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Comparison of Physical Activity Awareness, Perceived Barriers and Practices between Urban and Rural Adults in Selected Districts of Bangladesh

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Abstract

Background

Physical activity (PA) is one of the most important modifiable risk factors for non-communicable diseases (NCDs), which are increasing in Bangladesh. There may be differences between urban and rural adults in regard to PA levels, knowledge of guidelines, and perceived barriers, but few studies have looked at all three simultaneously.

Methods

A comparative cross-sectional study was carried out in 316 adults (158 urban and 158 rural) aged 18–64 years at selected sites of Dhaka, Rajshahi, Khulna and Sylhet with convenience sampling techniques. The WHO Global Physical Activity Questionnaire (GPAQ) was used to assess PA, while awareness and perceived barriers were assessed via structured, pre-tested items (23 items, $\alpha = 0.787$ and 25 items, $\alpha = 0.848$, respectively). The tests used were: Chi-square test, Fisher's exact test, Mann–Whitney U test, Kruskal–Wallis test, and binary logistic regression.

Results

The overall achievement at sufficient levels of PA was 55.1% of adults and was not found to differ between urban and rural areas (52.5% vs. 57.6%, $p = 0.366$). Occupational activity was significantly higher in rural adults ($p < 0.001$), and accounted for a larger proportion of total activity (81.8% vs. 58.6%) than in urban adults; recreation activity was higher in the urban adults ($p < 0.001$), and accounted for a larger proportion of total activity (37.1% vs. 12.8%); and sitting time was longer among urban adults than rural adults ($p = 0.022$). Overall awareness of PA recommendations was low (45.9%), with urban adults more likely to be aware than rural adults (54.4% vs. 37.3%, $p = 0.003$) and only 7.6% correctly identifying the WHO as the source of global recommendations. Awareness was not associated with PA status in adjusted analysis (AOR = 0.67, 95% CI 0.16–2.59, $p = 0.6$). High perceived barriers significantly increased the adjusted odds of low PA (AOR = 3.76, 95% CI 2.26–6.34, $p < 0.001$) and women had significantly higher adjusted odds than men of reporting high perceived barriers (AOR = 1.96, 95% CI 1.25–3.11, $p = 0.004$).

Conclusion

Overall, the level of PA sufficiency of the urban and rural adults were comparable, but the quantity, content, knowledge and barriers of PA varied significantly. Barriers, rather than awareness, were the primary determinants of PA status, and gender was a stronger predictor of barriers than residence was. PA promotion should take a combined approach of practical guideline education and intervention for

structural, occupational and gender related barriers, which should be done separately for urban/rural and male/female groups.

1 Introduction

Physical activity (PA) is a key element of a healthy lifestyle, and has a central role in the prevention and management of non-communicable diseases (NCDs). Physical activity is defined by the World Health Organization (WHO) as any movement of the skeleton muscles that uses energy, from work activity, transport, domestic activity, recreation, sport and exercise. There are significant health effects from regular physical activity, while low levels of physical activity are linked to greater risk of cardiovascular disease, diabetes and other chronic diseases [1–3].

Physical activity is influenced by the social, economic, occupational and physical factors under which people live[4]. Urbanization and shifts in the type of work available can lead to the decline of opportunities for routine physical activity, either through increased sedentary work or motorized transport, while rural populations might develop large amounts of physical activity through agricultural and other physically demanding jobs. As a result, overall levels of physical activity reported may not reflect the differences in the way physical activity is gained between population groups.

Observations in Bangladesh and other South and Southeast Asian contexts indicate that physical activity varies with place of residence, occupation, sex and socio-economic status. National surveillance data have shown that there is a significant level of insufficient physical activity in adults of Bangladesh with a high level of recreational inactivity [5]. It has also been suggested by previous Bangladeshi studies that older adults in rural areas might be able to get more physical activity from their work, while those living in urban areas might be exposed to higher levels of sedentary activities and environmental factors limiting physical activity [6–10]. Other urban–rural inequities have been described in other South Asian populations and contexts, but the nature and strength of inequities differ between populations and contexts [11–13].

Knowing the recommended amount of physical activity is another factor that could be important in determining behaviour. Moderate to intense physical activity is recommended for adults, and muscle strengthening exercises for a healthy lifestyle. But, if someone is active, knowledge of these particular recommendations may be limited. A lack of knowledge regarding recommended physical activities levels has been previously illustrated among adults in Bangladesh and neighbouring countries [14, 15]. This would increase the risk of a knowledge–behaviour gap, that is, physical activity being enjoyed in the context of getting to work or to transport goods without the individual having the knowledge that it is worthwhile for them to do so because it is within the recommended levels.

