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Assessment of knowledge, attitudes, and prevention practices regarding HIV/AIDS among urban slum dwellers in Bangladesh: an interview-based study

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Abstract

Background This study explores the impact of HIV/AIDS on urban slum dwellers in Dhaka, Bangladesh, addressing unique socio-economic challenges and limited health resources. Despite low overall prevalence, gender inequalities, economic disparities, and awareness gaps persist. The aim is to assess HIV/AIDS-related knowledge, attitudes, and practices among this population, informing targeted interventions.

Methods A cross-sectional survey was conducted using face-to-face interviews in Dhaka's slum areas between October and November 2023. The sample size was calculated as 453 participants through non-probability (convenient sampling) sampling. A structured questionnaire in Bengali assessed socio-demographic factors, HIV/AIDS-related knowledge, attitudes, and prevention practices. Data were analysed using descriptive statistics, bivariate, and multivariable linear regression by SPSS (version 26) and STATA (version 14).

Results Urban slum dwellers exhibited limited average HIV/AIDS knowledge of 33.00%, favouring males. Positive association was found between daily physical exercise and knowledge, while insufficient sleep and lack of social media access were negative predictors. Average attitudes were generally positive (81.06%), influenced by factors such as gender, employment status, family history of STDs, and daily physical exercise. The average score of prevention practices was 60.6%, with positive predictors including male gender, cooperative family members, STD history, family history of STDs, acquaintance with HIV patients, and social media usage over 2 h. Younger age was negatively associated with prevention practices.

Conclusion This study pinpoints factors influencing HIV/AIDS knowledge and behaviours in Bangladeshi urban slum dwellers. Tailored interventions focusing on gender, and social media can enhance preventive measures. Acknowledging limitations, the study urges cautious interpretation due to potential biases in convenience sampling and self-reporting.

Keywords HIV/AIDS, Urban slum dwellers, Knowledge, Attitudes, Prevention practices, Bangladesh

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Introduction

Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) have posed significant global health challenges since the late twentieth century [1]. HIV/AIDS presents a multifaceted and evolving issue that extends beyond the medical domain to encompass social, economic, and cultural dimensions [2]. The virus primarily targets the body's immune system by attacking CD4 cells, compromising the ability to resist infections and diseases [3]. As HIV replicates and progressively destroys these cells, the body becomes increasingly susceptible to opportunistic infections [3, 4]. Transmission of HIV occurs through specific body fluids, most commonly via unprotected sexual intercourse, needle-sharing among drug users, and from an infected mother to her child during childbirth or breastfeeding [5, 6].

According to the World Health Organization (WHO), an estimated 39.9 million people were living with HIV globally in 2023 [7]. Additionally, approximately 630,000 people (ranging from 500,000 to 820,000) succumbed to AIDS-related illnesses in 2023 [8]. In South Asia, where the HIV epidemic varies across regions, national prevalence rates are estimated to reach up to 0.5% [9]. Outside of Africa, India has the second-highest number of individuals living with HIV and AIDS [10]. According to the United Nations Programme on HIV/AIDS (UNAIDS), as of 2023, approximately 2.5 million people are living with HIV in India, with an adult prevalence of 0.20% [11]. In Pakistan, the National Health Survey reported around 0.15 million HIV patients as of August 2018, with the majority in Punjab, highlighting a concerning increase in HIV cases that mirrors the broader global struggle against HIV/AIDS [12].

Despite the low prevalence of HIV/AIDS in Bangladesh (less than 1% among the general population), there are challenges associated with low rates of condom use and limited awareness about HIV/AIDS. Factors such as gender inequality, economic deprivation, illicit drug trade and misuse, inadequate health-seeking practices, and a general lack of understanding and awareness regarding HIV/AIDS could contribute to an increased prevalence of the disease [13]. Almost one million people have sought refuge in Bangladesh after fleeing Myanmar [14, 15]. Among them, 273 HIV cases were officially documented, rising to 319 by 2019. However, the actual number is likely higher due to undiagnosed cases, thereby significantly elevating their health risks [15]. Research indicates that approximately 37% of AIDS patients in Bangladesh remain undiagnosed, leading to untreated cases [16].

Urban slum residents often encounter barriers to accessing accurate information about HIV/AIDS due to socioeconomic constraints [17]. The unique socioeconomic dynamics of slum communities differ significantly from those in other urban or rural areas. A systematic review and meta-analysis found that HIV prevalence among slum residents was higher, at 12%, compared to 5% in non-slum urban populations and 6% in rural areas [18]. A separate study in Kenya reported a 12% prevalence of HIV among slum dwellers, surpassing the national burden of 5% [19]. In Bangladesh, urban slum dwellers encounter an elevated risk of HIV due to various factors, including overcrowded living conditions, limited access to health services, pervasive poverty, and scarce resources, creating an environment conducive to HIV spread [18, 19]. Additionally, behavioural risk factors for HIV transmission are prevalent in segments of the Bangladeshi population, contributing to the susceptibility of urban slum residents [20]. Therefore, this study is vital for comprehending and addressing the knowledge, attitudes, and practices concerning HIV/AIDS among urban slum dwellers in Dhaka, Bangladesh [21]. It aims to inform targeted interventions that can enhance awareness and prevent the spread of the disease in this vulnerable population. Tailored interventions, specifically designed to meet the unique needs of urban slum communities, are crucial for effective HIV/AIDS control. Furthermore, no single study has investigated knowledge, attitudes, and practices regarding HIV/AIDS among urban slum dwellers in Bangladesh. This study seeks to assess the knowledge, attitudes, and practices related to HIV/AIDS among urban slum dwellers in Bangladesh. The findings can be utilized to guide policymakers in filling the knowledge gaps among slum dwellers regarding HIV/AIDS, thereby contributing to disease prevention and overall public health improvement. Additionally, understanding AIDS-related knowledge, attitudes, and practices (KAP) in Bangladeshi slums is vital globally, as slums worldwide share challenges like overcrowding, limited healthcare, and poverty [22]. Insights here reveal the effectiveness of awareness programs and highlight gaps that may fuel disease spread.

