and supper regularly. Three-forth preferred homemade tiffin and consumed fast food at least 4 days a week. The breakfast skipping rate was higher among female students (P < 0.001). Similarly, the lunch and supper skipping rate was higher among female students (P < 0.001). Additionally, canteen food preferences were higher among female students (P = 0.002). However, a fast-food consumption ≤4 days per week rate among male students was slightly higher than among female students (P < 0.05).
According to the findings, the younger respondents showed 40% less knowledge about diabetes compared to the older students (P = 0.010) [Table 5]. Business and art faculty students showed 60% less knowledge about diabetes than science students (P = 0.001, P < 0.029). However, more knowledge about hypertension was found among younger (P < 0.001) and male (P = 0.005) students. The result of this study also revealed that after adjusting for different socio-demographic variables diabetes and hypertension knowledge was significantly associated with younger age (P = 0.035, P < 0.001), being male for hypertension only (P = 0.001), business faculty for diabetes only (P = 0.002), arts faculty for diabetes and hypertension (P = 0.017, P = 0.040), and living in hostel for hypertension only (P = 0.020).

Table 2. Diabetes-related knowledge among students distributed by academic group

Question	Total N (%)	Science N (%)	Arts N (%)	Commerce N (%)	P value[a]
Diabetes is a non-communicable disease.					
Correct	434 (66.7)	339 (78.0)	28 (37.8)	67 (45.9)	<0.001*
Incorrect	102 (15.7)	30 (7.0)	34 (45.9)	38 (26.0)	
Don't know	115 (17.6)	62 (14.4)	12 (16.2)	41 (28.1)	
Diabetes is a curative disease.					
Correct	336 (51.6)	232 (53.8)	32 (43.2)	72 (49.3)	0.004*
Incorrect	158 (24.3)	107 (24.8)	26 (35.1)	25 (17.1)	
Don't know	157 (24.1)	92 (21.3)	16 (21.6)	49 (33.6)	
Elder people have more risk of diabetes than young people.					
Correct	432 (66.4)	290 (67.3)	52 (60.3)	90 (61.6)	0.018*
Incorrect	56 (8.6)	40 (9.3)	6 (8.1)	10 (6.8)	
Don't know	163 (25.0)	101 (23.4)	16 (21.6)	46 (31.5)	
A history of diabetes among blood relatives increases the risk of diabetes.					
Correct	448 (68.8)	299 (69.4)	55 (74.3)	94 (64.4)	0.020*
Incorrect	54 (8.3)	44 (10.2)	3 (4.1)	7 (4.8)	
Don't know	149 (22.9)	88 (20.4)	16 (21.6)	45 (30.8)	
Obese people are at more risk of diabetes than non-obese.					
Correct	457 (70.2)	300 (69.6)	57 (77.0)	100 (68.5)	0.009*
Incorrect	51 (7.8)	36 (8.4)	8 (10.8)	7 (4.8)	
Don't know	143 (22.0)	95 (22.0)	9 (12.2)	39 (26.7)	
Physical exercise reduces the risk of diabetes.					
Correct	569 (87.4)	389 (90.3)	62 (83.8)	118 (80.8)	<0.001*
Incorrect	16 (2.5)	8 (1.9)	6 (8.1)	2 (1.4)	
Don't know	66 (10.1)	34 (7.9)	6 (8.1)	26 (17.8)	
Symptoms of diabetes: frequent urination and frequent drinking water from thirst.					
Correct	539 (82.8)	357 (82.8)	63 (85.1)	119 (81.5)	0.569
Incorrect	15 (2.3)	10 (2.3)	3 (4.1)	2 (1.4)	
Don't know	97 (14.9)	64 (14.8)	8 (10.8)	25 (17.1)	
Fatty foods, sweets, and fried food increase the risk of diabetes.					
Correct	528 (81.1)	346 (80.3)	62 (83.8)	120 (82.2)	0.012*
Incorrect	37 (5.7)	31 (7.2)	4 (5.4)	2 (1.4)	
Don't know	86 (13.2)	54 (12.5)	8 (10.8)	24 (16.4)	