People can have several barriers to becoming and staying physically active besides knowledge. Some of these barriers are time, long working hours, family commitments, lack of information, lack of social support/exercise partners, cost, environment safety issues, poor footpaths, traffic, lack of recreational

facilities, and psychological/physical issues. Working hours, time constraints, environmental factors and other contextual factors have been shown to be significant perceived barriers in previous studies in the context of adults in Bangladesh [16, 17, 18]. The barriers and their relative significance may, however, vary across urban and rural populations.

Although the increasing body of evidence regarding physical activity in Bangladesh, few studies have explored the three components physical activity practice, physical activity recommendations and perceived barriers at the same time in a population with a similar measurement framework. Past research often has been conducted on the urban population, on distinct groups of occupations, or on the separate elements of physical activity behaviour. This means that direct comparisons of adults in the city and adults in the countryside with regards to awareness, perceived barriers and structured measures of physical activity practice are limited.

In a country like Bangladesh, which is experiencing rapid urbanization, evolving job structures and socio-economic transition, these interrelated dimensions are especially pertinent as they may impact traditional physical activity sources. Knowing if there are differences in physical activity that are related to differences in awareness and perceived barriers can guide context-specific physical activity promotion strategies. Thus, this study was designed to compare the awareness about physical activity, perceived barriers for physical activity and physical activity among urban and rural adult population of selected districts of Bangladesh and to explore the association of these physical activity parameters with the sociodemography associated with them.

2 Methods

2.1 Study design and setting

It was a comparative cross-sectional study conducted between adults in selected area of urban and rural areas in Bangladesh from 1st July 2025 to 30th June 2026, which was set for April and May 2026 for data collection. The four districts: Dhaka, Rajshahi, Khulna and Sylhet were chosen to represent various contexts of urban, peri-urban and rural settings. The study was conducted at specific study sites of Dhanmondi in Dhaka, Mirpur in Dhaka, Mouchak (Gazipur) in Dhaka, Sopura in Rajshahi, Padma Residential Area in Rajshahi, Horian in Rajshahi, Zindabazar in Sylhet, Khadimpara in Sylhet, Sonadanga in Khulna and Gollamari in Khulna.

2.2 Study population and eligibility

This study population consisted of adults (18–64 years) living in selected urban and rural areas. The participants included those who lived in the selected area for at least one year and consent to participate in the study. Those who were critically ill, had been diagnosed with cognitive impairment or severe mental illness that would be likely to make reliable information difficult to obtain, or did not want to participate were excluded.

2.3 Sample size and sampling

A previously reported comparative cross sectional study on physical inactivity in urban (59.5%) and rural (41.9%) adults in Bangladesh was used to estimate the sample size for this study [16]. A 20% allowance for non-response was added to the sample and a total of 316 adults were required, with 158 individuals needed per group. Convenience sampling was used to select the participants based on their accessibility and availability in the selected study areas, equal number of participants in urban and rural areas.

2.4 Data collection instrument

A pre-tested semi-structured questionnaire was used to gather data through face-to-face interviews and included sociodemographic information, physical activity assessment, awareness of physical activity recommendations and perceived barriers to physical activity. The STEPwise approach to NCD surveillance of the WHO was used to adapt the sociodemographic questions. The WHO Global Physical Activity Questionnaire (GPAQ), version 2 [19–22] was used to assess physical activity. Items addressing the awareness were adapted from literature previously published, and items addressing the perceived barriers were developed based on previously reported instruments and literature.

2.5 Physical activity assessment

Physical activity for the GPAQ was measured across three domains (work, transportation, and recreation) and sedentary behaviour. Physical activity was reported in MET-min/week; moderate intensity activities had 4 METs, vigorous intensity had 8 METs. The total MET-min/week was determined by multiplying the duration (min/day) by the frequency (days/week) for each domain and adding them together to get the total for the week. Physical activity level was classified as low, moderate, or high, based on the GPAQ criteria: moderate activity level, = 600 MET-min/week, at least one domain and high activity level, = 1500 MET-min/week or at least one domain or 3000 MET-min/week combined. In the binary physical activity status, ≥ 600 MET-min/week was considered as sufficient, and < 600 MET-min/week was considered as insufficient.