Materials and methods

Study area

The study employed a face-to-face interview-based cross-sectional survey. Data was collected from slum areas of Dhaka city in Bangladesh, between October and November 2023.

Sample size

The sample size was calculated using the following equation:

$n = \frac{z^2pq}{d^2}; n = \frac{1.96^2 \times 0.5 \times (1-0.5)}{0.05^2} = 384.16 \approx 384$	Here, n = number of samples z = 1.96 (95% confidence level) p = prevalence estimate (50% or 0.5), no previous study found q = (1-p) d = Precession of the prevalence estimate (10% of 0.05)

Anticipating a prevalence estimate (p) of 50% in the current study, we aimed for a sample size of 424 people, accounting for a 10% non-response rate. Our sample size surpassed this initial estimate. Yet, 453 individuals were enlisted to bolster the study's robustness.

Study design, participants, and procedure

The study employed a cross-sectional survey design with face-to-face interviews using questionnaires conducted between October and November 2023. Participants were recruited through a non-probability sampling (convenience sampling) technique. Participants spent around 15–20 min completing the interviews. Initially, 490 participants participated in the surveys. After excluding incomplete responses, the final analysis encompassed 453 surveys. Missing responses occurred randomly, and justification will be provided during the revise and data entry phase. Data collection involved a paper-based semi-structured questionnaire in Bangla, the native language of the participants, conducted house-to-house. Given the sensitivity of HIV/AIDS, trained research assistants conducted the data collection, ensuring strict confidentiality.

A preliminary trial involving 30 participants from the target population was conducted to assess the questionnaire's acceptability and transparency. Subsequent to the pilot testing, minor adjustments were made to the questionnaire. Data from this trial were not included in the final analysis. The initial page of the questionnaire included an informed consent statement outlining the study's objectives, procedures, and the participant's right to refuse participation. Prior to the survey commencement, participants were requested to give informed consent by confirming their voluntary and spontaneous willingness to participate in the study. The participant inclusion criteria comprised: i) adults aged 18 or above residing in urban slums for at least one year, ii) proficiency in Bengali language (ability to talk), iii) willingness to participate in the study, iv) being married and sexually active (as most questions were related to sexual activity), and v) residency in Bangladesh as Bangladeshi citizens. Individuals below 18 years and those unwilling to participate were excluded during the interview.

Measures

Socio-demographic measures

Socio-demographic data were collected through inquiries covering various aspects: age, education level (categorized as illiterate, primary, secondary, or higher secondary and above), occupation (including housewife, day laborer, rickshaw puller, employee, unemployed, or other), monthly family income (grouped into less than 10,000 Bangladeshi Taka [BDT], 1000BDT to 20,000 BDT, or more than 20,000 BDT), history of sexually transmitted diseases (STDs) (yes/no), presence of STDs among family members (yes/no), willingness of family members to discuss STDs/HIV, acquaintance with HIV patients (yes/no), smoking and alcohol consumption habits (yes/no), daily physical exercise routine (yes/no), body mass index (BMI) classification based on measured height and weight (underweight/normal/overweight/obese), daily sleeping duration (classified as less than 7 h, 7 to 9 h, or more than 9 h), and daily social media usage time (categorized as less than 2 h, 2 to 5 h, or more than 5 h) [23]. The full study was conducted using a blinded questionnaire (see *Additional file 1* for details).

Knowledge, attitudes, and practices measures

In this study, we employed a set of 33 questions, comprising 11 items each for knowledge, attitudes, and prevention practices related to HIV/AIDS. These questions were adapted from previous validated studies [24–26]. The skewness and kurtosis of the total scores for all measures fell within the acceptable range of ± 2, a methodology consistent with validated Knowledge, Attitudes, and Practices (KAP) studies [23, 27].

Participants were presented with a set of eleven questions addressing knowledge about HIV/AIDS and its health effects, each offering three response options: yes, no, or don't know (e.g., *"Is HIV/AIDS a preventable disease?, Can HIV/AIDS spread by coughing & sneezing?"* (See details in Fig. 1). During the analysis, responses affirming with "yes" were designated the code "1," while responses of "no" and "don't know" were assigned the code "0." The cumulative score was computed by adding the scores of all items, ranging from 0 to 11, where a higher score indicated a higher level of knowledge [27].