[a] P value for no association between sex and the variables
* P < 0.05

Table 3. Hypertension knowledge among students distributed by academic group

Question	Total N (%)	Science N (%)	Arts N (%)	Commerce N (%)	P value[a]
Hypertension is a non-communicable disease.					
Correct	331 (50.8)	253 (58.7)	24 (32.4)	54 (37.0)	<0.001*
Incorrect	70 (10.8)	31 (7.2)	14 (18.9)	25 (17.1)	
Don't know	250 (38.4)	147 (34.1)	36 (48.6)	67 (45.9)	
Hypertension is a curable disease.					
Correct	198 (30.4)	141 (32.7)	20 (27.0)	37 (25.3)	0.249
Incorrect	209 (32.1)	138 (32.0)	27 (36.5)	44 (30.1)	
Don't know	244 (37.5)	152 (35.3)	27 (36.5)	65 (44.5)	
Elder people are at more risk of hypertension than younger.					
Correct	351 (53.9)	242 (56.1)	43 (58.1)	66 (45.2)	0.031*
Incorrect	59 (9.1)	44 (10.2)	5 (6.8)	10 (6.8)	
Don't know	241 (37.0)	145 (33.6)	26 (35.1)	70 (47.9)	
A history of hypertension among blood relatives increases the risk of hypertension.					
Correct	208 (32.0)	154 (35.7)	28 (37.8)	26 (17.8)	0.001*
Incorrect	158 (24.3)	97 (22.5)	18 (24.3)	43 (29.5)	
Don't know	285 (43.8)	180 (41.8)	28 (37.8)	77 (52.7)	
Obese people are at more risk of hypertension than non-obese people.					
Correct	352 (54.1)	254 (58.9)	35 (47.3)	63 (43.2)	0.005*
Incorrect	39 (6.0)	27 (6.3)	5 (6.8)	7 (4.8)	
Don't know	260 (39.9)	150 (34.8)	34 (45.9)	76 (52.1)	
Stress and anxiety increase the risk of hypertension.					
Correct	488 (75.0)	328 (76.1)	64 (66.5)	96 (65.8)	0.014*
Incorrect	10 (1.5)	7 (1.6)	0 (0.0)	3 (2.1)	
Don't know	153 (23.5)	96 (22.3)	10 (13.5)	47 (32.2)	

Smoking increases the risk of hypertension.					
Correct	477 (73.3)	350 (81.2)	41 (55.4)	86 (58.9)	<0.001*
Incorrect	18 (2.8)	4 (0.9)	4 (5.4)	10 (6.8)	
Don't know	156 (24.0)	77 (17.9)	29 (39.9)	50 (34.2)	
Salty food consumption increases the risk of hypertension.					
Correct	438 (67.3)	284 (65.9)	59 (79.7)	95 (65.1)	0.204
Incorrect	25 (3.8)	17 (3.9)	2 (2.7)	6 (4.1)	
Don't know	188 (28.9)	130 (30.2)	13 (17.6)	45 (30.8)	
Hypertension symptoms: headache, dizziness, blurred vision, nausea, and weakness					
Correct	406 (62.4)	284 (65.9)	43 (58.1)	79 (54.1)	0.058
Incorrect	17 (2.6)	8 (1.9)	2 (2.7)	7 (4.8)	
Don't know	228 (35.0)	139 (32.3)	29 (39.2)	60 (41.1)	
Physical inactivity reduces the risk of hypertension.					
Correct	441 (67.7)	301 (69.8)	54 (73.0)	86 (58.9)	0.011*
Incorrect	26 (4.0)	15 (3.5)	6 (8.1)	5 (3.4)	
Don't know	184 (28.3)	115 (26.7)	14 (18.9)	55 (37.7)	
A blood pressure of 140/90 mmHg is considered high.					
Correct	308 (47.3)	215 (49.9)	24 (32.4)	69 (47.3)	0.005*
Incorrect	31 (4.8)	24 (5.6)	6 (8.1)	1 (0.7)	
Don't know	312 (47.9)	192 (44.5)	44 (59.5)	76 (52.1)	