2.6 Assessment of awareness and perceived barriers

Awareness was measured with 23 structured items including knowledge of physical activity guidelines, the organization responsible for the global guidelines, recommended moderate and vigorous intensity activity, muscle strengthening recommendations, combined aerobic and muscle strength recommendations, health implications of sitting for too long and health benefits of physical activity. A point was awarded for each correct answer (maximum of 23 points). Twenty-five items related to physical, psychological, environmental, and socio-ecological factors were used to measure perceived barriers, such as perceived physical unfitness and fatigue, stress, lack of interest, self-confidence, environmental conditions (weather, recreational spaces, footpaths, traffic, lighting, stray dogs), and socio-ecological factors (time, social support, information, safe areas, companions, cost, working hours, family responsibilities) The internal consistencies of the awareness scale and the barrier scale were 0.787 and 0.848 respectively (Cronbach's alpha).

2.7 Pre-testing and data quality

Pre-testing of the questionnaire was carried out for 20 adults (10 urban, 10 rural) who did not form a part of the main study and the questionnaire was changed in wording and order to ensure clarity and comprehension, and feasibility. Interviews were standardized, questionnaires that were completed, were reviewed for missing or incomplete items, and data entry was double-checked. A unique identification code was given for each participant.

2.8 Statistical analysis

The data was entered and analyzed using IBM SPSS Statistics (Version 27) and R software. Categorical variables were presented as frequencies and percentages; continuous variables as median and interquartile ranges. The Pearson's chi-square test or Fisher's exact test (expected cell counts were small) was used for categorical variables; the Mann–Whitney U test (two groups) and Kruskal–Wallis test (more than two groups) were used for continuous variables. The association between awareness level, perceived barrier category, and physical activity status were examined using binary logistic regression. Three multivariable models were created for awareness, perceived barriers, and physical activity status.Three multivariable models were created for awareness, perceived barriers and physical activity status. Only 11 participants had sufficient awareness, so the awareness model was reduced for the sparse data and included age, sex, residence and household income. Barrier model included the same variables.A reduced model was used for sparse data for the awareness and barrier model, and included age, sex, residence and household income. The physical activity status model comprised of age, sex, marital status, religion, occupation, awareness level and perceived barrier category. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) are reported. Hosmer-Lemeshow test and Nagelkerke R^2 were used to examine model fit. Statistically significant ($P < 0.05$) was defined as a two-sided p value.

2.9 Ethical considerations

Ethical clearance was issued by the IRB of the National Institute of Preventive and Social Medicine (NIPSOM) before the study started (approval memo no. NIPSOM/IRB/2026/9(165))). All the participants gave written informed consent prior to data collection. The interviews were conducted one by one and the results were kept confidential. The participants took part of the activity voluntarily and they were free to withdraw or refuse at any time. No invasive techniques or biological samples were used.

3 Results

3.1 Participant characteristics

There were 316 adults in the analysis (158 in urban areas, 158 in rural areas). The median age was 35 years (IQR 28–45), and was 34 years in urban participants and 35 years in rural ($p = 0.043$). Overall, 53.2% of participants were women and 46.8% were men, and there was no significant difference in the distribution by urban and rural areas. The majority (79.4%) were currently married and marital status was significantly different depending on the participants' residence ($p = 0.010$). There was more non-

government job in the urban areas (37.3% vs. 21.5%, p = 0.001) and higher monthly income among the urban participants (BDT 150,000 vs. 100,000, p < 0.001). The distribution of the urban and rural groups on a district basis was comparable (Dhaka 87, Rajshahi 94, Khulna 84 and Sylhet 51). There was no significant difference in the prevalence of tobacco use by residence (9.5% urban, 12.0% rural, p = 0.586), but chronic health conditions were significantly higher among rural participants (37% vs. 18%, p < 0.001). Table 1 shows that the full sociodemographic and health characteristics are presented.