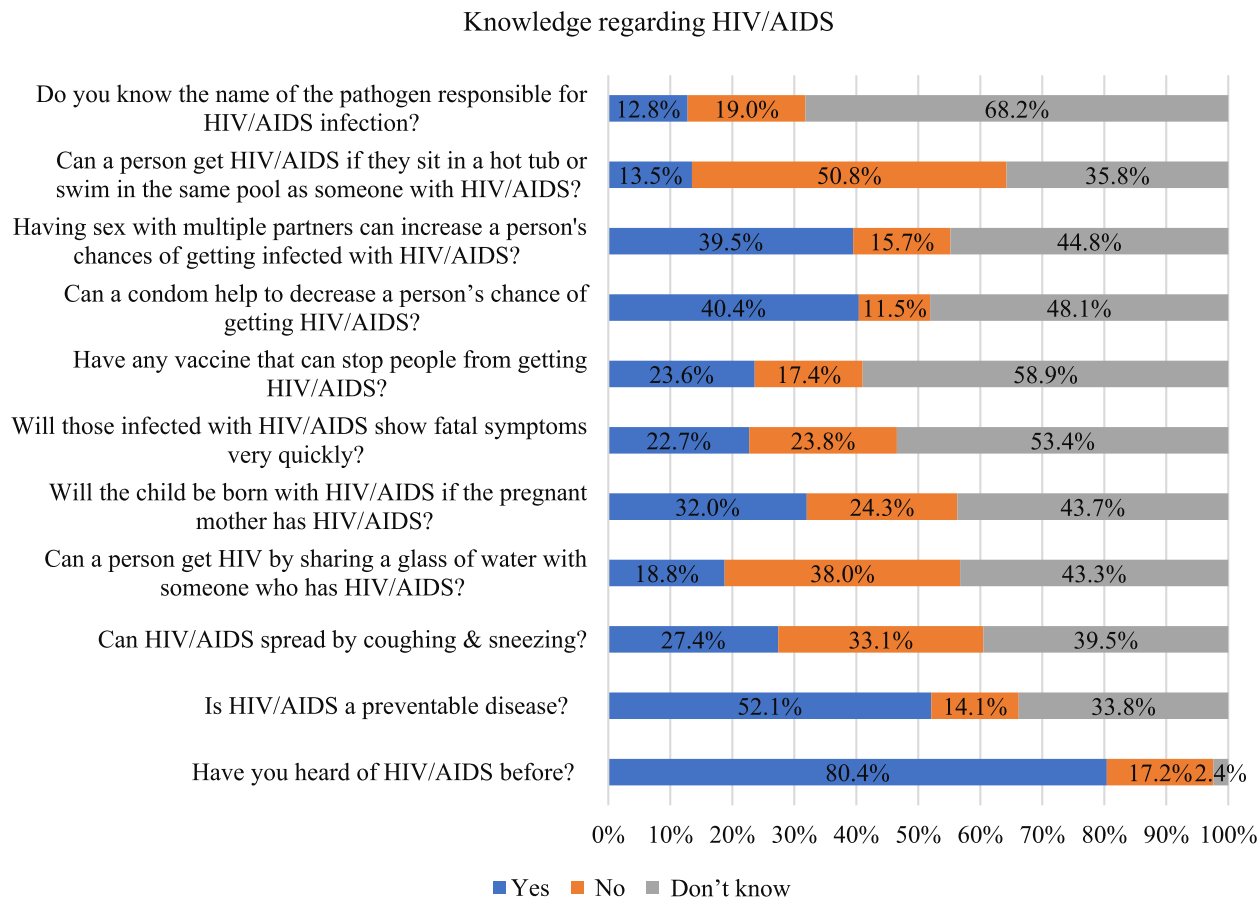

Fig. 1 Knowledge regarding HIV/AIDS

Additionally, the study documented the origins from which participants acquired knowledge about HIV/AIDS. The reliability of the knowledge items was assessed using Cronbach's Alpha, resulting in a calculated value of 0.88 indicates that there is a high internal consistency [28].

To assess attitudes regarding HIV/AIDS, eleven questions were utilized, employing a three-point Likert scale (e.g., 1 = disagree, 2 = neutral, 3 = agree). Illustrative queries included statements such as: *I feel comfortable discussing HIV/AIDS and related topics with healthcare providers, I trust that regular screening is an effective way to detect HIV/AIDS early. "* (see details in Fig. 2). The overall score, obtained by adding up individual item scores, ranged from 11 to 33, with a higher score reflecting a more positive attitude [27]. The Cronbach's Alpha for attitude items was computed at 0.82 indicates that there is a high internal consistency [28], and negative statements were reverse-coded.

To assess the participants' practices, eleven questions were posed, such as "*How often do you perform self-examinations to check for any abnormal changes in your body including reproductive health?, How often do you engage in practices that can reduce the risk of HIV/AIDS (e.g., limiting sexual partners, using protection, not sharing needles,* etc.*)?, How frequently do you use protection (e.g., condoms) during unsafe sexual intercourse to reduce the risk of HIV/AIDS??*" (see details in Fig. 3). Participants used a three-point scale (indicating "never," "sometimes," or "always"). In the analysis, "never" was coded as "1," "sometimes" as "2," and "always" as "3." The total score, ranging from 11 to 33, reflected adherence to practices, with a higher score indicating a higher level of adherence [27]. The Cronbach's Alpha value for the practice items, calculated as 0.79, demonstrates a high level of internal consistency [28].

Statistical analysis

The analysis involved multiple statistical tools, including Microsoft Excel 2021, SPSS version 26.0 (Chicago, IL, USA), and STATA version 15.0. Microsoft Excel facilitated data cleaning, coding, and sorting, after which the Excel file was imported into SPSS for calculating