[a] P value for no association between sex and the variables
* $P < 0.05$

Table 4. Prevalence of physical activity, sedentary behaviour, and eating habits according to gender

Characteristics	Total	Male	Female	P value[a]
	N (%)	N (%)	N (%)	
PHYSICAL ACTIVITY/DAY				
Household Chores				
Yes	461 (70.8)	147 (62.3)	314 (75.7)	<0.001*
No	190 (29.2)	89 (37.7)	101 (24.3)	
Walking				
Yes	435 (66.8)	175 (74.2)	260 (62.7)	0.003*
No	216 (33.2)	61 (25.8)	155 (37.3)	
Cycling				
Yes	49 (7.5)	42 (17.8)	7 (1.7)	<0.001*
No	602 (92.5)	194 (82.2)	408 (98.3)	
Sports involvement				
Yes	118 (18.1)	94 (39.8)	24 (5.8)	<0.001*
No	533 (81.9)	142 (60.2)	391 (94.2)	
SEDENTARY BEHAVIOUR/DAY				
Sitting				
≤7 hours	96 (14.7)	52 (22.0)	44 (10.6)	<0.001*
7+ hours	555 (85.3)	184 (78.0)	371 (89.4)	
Use of social media				
<2 hours	541 (83.1)	175 (74.2)	366 (88.2)	<0.001*
2+ hours	110 (16.9)	61 (25.8)	49 (11.8)	
Watching YouTube or television				
<2 hours	605 (92.9)	206 (87.3)	399 (96.1)	<0.001*
2+ hours	46 (7.1)	30 (12.7)	16 (3.9)	

Sleeping				
<8 hours	560 (86.0)	213 (90.3)	347 (83.6)	0.055
8-10 hours	80 (12.3)	21 (8.9)	59 (14.2)	
>10 hours	11 (1.7)	2 (0.8)	9 (2.2)	
EATING HABIT/WEEKLY				
Breakfast intake				
Everyday	385 (59.1)	173 (73.3)	212 (51.5)	<0.001*
Often	266 (40.9)	63 (26.7)	203 (48.9)	
Lunch intake				
Everyday	452 (69.4)	186 (78.8)	266 (64.1)	<0.001*
Often	199 (30.6)	50 (21.2)	149 (35.9)	
Supper intake				
Everyday	444 (68.2)	199 (84.3)	245 (59.0)	<0.001*
Often	207 (31.8)	37 (15.7)	170 (41.0)	
Tiffin preference				
Home-made food	498 (76.5)	197 (83.5)	301 (72.5)	0.002*
Canteen food	153 (23.5)	39 (16.5)	114 (27.5)	
Fast-food consumption				
≤4	490 (75.3)	185 (78.4)	305 (73.5)	0.014*
4+	161 (24.7)	110 (26.5)	51 (21.6)	

[a] P value for no association between sex and the variables
* P < 0.05

Table 5. Factors associated with knowledge of diabetes and hypertension among students

Variables	Adjusted[a]						Non adjusted[b]					
	Diabetes			Hypertension			Diabetes			Hypertension		
	OR	95% CI	*p*	*OR*	95% CI	*p*	*OR*	*95% CI*	*P*	*OR*	95% CI	*p*
Age												
≤15years [Ref: 16+ years]	0.6	0.4-0.9	0.010*	2.0	1.4–2.8	<0.001*	1.5	1.0–2.4	0.035*	2.1	1.4–3.0	<0.001*
Gender												
Male [Ref: Female]	0.9	0.6–1.5	0.99	1.6	1.1–2.2	0.005*	1.0	0.6–1.6	0.725	1.9	1.3–2.8	0.001*
Group												
Business	0.4	0.3-0.7	0.001*	0.8	0.5-1.3	0.517	0.4	0.3-0.7	0.002*	0.9	0.6–1.5	0.903
Arts [Ref: Science]	0.4	0.2-0.9	0.029*	0.4	0.2-0.9	0.035*	0.3	0.1-0.8	0.017*	0.4	0.2-0.9	0.040*
Living Place												
Hostel [Ref: family]	1.1	0.5–2.2	0.701	2.3	1.1–4.5	0.020*	0.8	0.4–1.7	0.731	2.3	1.1–4.8	0.020*