Table 1
Sociodemographic and health characteristics of study participants

Characteristic	Overall, n (%)	Urban, n (%)	Rural, n (%)	p-value
Participants	316 (100)	158 (100)	158 (100)	—
Age, median (IQR), years	35 (28–45)	34 (28–42)	35 (28–47)	0.043
Sex				**0.430**
Male	148 (46.8)	78 (49.4)	70 (44.3)	
Female	168 (53.2)	80 (50.6)	88 (55.7)	
Marital status				**0.010**
Never married	53 (16.8)	25 (15.8)	28 (17.7)	
Currently married	251 (79.4)	132 (83.5)	119 (75.3)	
Ever married	12 (3.8)	1 (0.6)	11 (7.0)	
Education				**< 0.001**
No formal schooling	20 (6.3)	2 (1.3)	18 (11.4)	
Less than primary	38 (12.0)	8 (5.1)	30 (19.0)	
Primary completed	52 (16.5)	15 (9.5)	37 (23.4)	
Secondary completed	27 (8.5)	14 (8.9)	13 (8.2)	
High school completed	27 (8.5)	16 (10.1)	11 (7.0)	
College completed	55 (17.4)	21 (13.3)	34 (21.5)	
Graduate degree	63 (19.9)	51 (32.3)	12 (7.6)	
Postgraduate degree	34 (10.8)	31 (19.6)	3 (1.9)	
Occupation				**0.001**
Government employee	29 (9.2)	21 (13.3)	8 (5.1)	
Non-government employee	93 (29.4)	59 (37.3)	34 (21.5)	
Self-employed	82 (25.9)	33 (20.9)	49 (31.0)	
Student	31 (9.8)	15 (9.5)	16 (10.1)	
Homemaker	63 (19.9)	23 (14.6)	40 (25.3)	
Retired	7 (2.2)	2 (1.3)	5 (3.2)	
Other	11 (3.5)	5 (3.2)	6 (3.8)	

Characteristic	Overall, n (%)	Urban, n (%)	Rural, n (%)	p-value
Monthly household income, median BDT (IQR)	124,500 (71,500–250,000)	150,000 (100,000–300,000)	100,000 (70,000–200,000)	< 0.001
Tobacco use				**0.586**
Yes	34 (10.8)	15 (9.5)	19 (12.0)	
No	282 (89.2)	143 (90.5)	139 (88.0)	
Chronic health condition				**0.001**
None	229 (72.5)	129 (81.6)	100 (63.3)	
One condition	31 (9.8)	9 (5.7)	22 (13.9)	
Multiple conditions	56 (17.7)	20 (12.7)	36 (22.8)	

Data are n (%) unless otherwise indicated. IQR, interquartile range. p-values were obtained using Pearson's chi-square/Fisher's exact test or Mann–Whitney U test, as appropriate.

3.2 Physical activity

Overall the median total activity was 840 MET-min/week (IQR 0–1440) and significantly more was achieved in the rural group compared to the urban group (960 vs. 720 MET-min/week, $p = 0.018$). Within the residence–sex subgroups, there were significant differences between rural men (1400 MET-min/week) and urban men (510 MET-min/week; $p < 0.001$); and men had a higher median activity than women (1060 MET-min/week vs. 720 MET-min/week, $p = 0.001$). The distribution of PA level was significantly different among people based on their residence ($\chi^2 = 8.786$, $p = 0.012$): high activity was more common among rural participants (27.2% vs. 13.9%) and moderate activity was more common among urban participants (38.6% vs. 30.4%). When dichotomized, 174 participants (55.1%) achieved sufficient physical activity (57.6% rural vs. 52.5% urban; $\chi^2 = 0.819$, $p = 0.366$, not significant). The proportion of activity spent on work-related activity was significantly different by residence, with 58.6% of MET-min/week in urban areas and 81.8% in rural areas; contribution of MET-min/week for recreational activity was 37.1% and 12.8% in urban and rural areas, respectively (transport contribution did not differ significantly). Sedentary behaviour also differed; the overall median sitting/reclining time was 210 minutes/day, with the urban respondents having 240 minutes/day and the rural respondents 210 minutes/day ($p = 0.022$); and women reporting a higher level of sitting than men (240 minutes/day vs. 210 minutes/day, $p = 0.005$). The details are given in Table 2.