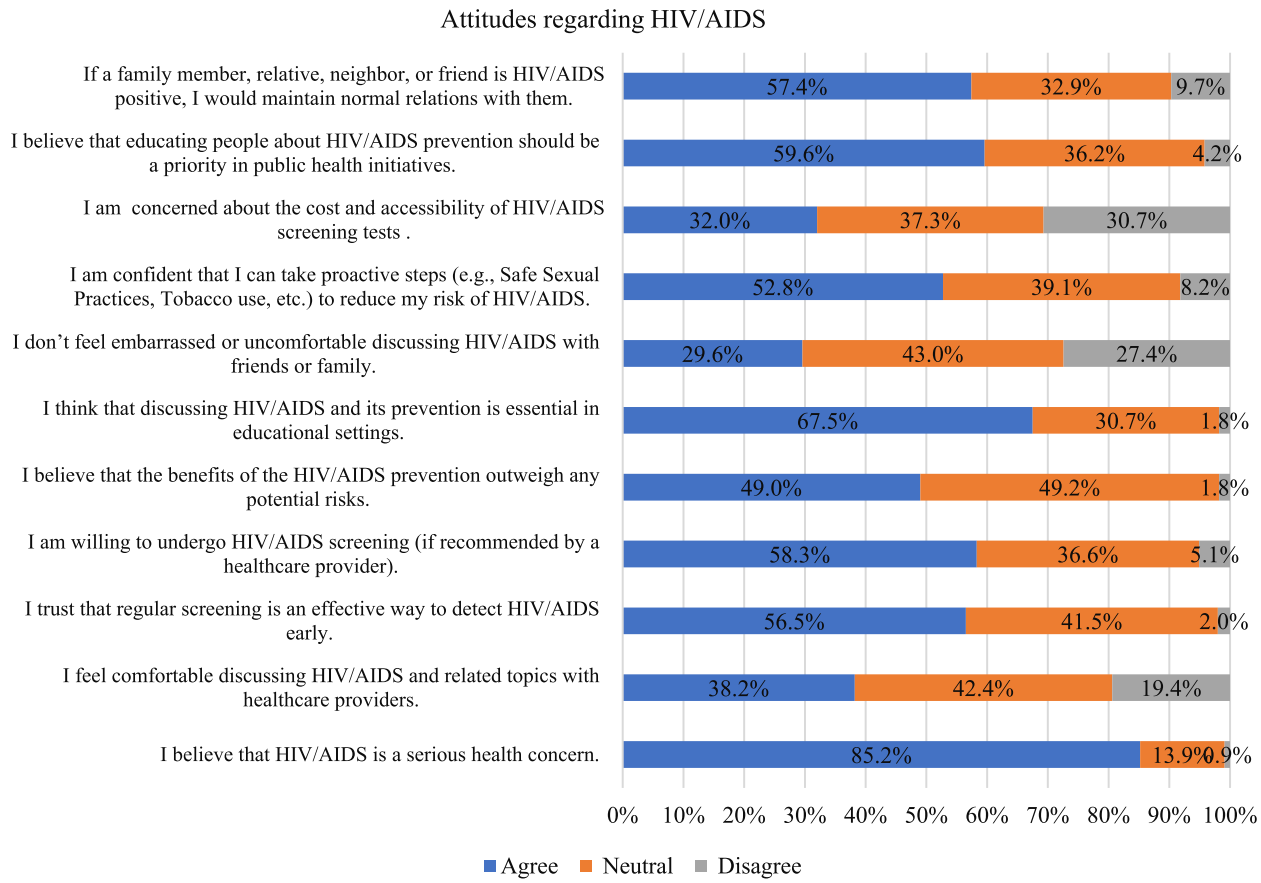

Fig. 2 Attitudes regarding HIV/AIDS

descriptive statistics like frequencies, percentages, means, and standard deviations. Bivariate and multivariable linear regression analyses, using the total scores of knowledge, attitudes, and practices measures, were conducted in STATA. All analyses adhered to a significance level of $p < 0.05$.

Ethics approval and consent to participate

The research protocol underwent review and approval by the Biosafety, Biosecurity, and Ethical Clearance Committee at Jahangirnagar University, Savar, Dhaka-1342, Bangladesh [Ref. No: BBEC, JU/M 2023/9–72]. The study procedures strictly adhered to human research guidelines, including the Helsinki Declaration. Informed written consent was procured from every participant, outlining the study's procedures, objectives, and confidentiality of their information. Informed written consent was taken from participants, and local guardians of the illiterate participants. Data collection was anonymous, and numerical codes were used for analysis.

Results

Table 1 shows that participants ($n = 453$) ranged in age from 18–75 years; Mean = 33.42, SD = 10.67. Most of them were female (52.3%). The majority of the participants had educational qualification of primary level (44.2%); followed by illiteracy of 24.9%. About 53.40% had monthly income in between 10,000 to 20,000 BDT. Around one fourth of the participants were housewives (26%); whereas day labor, employee are both at 21.2%. Regarding having STDs and STDs in family, majority of the participants had responded negatively by 86.8% and 91.4%. Only 14.3% participants had co-operative family members to discuss STDs/HIV. 94.5% of them didn't know any HIV patient. More than two third (68.7%) were non-smokers. Percentage of alcohol intake is also significantly low at 8.4%. Average sleeping hours of 58.3% were less than 7 h. Majority of participants did not have access to social media which stands at 51.4%. BMI status of more than two third (71.7) were at normal level; followed by overweight at 21%. 90.7% did not use narcotics.