[a] Unadjusted estimates were based on univariate logistic regression for diabetes, hypertension knowledge as the outcome, and socio-demographic variables as explanatory variables.
[b] Adjusted estimates were based on multivariate logistic regression for diabetes, hypertension knowledge as outcome, and socio-demographic variables as explanatory variables.
* P < 0.05

DISCUSSION

This study explores knowledge about two common non-communicable diseases in Bangladesh: diabetes and hypertension, physical activity and eating habits among college students. According to the study findings, female student's normal BMI was slightly higher than male students. Also, female students were more underweight than male students, and the overweight rate was slightly higher among male students. The percentage of underweight and overweight was slightly higher than in a previous study conducted in Bangladesh among the same age group (Hossain et al., 2018). Most of the study participants came from other parts of the country, and among them, a small percentage of students lived in hostels. Moving to another city for better education comes with various challenges based on individual situations, such as cultural adjustments, academic pressure, financial condition, and homesickness, which might lead to isolation or loneliness, often leading to a poor life standard. Since transitioning from primary to secondary or higher secondary education involves significant life changes, it has a great impact on their physical and mental health (Deforche et al., 2015).

Knowledge about health-related complications prevents adolescents from establishing unhealthy behaviors which ultimately prevents the development of NCD (Abelson, 1995). According to the study findings, a greater proportion of students had good knowledge of diabetes, which is positive and is similar to a study conducted in Kuwait (Al-Hussaini & Mustafa, 2016). However, arts and commerce faculty students had little knowledge compared to science faculty students about symptoms and risk factors, which showed similarity with another study conducted in Sri Lanka (Gamage & Jayawardana, 2017). It has been reported by a study conducted in Canada that good knowledge and awareness increase physical activity behaviour among people (Plotnikoff et al., 2011).

The knowledge about hypertension among students also seemed good, though the science faculty had better knowledge than the other faculty students. Hence, an appropriate knowledge implementation program among all faculty students is inevitable by arranging campaigns or seminars. During those seminars, blood pressure measurement and knowing a family history of hypertension might improve the awareness level, as it is one of the risk factors for forming certain non-communicable diseases such as cardiovascular diseases and atherosclerosis (Grad et al., 2015). Hypertension is also a top health problem among children and adolescents (Akgun et al., 2010).

In an Asian family with a traditional structure, girls are more willing or predisposed to household activities, for example, cooking, washing clothes, cleaning the house, and serving food. This type of activity often requires less energy expenditure than outdoor physical activity. On the contrary, boys are more likely to be involved in outdoor activities (Gulati et al., 2014). Similarly, the present study also reported that girls were more active in household chores, whereas male involvement in outdoor activities was higher among female participants. Another reason behind girl's less involvement in outdoor activities might be the gender differences in such activities in Asian societies. Here, parents are more concerned about girls performing outdoor physical activities and put more restrictions on them (Shokrvash et al., 2013). Going to college by walking rather than taking motorized transport can be a key source of daily physical activity and has been suggested as a strategy to increase children's physical activity (Tudor-Locke et al., 2003). According to the study findings, more than two-thirds of the stu-

dents preferred walking to going to college, which showed a good way of doing regular physical activity.

The present study has reported that female students tend to spend more time in a sitting position. Though the association between sitting time and obesity and all causes of mortality was not found, prolonged sitting might be the cause of neck, shoulder, or lower back pain (Daneshmandi et al., 2017; Pulsford et al., 2013). Using social media and watching YouTube or television was more common behaviour among female participants since they spent most of their time at home, but it was less than two hours. On the other hand, male students were found to spend more time watching television and social media. It was suggested that watching television should not exceed two hours in a single day to prevent obesity as well as co-morbidity (Bar-On et al., 2001). Researchers have proved that short daily sleep may increase the risk of obesity as well as other health complications (Cappuccio et al., 2008). However, this study did not find any significant association with sleeping habits.