Table 2
Physical activity indicators among urban and rural adults

Physical activity indicator	Overall	Urban	Rural	p-value
Sufficient PA, n (%)	174 (55.1)	83 (52.5)	91 (57.6)	0.366
Insufficient PA, n (%)	142 (44.9)	75 (47.5)	67 (42.4)	
Total PA, median MET-min/week (IQR)	840 (0–1440)	720 (0–1200)	960 (255–1680)	0.018
PA level, n (%)				**0.012**
Low	148 (44.9)	73 (46.2)	75 (47.5)	
Moderate	103 (34.5)	61 (38.6)	48 (30.4)	
High	65 (20.6)	22 (13.9)	43 (27.2)	
Contribution to total MET-min/week, %				
Work	72.4	58.6	81.8	< 0.001
Transport	4.9	4.3	5.4	0.149
Recreation	22.6	37.1	12.8	< 0.001
Sitting time, median min/day (IQR)	210	240	210	0.022

PA, physical activity; MET, metabolic equivalent of task; IQR, interquartile range. PA-level categories were derived using GPAQ criteria.

3.3 Awareness of physical activity recommendations

Overall, 45.9% of participants indicated that they knew the recommendations for physical activity; this was greater among urban participants than rural (54.4% vs. 37.3%, p = 0.003). Limited knowledge was noted regarding the organisation responsible for the global guidance as only 7.6% identified the WHO, with urban participants having more correct answers than rural (10.8% vs. 4.4%; p < 0.001). Of the 145 participants who knew of recommendations, 13.1% correctly identified the 150 minutes/week of moderate-intensity activity recommendation, and approximately 20% correctly identified the combined aerobic and muscle-strengthening recommendation. Knowledge about PA benefits for specific chronic conditions was also not equal; most participants (94.6%) knew about the benefits of PA for general chronic conditions, 68.7% knew about benefits for diabetes, and 24.7% and 26.3% knew about benefits for hypertension and high cholesterol, respectively, especially for rural participants. Most participants were in the low awareness range on the composite awareness score. No sociodemographic factor was a statistically significant independent predictor of adequate awareness in the multivariable model, but there was a trend for lower adjusted odds of adequate awareness among women vs men (AOR = 2.39, 95% CI 0.66–11.30, p = 0.212), and lower adjusted odds of adequate awareness among those residing in

rural areas vs those in urban areas (AOR = 0.25, 95% CI 0.04–1.09, p = 0.095); the model explained limited variance (Nagelkerke R^2 = 0.123). Refer to Table 3 and Table 5A.

Table 3
Awareness and knowledge of physical activity recommendations

Indicator	Overall, n (%)	Urban, n (%)	Rural, n (%)	p-value
Aware of PA recommendations				**0.003**
Yes	145 (45.9)	86 (54.4)	59 (37.3)	
No	171 (54.1)	72 (45.6)	99 (62.7)	
Correctly identified WHO as guideline organization				**< 0.001**
Yes	24 (7.6)	17 (10.8)	7 (4.4)	
No/other response	292 (92.4)	141 (89.2)	151 (95.6)	
Correctly identified 150 min/week moderate PA*	19 (13.1)	—	—	—
Correctly identified combined aerobic + muscle-strengthening recommendation	~ 21%	—	—	—
Believed PA provides chronic-disease benefits	299 (94.6)	157 (99.4)	142 (89.9)	< 0.001
Recognized PA benefit for diabetes	217 (68.7)	110 (69.6)	107 (67.7)	0.700
Recognized hypertension	78 (24.7)	50 (31.6)	28 (17.7)	0.004
Recognized obesity/overweight	128 (40.5)	71 (44.9)	57 (36.1)	0.110
Recognized high cholesterol	83 (26.3)	50 (31.6)	33 (20.9)	0.030

**The moderate-intensity recommendation analysis was based on the 145 participants who reported awareness of PA recommendations.*

3.4 Perceived barriers

The most common barrier overall was long working hours (63.3%); lack of exercise information followed (61.7%); lack of time (56.0%) and family responsibilities (52.8%). Urban participants were more likely than rural participants to report feeling unsafe while exercising (19.6% vs. 11.4%, p = 0.043), fear of thieves/hijackers (32.3% vs. 22.2%, p = 0.043), poor footpath conditions (36.7% vs. 23.4%, p = 0.010), and

heavy traffic (31.0% vs. 15.2%, p < 0.001). The rural participants were more likely to feel physically unfit for activity (27.8% vs. 12.7%, p < 0.001). There were no significant urban–rural differences with respect to lack of time, social support, exercise information, exercise companions, cost, long working hours or family responsibilities. The perceived barriers were reported by 53.2% of the participants in the urban area and 48.7% of the participants in the rural area and the difference was not statistically significant (χ^2 = 0.620, p = 0.431). Women were almost twice as likely as men to report high perceived barriers (AOR = 1.96, 95% CI 1.25–3.11, p = 0.004) while residence and household income were not independently associated with high perceived barriers (Table 5B). Details of individual barriers are shown in Table 4.