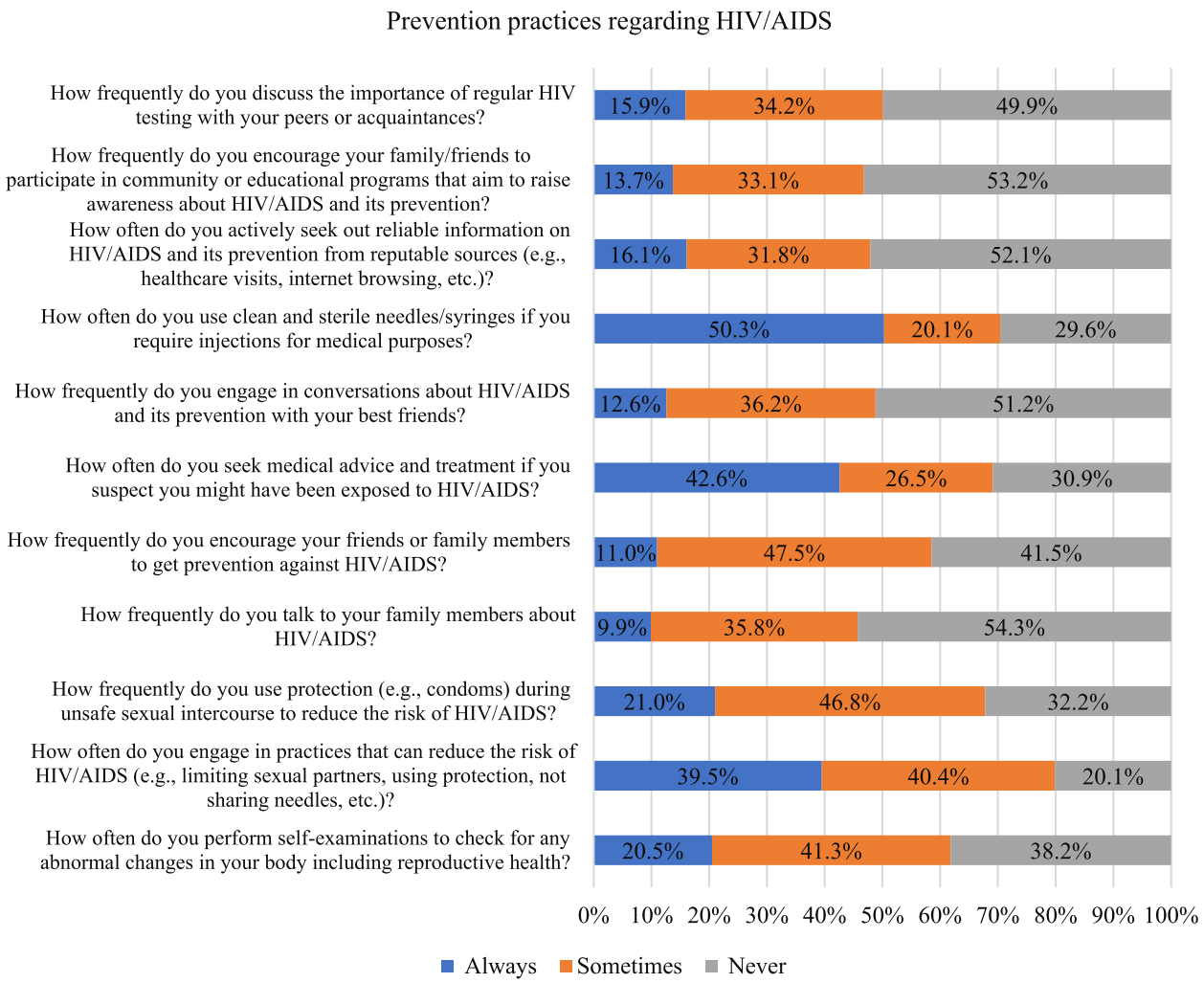

Fig. 3 Prevention practices regarding HIV/AIDS

Knowledge regarding HIV/AIDS

The mean score of the knowledge items was 3.63 (SD = 2.73) out of 11, indicating an overall correct percentage of only 33.00%. As per as multiple linear regression analysis, the positively predicting factors of knowledge score included: i) being male (β = 0.24, $p < 0.001$) in reference to 'female', ii) daily physical exercise (β = 0.09, $p = 0.033$) in reference to 'no'. Negative predicting factors were: i) sleeping less than 7 h (β = −0.27, $p = 0.009$) in reference to 'more than 9 h', ii) not having access to social media (β = −0.25, $p < 0.001$) in reference to 'less than 1 h of social media usage' (Table 2). Figure 4 demonstrates the sources of knowledge regarding HIV/AIDS.

Attitudes regarding HIV/AIDS

The mean score of the attitudes items was 26.75 (SD = 3.39) out of 33, indicating an overall correct percentage of 81.06%. As per as multiple linear regression analysis, the positively predicting factors of attitudes score included: i) being male (β = 0.18, $p = 0.008$), ii) being unemployed (β = 0.10, $p = 0.029$) in reference to 'housewife', iii) having family history of STDs (β = 0.07, $p = 0.037$), iv) having cooperative family members (β = 0.30, $p = < 0.001$), v) having bad self-perception about own physical health (β = 0.11, $p = 0.008$), vi) having normal sleeping time (β = 0.12, $p = 0.005$), and vii) doing daily physical exercise (β = 0.14, $p = 0.003$) (Table 3).

Prevention practices regarding HIV/AIDS

The mean score of the practices items was 20.00 (SD = 5.24) out of 33, indicating an overall correct percentage of 60.60%.As per as multiple linear regression analysis, the positively predicting factors of attitudes score included: i) being male (β = 0.22, $p = < 0.001$) in reference to 'female', ii) having cooperative family members

Table 1 General characteristics of the participants

Variables	n (%)
Age (Mean ± S.D)	33.42 ± 10.67
Gender	
Male	216(47.7)
Female	237(52.3)
Educational qualification	
Illiterate	113(24.9)
Primary	200(44.2)
Secondary	101(22.3)
Higher secondary or more	39(8.6)
Monthly family income	
Less than 10,000 BDT	169(37.3)
10,000 to 20,000 BDT	242(53.40)
More than 20,000 BDT	42(9.3)
Occupation	
Housewife	118(26)
Day labour	96(21.2)
Rickshaw puller	34(7.5)
Employee	96(21.2)
Other	97(21.4)
Unemployed	12(2.6)
STDs	
Yes	60(13.2)
No	393(86.8)
Family member with STDs	
Yes	39(8.60)
No	414(91.4)
Co-operative family members to discuss about STDs/HIV	
Yes	65(14.3)
No	388(85.7)
Known to any/ familiar with any HIV patient	
Yes	25(5.5)
No	428(94.5)
Smoking	
Yes	142(31.3)
No	311(68.7)
Alcohol intake	
Yes	38(8.4)
No	415(91.6)
Daily Physical activity	
Yes	95(21.0)
No	358(79.0)
Average sleeping status	
< 7 h	264(58.3)
7–9 h	168(37.1)
> 9 h	21(4.6)
Social media usage time	
< 1 h	70(15.5)
1–2 h	72(15.9)
> 2 h	78(17.2)
Don't have access	233(51.4)
BMI	
Underweight	33(7.3)
Normal	325(71.7)
Overweight	79(17.4)
Obese	16 (3.5)
Narcotics usage	
Yes	42(9.3)
No	411(90.7)