Poor dietary intake harms health. The present study indicated that almost two-thirds consume breakfast regularly, which is a good sign. However, male students have a higher breakfast intake rate than female students, which is similar to a study conducted on Sudanese university students (Musaiger et al., 2016b). Several studies suggest that regular breakfast intake may reduce the risk of obesity and some chronic diseases by involving energy balance as well as metabolism (Timlin & Pereira, 2007). A study conducted on US adults revealed that skipping meals is correlated with poor dietary intake as well as diet quality (Kerver et al., 2006). The present study showed a good percentage of regular breakfast, lunch, and supper intake. However, it was discovered that female students skip a higher percentage of breakfast, lunch, and supper than male students. The reason behind this needs further investigation. In addition, a large amount of fast food consumption increases the risk of certain chronic diseases, including obesity (Virtanen et al., 2015). Again, sugar-containing beverages are correlated with obesity as well as diet-related chronic diseases globally (Lim et al., 2014). According to the study findings, canteen food preferences were more common among female students than male students. The reason behind this might be the shifting system of education because female students started their class on the morning shift (08:00 a.m.) and male students started their class on the day shift (noon). As a result, female students left early from home and chose canteen food over homemade food. However, the fast-food consumption rate was a little bit higher among males than females, which might indicate the reason for being overweight, as found in this study among male students.

A comprehensive approach to health promotion programs is necessary to reduce the knowledge gaps among the academic group of the study population. An effective intervention means not only addressing knowledge deficits but also targeting behaviour change with the collaboration of healthcare providers, policymakers, educators, and individuals. Thus, by addressing knowledge gaps and fostering positive changes in physical activity, sedentary behaviour, and dietary habits, the burden of diabetes and hypertension can be reduced and pave the way for a healthier future.

There was no previous study conducted on diabetes and hypertension knowledge among Bangladeshi students. This study tried to provide a little overview of two common non-communicable diseases among these age groups, along with their prevalence in physical activity and eating habits. However, the study could not include all the non-communicable disease questions (chronic obstructive pulmonary disease, asthma, and cancer) to keep the

questionnaire short in favor of student time, and only included diabetes, and hypertension questions. The findings of this study could help to conduct further exploratory studies on other unaddressed non-communicable diseases in the future. Although there were experts in every class during data collection, another issue with the information was that it was a self-reported questionnaire, which made it impossible to properly prevent bias. In addition, the findings of the study need to be used with caution because the sample was only drawn from urban college students, which might not represent rural college student's knowledge and lifestyles.

CONCLUSION

In conclusion, this study's findings regarding knowledge of diabetes and hypertension, along with patterns of physical activity and dietary habits, have provided a complex picture. The academic group of the study population has significant knowledge gaps on diabetes and hypertension risk factors, prevention, and management. Addressing these knowledge gaps via education and awareness campaigns is important. Diabetes and hypertension prevalence are closely associated with patterns of physical activity and sedentary behaviour. The study reported less physical activity and higher sedentary behaviour among the female students. Hence, preventive measures must include promoting regular physical activity and limiting inactive time among them. Also, dietary choices have a significant impact on the development and management of these chronic conditions. The dietary patterns that have been observed among the study population highlight the importance of encouraging balanced diets, cutting back on harmful food intake, and increasing consumption of fruits, vegetables, and whole grains. Besides, developing healthy behaviours needs multiple interventions that involve people, communities, and healthcare systems. Therefore, to reduce the rising prevalence of diabetes and hypertension, everybody must have the information to make healthy decisions, which might start with an effective health education program arranged by healthcare providers, policymakers, and educators in schools throughout the year. Considering these, a comprehensive approach to health promotion is necessary that encompasses not only education but also policies and environments and facilitates healthy choices in the future.

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