Table 4
Selected perceived barriers to physical activity among urban and rural adults

Barrier	Overall, n (%)	Urban, n (%)	Rural, n (%)	p-value
Long working hours	200 (63.3)	100 (63.3)	100 (63.3)	> 0.900
Lack of exercise information	195 (61.7)	90 (57.0)	105 (66.5)	0.083
Lack of time	177 (56.0)	86 (54.4)	91 (57.6)	0.600
Family responsibilities	167 (52.8)	85 (53.8)	82 (51.9)	0.700
No exercise companion	136 (43.0)	76 (48.1)	60 (38.0)	0.069
Lack of support	127 (40.2)	68 (43.0)	59 (37.3)	0.300
Cost	68 (21.5)	41 (25.9)	27 (17.1)	0.055
Unsafe exercise area	49 (15.5)	31 (19.6)	18 (11.4)	0.043
Not fit for PA	64 (20.3)	20 (12.7)	44 (27.8)	< 0.001
Feel too tired to exercise	141 (44.6)	71 (44.9)	70 (44.3)	> 0.900
Feel fit enough/no need for PA	111 (35.1)	64 (40.5)	47 (29.7)	0.045
Fear of thieves/hijackers	86 (27.2)	51 (32.3)	35 (22.2)	0.043
Poor footpath conditions*	95	58 (36.7)	37 (23.4)	0.010
Heavy traffic*	73	49 (31.0)	24 (15.2)	< 0.001

**Counts for the final two environmental items are reconstructed from percentages reported in the underlying dataset; verify against the original SPSS/R output before submission.*

3.5 Factors associated with physical activity status

The relationship between low perceived barriers and achieving sufficient physical activity was statistically significant (χ^2 = 33.675, df = 1, p < 0.001) with 71.6% of participants with low perceived barriers meeting the criteria for sufficient physical activity compared to 39.1% of those with high perceived barriers. For unadjusted binary logistic regression, the odds of insufficient physical activity

were significantly higher with high perceived barriers (OR approximately 4, 95% CI approximately 2.5–6.5, $p < 0.001$), and the odds of physical activity status were not significantly associated with awareness level. The multivariable model (Table 5C) showed that high perceived barriers was still significantly and strongly associated with insufficient physical activity (AOR = 3.76, 95% CI 2.26–6.34, $p < 0.001$), but adequate awareness was not. No significant difference was found for age, sex, marital status or occupation. The odds of insufficient physical activity were higher for Christian participants than for Muslim participants (AOR = 5.51, 95% CI 1.24–39.2, $p = 0.042$), but this was an imprecise estimate due to the small number of participants classified as Christians and could not be calculated for participants who were identified as Buddhist. Overall the final model was statistically significant (likelihood-ratio $\chi^2 = 53.745$, $p < 0.001$), Hosmer–Lemeshow $\chi^2 = 11.324$, df = 8, $p = 0.184$), and explained about 20.9% of the variance in physical activity status, and was an acceptable goodness of fit (Nagelkerke $R^2 = 0.209$).

Table 5
Multivariable logistic regression analyses of awareness, perceived barriers, and physical activity status *A. Factors associated with adequate awareness*

Predictor	AOR	95% CI	p-value
Age	0.95	0.88–1.02	0.212
Female vs. male	2.39	0.66–11.30	0.212
Rural vs. urban	0.25	0.04–1.09	0.095
Household income	1.00	1.00–1.00	0.439

Nagelkerke $R^2 = 0.123$; Hosmer–Lemeshow $\chi^2 = 11.07$, df = 8, $p = 0.198$.

B. Factors associated with high perceived barriers

Predictor	AOR	95% CI	p-value
Age	1.01	0.99–1.03	0.517
Female vs. male	1.96	1.25–3.11	0.004
Rural vs. urban	0.79	0.50–1.26	0.326
Household income	1.00	1.00–1.00	0.905

Nagelkerke $R^2 = 0.038$; Hosmer–Lemeshow $\chi^2 = 12.40$, df = 8, $p = 0.134$.