BDT Bangladeshi Taka, *1BDT* 0.0091 USD

(β = 0.20, $p = 0.004$) in reference to 'female', iii) having STDs (β = 0.13, $p = 0.001$) in reference to 'no', iv) having family history of STDs (β = 0.12, $p = 0.006$) in reference to 'no', v) known to any HIV patient (β = 0.10, $p = 0.029$) in reference to 'no', vi) using social media more than 2 h (β = 0.15, $p = 0.023$) in reference to 'no access', vi) smoking (β = 0. 0.19, $p = 0.001$) in reference to 'no access'. Negative predicting factors were: i) age (β = −0.02, $p = 0.002$) (Table 4).

Discussion

Several factors, including gender, daily physical exercise, social media access, sleep duration, employment status, family history of STDs, cooperative family members, self-perception of physical health, age, acquaintance with an HIV patient, and social media usage, were identified as significant predictors correlate with knowledge, attitudes, and preventive practices regarding HIV/AIDS among urban slum dwellers in Dhaka, Bangladesh.

This study revealed that there was a significant gender gap in HIV/AIDS knowledge among the people living in urban slums. Being male was a significant predictor, suggesting that males tended to have better knowledge levels compared to females. This finding is consistent with previous research [29]. Social dynamics, educational opportunities, and vulnerability factors could be the potential influencers contributing to the observed gender disparity in HIV/AIDS knowledge between men and women in urban slums [18, 30]. In urban slums, social dynamics shape unequal access to health information, limited educational opportunities impact awareness, and vulnerability factors, such as socio-economic conditions, contribute to a gender disparity in HIV/AIDS knowledge favoring men over women [31]. Additionally, it was determined that male participants exhibited a more positive attitude compared to their female counterparts regarding HIV/AIDS prevention. Similar patterns were identified in parallel studies [32]. This difference of attitude may be

Table 2 Regression analysis predicting knowledge

Variables	Overall	*Bivariable regression analysis*					*Multivariable regression analysis*				
	Mean (SD)	B	SE	t	β	*p*-value	B	SE	t	β	*p*-value
Age		< −0.01	0.01	−0.64	−0.03	0.523	0.02	0.01	1.55	0.07	0.123
Gender											
Male	4.50 (2.66)	1.65	0.24	6.74	0.03	**< 0.001**	1.36	0.37	3.63	0.24	**< 0.001**
Female	2.84(2.56)	Ref					Ref				
Educational qualification											
illiterate	3.57(2.86)	Ref					Ref				
Primary level	3.79(2.64)	0.22	0.32	0.69	0.04	0.488	0.06	0.30	0.21	0.01	0.835
Secondary	3.48(2.87)	−0.09	0.37	−0.24	−0.01	0.808	−0.18	0.35	−0.51	−0.02	0.609
Higher secondary or more	3.41(2.49)	−0.15	0.50	−0.31	−0.01	0.759	−0.81	0.47	−1.70	−0.08	0.090
Monthly family income											
Less than 10,000 BDT	3.36(2.62)	Ref					Ref				
10,000 to 20,000 BDT	3.77(2.80)	0.41	0.27	1.51	0.07	0.131	0.39	0.26	1.48	0.07	0.141
More than 20,000 BDT	3.95(2.74)	0.59	0.47	1.27	0.06	0.205	−0.29	0.46	−0.63	−0.03	0.526
Occupation											
Housewife	2.78 (2.40)	Ref					Ref				
Day labour	3.77 (2.67)	0.99	0.36	2.69	0.14	0.007	−0.61	0.43	−1.40	−0.09	0.163
Rickshaw puller	3.62 (3.13)	0.83	0.52	1.61	0.08	0.109	−0.88	0.59	−1.50	−0.08	0.135
Employee	3.77 (2.39)	0.99	0.36	2.69	0.14	**0.007**	0.03	0.37	0.08	< 0.01	0.934
Other	4.14 (3.09)	1.36	0.36	3.72	0.20	**< 0.001**	−0.03	0.41	−0.09	< −0.01	0.927
Unemployed	5.67 (2.53)	2.88	0.81	3.56	0.16	**< 0.001**	0.80	0.79	1.01	0.04	0.312
STDs											
Yes	4.43 (2.58)	0.92	0.37	2.46	0.11	**0.014**	0.49	0.36	1.35	0.06	0.177
No	3.51(2.73)	Ref					Ref				
Family with STDs											
Yes	4.67(3.07)	1.13	0.45	2.49	0.11	**0.013**	.80	0.43	1.87	0.08	0.062
No	3.53(2.68)	Ref					Ref				
Cooperative family members											
Yes	4.28(2.51)	0.75	0.36	1.22	2.07	**0.039**	0.23	0.36	0.65	0.03	0.517
No	3.52(2.75)	Ref					Ref				
Known to any HIV patient											
Yes	4.04(2.70)	0.43	0.56	0.77	0.03	0.442	−0.40	0.58	−0.69	−0.03	0.489
No	3.61(2.73)	Ref					Ref				
Smoking											
Yes	3.29(2.74)	Ref									
No	4.37(2.56)	1.08	0.27	3.97	0.18	**< 0.001**	0.06	0.34	0.18	0.01	0.856
Alcohol intake											
Yes	3.48(2.71)	Ref									
No	5.29(2.46)	0.81	0.31	2.60	0.12	**< 0.001**	0.64	0.49	1.32	0.06	0.189
Daily physical exercise											
Yes	4.27 (3.02)	0.44	0.29	1.54	0.09	**0.010**	0.66	0.30	2.14	0.09	**0.033**
No	3.46(2.63)	Ref					Ref				
Average sleeping time											
Less than 7 h	3.46(2.47)	−1.97	0.61	−3.21	−0.35	**0.001**	−1.53	0.58	−2.61	−0.27	**0.009**
7 to 9 h	3.68(2.94)	−1.75	0.62	−2.79	−0.30	**0.005**	−1.53	0.59	−2.56	−0.27	**0.011**
More than 9 h	5.43(3.53)	Ref					Ref				
Social media using time											
Less than 1 h	4.39(2.35)	Ref					Ref				
1 to 2 h	4.44(2.49)	0.05	0.43	0.13	< 0.01	0.893	−0.31	0.43	−0.73	−0.04	0.463