C. Factors associated with insufficient physical activity

Predictor	AOR	95% CI	p-value
Age	1.00	0.98–1.03	0.800
Female vs. male	0.88	0.47–1.63	0.700
Currently married vs. never married	0.82	0.33–2.03	0.700
Ever married vs. never married	4.66	0.79–39.8	0.110
Hinduism vs. Islam	0.98	0.49–1.92	> 0.900
Christianity vs. Islam	5.51	1.24–39.2	0.042
Non-government employee vs. government employee	1.12	0.44–2.86	0.800
Self-employed vs. government employee	1.01	0.40–2.56	> 0.900
Student vs. government employee	0.68	0.16–2.75	0.699
Homemaker vs. government employee	1.86	0.63–5.58	0.300
Retired vs. government employee	0.70	0.08–4.59	0.700
Other vs. government employee	1.63	0.32–10.0	0.600
Adequate vs. low awareness	0.67	0.16–2.59	0.600
High vs. low perceived barriers	3.76	2.26–6.34	< 0.001

Nagelkerke $R^2 = 0.209$; likelihood-ratio $\chi^2 = 53.745$, $p < 0.001$; Hosmer–Lemeshow $\chi^2 = 11.324$, $df = 8$, $p = 0.184$. AOR, adjusted odds ratio; CI, confidence interval. Reference categories are shown where applicable. The Buddhism category produced an unstable estimate because of the very small number of observations and should not be interpreted.

4 Discussion

This study explored physical activity practices, knowledge about the recommendations for physical activity and perceived barriers for physical activity among the urban and rural adults with four districts of Bangladesh. The results show that the overall percentage of participants that had adequate physical activity levels was quite comparable, but the amount, types, knowledge and barriers to physical activity were significantly different in urban and rural participants. While rural participants had higher overall amounts of physical activity, urban participants had significantly higher percentages of physical activity within the recreation category. Knowledge of physical activity guidelines was low, especially among rural participants, and barriers to physical activity had a greater association with physical activity than did awareness.

The rural group had a higher mean total physical activity, which was consistent with the occupational distribution of rural versus urban groups; work-related activity accounted for 81.8% of total MET-

min/week in rural compared to 58.6% in urban; and recreational activity accounted for 37.1% in urban compared to 12.8% in rural. This is in line with Bangladesh's previous studies which show that physical activity in rural areas is strongly related to occupational and livelihood related activities [16, 23]. The present findings thus suggest that total physical activity levels may mask important differences in the context and sustainability of physical activity: in rural populations, physical activity might be part of routine work, while in urban populations, physical activity might require discretionary time and resources [24].

No difference was found in the binary sufficient/insufficient classification of the total activity, despite the higher amount of activity in the rural participants. Residence was related more strongly to physical activity distributions and types than to the binary threshold for meeting the study's criteria for adequate levels of activity. It would not then be accurate to state that one setting is simply "more active" than the other.

Urban and rural groups spent different amounts of time sitting/reclining per day, with the urban group reporting sitting/reclining time of 240 minutes/day and the rural group reporting sitting/reclining time of 210 minutes/day. This observation is consistent with a general trend towards increased sedentary habits and less physical activity in urban environments, and suggests that physical activity and sedentary behaviour should be viewed separately.

One of the key findings of this study was that there was limited knowledge of physical activity recommendations. Less than half of participants indicated awareness, with awareness being significantly higher for urban participants than rural participants. Only 7.6% correctly identified WHO as the organisation with global guidance on physical activity and only a small proportion identified specific guidelines for the amount of physical activity. This difference may plausibly be related to differences in the educational and socioeconomic characteristics between both study groups but was not found to be an independent predictor of adequate awareness in the multivariable model. This needs to be interpreted with caution as there was only limited data (n = 11) with relatively wide confidence intervals because only 11 participants were classified as having adequate awareness in the composite measure. However, the results show that there is a significant disparity between physical activity being viewed as a health concept and knowledge about specific evidence-based recommendations [14, 15].

This was especially striking as there was little evidence of a relationship between awareness and physical activity status in either the unadjusted or adjusted analysis. This indicates that knowledge may be limited in predicting whether or not adults reach the recommended level of physical activity. In rural areas, people can have a lot of activity, and don't even know the formal recommendations, while others who are aware of the health benefits of activity may be constrained by practical, environmental, or social factors that limit participation.