Table 2 (continued)

Variables	Overall	*Bivariable regression analysis*					*Multivariable regression analysis*				
	Mean (SD)	B	SE	t	β	*p*-value	B	SE	t	β	*p*-value
More than 2 h	4.72(2.77)	0.33	0.42	0.78	0.04	0.437	0.20	0.43	0.47	0.02	0.636
Don't have access	2.79(2.64)	−1.59	0.35	−4.51	−0.29	**< 0.001**	−1.36	0.35	−3.87	−0.25	**< 0.001**
BMI											
Under weight	4.00(2.35)	Ref					Ref				
Normal	3.79(2.71)	−0.21	0.49	−0.43	0.11	0.669	−0.23	0.47	−0.50	−0.03	0.620
Over weight	3.10(2.83)	−0.89	0.56	−1.60	0.07	0.111	−0.59	0.53	−1.10	−0.08	0.272
Obese	2.31(2.89)	−1.68	0.82	−2.04	−0.11	**0.042**	−1.32	0.78	−1.68	−0.08	0.094
Narcotic drug usage											
Yes	5.02(3.02)	Ref					Ref				
No	3.49(2.66)	1.53	0.43	3.51	0.16	**< 0.001**	0.75	0.48	1.58	0.08	0.116

B unstandardized regression coefficient, *SE* Standard error, *β* standardized regression coefficient

Bold indicates significant

$F_{(28,424)} = 4.90$

$p < 0.001$, $R^2_{Adj} = 0.1947$

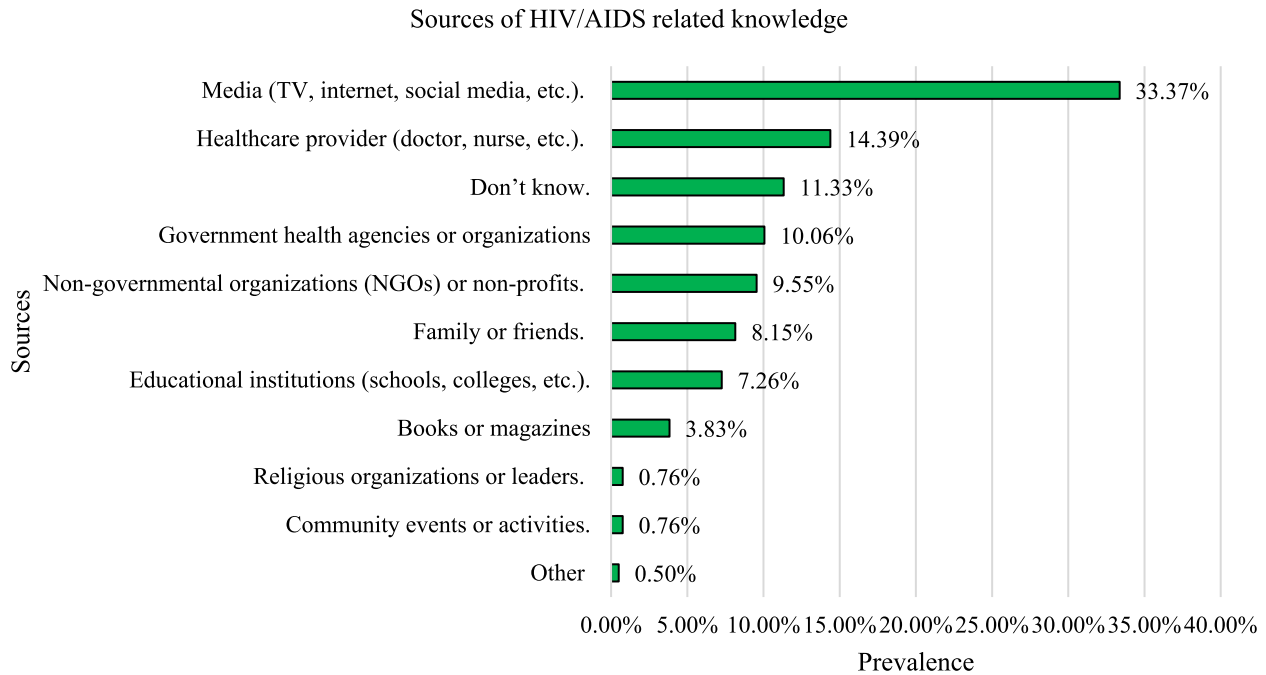

Fig. 4 Sources of HIV/AIDS AIDS-related knowledge

influenced by various factors, including cultural norms, social expectations, and gender-specific experiences related to HIV/AIDS awareness and prevention [33, 34]. Furthermore, disparities in accessing health information within urban slums are shaped by social dynamics. Limited educational opportunities impede awareness, and a gender gap persists in HIV/AIDS knowledge, primarily benefiting men due to diverse vulnerability factors, such as socio-economic conditions [35, 36]. This research also revealed that male participants residing in urban slums exhibit a higher level of engagement in HIV/AIDS prevention practices compared to their female counterparts, consistent with previous research [29]. Knowledge disparities on HIV/AIDS may be the reason behind the differences of practice status [24].