Perceived barriers had a significantly stronger association with the physical activity status. The unadjusted model had an AOR of 4.03 (95% CI 2.24–4.99) and the association was persistent after

adjustment (AOR = 3.76, 95% CI 2.26–6.34). The cross tabulation shows that the participants who reported low perceived barriers had more than double the percentage (71.6%) of those who reported high perceived barriers (39.1%) that reported sufficient activity. The most cited barriers were long working hours, no exercise information, lack of time and family responsibilities, and urban participants reported additional barriers including high traffic and footpath issues and safety concerns more often. The results indicated that the effectiveness of interventions solely based on individual motivation or health education may be limited if environments in which people live and work continue to limit physical activity [25, 26, 27].

Gender emerged as an important determinant of perceived barriers: women had almost twice the adjusted odds of reporting high perceived barriers compared with men. This indicates that the promotion of physical activity needs to take into consideration gender-specific considerations such as time demands, family responsibilities, safety, access to suitable exercise settings, and social support. In particular, the lack of an important residence effect in the adjusted barrier model suggests that some of the barriers could be common in more than one context despite their different forms.

A few strengths of this study can be highlighted: The same participants were assessed on awareness, perceived barriers, and physical activity practice; the GPAQ was used across both the work, transport, and recreation domains, and the internal consistency for the awareness and barrier scales were acceptable. For several reasons, however, it must be noted that there are several limitations. Recall and social-desirability bias were present for all major measures reported, and physical activity was not assessed by accelerometer. Findings in this study cannot be generalized beyond the selected study locations because of the convenience sampling, and the number of participants in Sylhet was less than that of other districts, which means that the estimates in this district may not be representative. Because of the cross-sectional design, no temporal/causal inferences can be made and the observed association between barriers and inadequate levels of physical activity should not be interpreted as causal evidence that barriers lead to physical inactivity. The convenience sampling design used in four districts, therefore, these results are not nationally representative figures for Bangladesh.

5 Conclusions

The overall rate of physical activity for adults was comparable between urban and rural areas in selected districts of Bangladesh, but there was a marked difference in the pattern and sources of physical activity. The total physical activity of adults in rural areas was higher, and the percentage of high activity was higher than in urban areas, and most of the physical activity was in the work domain. Urban adults had more of their activity in the recreation domain and reported greater sitting time per day. Generally, knowledge of physical activity guidelines was low, and was particularly low among rural adults. Specific WHO recommendations were well known, especially those concerning the latter. But there was no significant association between awareness and physical activity status. In contrast, perceived barriers had a strong relationship with low physical activity, with those who perceived high barriers having significantly higher odds of insufficient activity even after adjusting for the other factors. High perceived

barriers were also more likely to be reported by women than men. The results in this study suggest that raising awareness is not enough to increase physical activity in adults from Bangladesh. Promoting physical activity should focus on both providing practical information about the recommended amount of physical activity, and on addressing the time constraints, long working hours, family responsibilities, access to recreational areas, safety, traffic, etc. that constitute barriers to the adoption of physical activity. The strategies should be designed to address the variability in activity patterns and constraints of urban and rural populations, and should include gender-responsive strategies.

Ethical Approval

and accordance

This study was approved by the Institutional Review Board (IRB) of the National Institute of Preventive and Social Medicine (NIPSOM), Mohakhali, Dhaka, Bangladesh (approval memo no. NIPSOM/IRB/2026/9(165), dated 8 February 2026) in accordance with the ethical guidelines of the IRB of NIPSOM. Written informed consent was obtained from all participants before data collection.

Declarations

Ethics approval and consent to participate:

The study protocol was approved by the Institutional Review Board (IRB) of the National Institute of Preventive and Social Medicine (NIPSOM), Bangladesh Medical University (approval memo no. NIPSOM/IRB/2026/9(165)) before the commencement of the study. All participants gave informed consent prior to data collection. Participants were informed that they could opt out of the study or withdraw from it at any time and that they did not have to participate.

Consent for publication:

Not applicable. The manuscript does not contain identifiable individual-level information, images, or videos requiring consent for publication.

Competing interests:

The authors declare that there are no competing interests.

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Author Contribution

Fatema Tuzzannat Brishty conceived and designed the study, developed the data collection tools, collected the data, performed the statistical analysis, interpreted the results, and wrote the main manuscript text, including all tables. Qazi Hena Ferdousi only supervised the study. All authors reviewed the manuscript.

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Data Availability

The datasets generated during and/or analyzed during the current study are not publicly available due to the presence of participant-level information collected under institutional ethical approval but are available from the corresponding author on reasonable request.

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