It became evident in this study that individuals of urban slum engaging in daily physical exercise exhibit a higher level of knowledge compared to those who do not

Table 3 Regression analysis predicting attitudes

Variables	Overall	*Bivariable regression analysis*					*Multivariable regression analysis*				
	Mean (SD)	B	SE	t	β	*p*-value	B	SE	t	β	*p*-value
Age		−0.01	0.01	−0.80	−0.03	0.423	0.01	0.01	0.53	0.02	0.597
Gender											
Male	27.80 (3.99)	2.00	0.35	5.60	0.25	**< 0.001**	1.48	0.55	2.67	0.18	**0.008**
Female	25.79 (3.63)	Ref					Ref				
Educational qualification											
illiterate	26.81(3.99)	Ref					Ref				
Primary level	26.95(3.98)	0.13	0.46	0.29	0.01	0.770	0.19	0.44	0.45	0.02	0.653
Secondary	26.46(3.93)	−0.35	0.53	−0.66	−0.03	0.506	−0.24	0.52	−0.46	−0.02	0.647
Higher secondary or more	26.31(3.59)	−0.50	0.73	−0.69	−0.03	0.489	−0.72	0.71	−1.01	−0.05	0.313
Monthly family income											
Less than 10,000 BDT	26.56(4.19)	Ref					Ref				
10,000 to 20,000 BDT	26.72(3.77)	0.16	0.39	0.41	0.02	0.683	−0.21	0.39	−0.56	−0.02	0.575
More than 20,000 BDT	27.67(3.73)	1.10	0.47	0.67	0.08	0.104	−0.11	0.69	−0.17	< 0.01	0.863
Occupation											
Housewife	25.65(3.35)	Ref					Ref				
Day labour	27.21(3.88)	1.55	0.52	2.94	0.14	**0.003**	−0.30	0.65	−0.46	−0.03	0.646
Rickshaw puller	26.79(4.30)	1.14	0.75	1.52	0.08	0.129	−0.83	0.88	−0.94	−0.05	0.346
Employee	26.86(3.60)	1.21	0.52	2.29	0.14	**0.023**	0.16	0.55	0.31	0.01	0.760
Other	27.02(4.52)	1.36	0.52	2.59	0.20	**0.010**	−0.11	0.61	−0.19	−0.01	0.847
Unemployed	30.67(2.87)	5.01	1.16	4.29	0.16	**< 0.001**	2.59	1.18	2.19	0.10	**0.029**
STDs											
Yes	26.90(4.39)	0.17	0.54	0.32	0.01	0.752	−0.29	0.54	−0.54	−0.02	0.592
No	26.73(3.87)	Ref					Ref				
Family with STDs											
Yes	28.77(4.57)	2.20	0.65	3.39	0.15	**0.001**	1.81	0.64	2.81	0.12	**0.005**
No	26.56(3.82)	Ref					Ref				
Cooperative family members											
Yes	26.97(4.42)	0.25	0.52	0.48	0.02	0.629	−0.18	0.53	−0.34	−0.01	0.736
No	26.71(3.85)	Ref					Ref				
Known to any HIV patient											
Yes	25.80(4.69)	−1.00	0.80	−1.24	−0.05	0.214	−1.58	0.85	−1.85	−0.09	0.064
No	26.81(3.88)	Ref					Ref				
Smoking											
Yes	26.24(3.83)	Ref					Ref				
No	27.87(3.93)	1.62	0.39	4.15	0.19	**< 0.001**	−0.79	0.50	−1.57	−0.09	0.118
Alcohol intake											
Yes	26.67(3.89)	Ref					Ref				
No	27.61(4.32)	0.93	0.66	1.40	0.06	0.162	0.18	0.73	0.25	0.01	0.802
Daily physical exercise											
Yes	27.95(4.33)	1.51	0.44	3.37	0.15	**0.001**	1.38	0.45	3.04	0.14	**0.003**
No	26.43(3.77)	Ref					Ref				
Average sleeping time											
Less than 7 h	26.43(3.76)	−1.56	0.88	−1.76	−0.19	0.078	−0.63	0.87	−0.72	−0.07	0.470
7 to 9 h	27.10(4.11)	−0.90	0.90	−1.00	−0.11	0.319	−0.24	0.88	−0.28	−0.03	0.779
More than 9 h	28.00(4.36)	Ref					Ref				
Social media using time											
Less than 1 h	27.04(3.39)	Ref					Ref				
1 to 2 h	27.67(4.04)	0.62	0.64	0.97	0.05	0.332	0.09	0.64	0.14	< 0.01	0.887

Table 3 (continued)

Variables	Overall	*Bivariable regression analysis*					*Multivariable regression analysis*				
	Mean (SD)	B	SE	t	β	*p*-value	B	SE	t	β	*p*-value
More than 2 h	28.26(4.02)	1.21	0.62	1.93	0.11	0.055	1.05	0.64	1.62	0.10	0.107
Don't have access	25.88(3.82)	−1.16	0.52	−2.24	−0.14	**0.026**	−0.97	0.52	−1.87	−0.12	0.062
BMI											
Under weight	26.52(4.28)	Ref									
Normal	27.06(3.89)	0.54	0.71	0.77	0.06	0.441	0.64	1.51	0.88	0.09	0.541
Over weight	26.08(3.93)	−0.45	0.80	−0.56	−0.04	0.576	−0.55	1.40	−0.62	−0.07	0.500
Obese	24.25(3.04)	−2.26	1.18	−1.91	−0.10	0.057	−2.33	1.25	−2.11	−0.12	0.457
Narcotic drug usage											
Yes	27.07(4.10)	Ref					Ref				
No	26.72(3.92)	−0.35	0.63	−0.55	0.16	0.579	0.09	0.71	0.13	< 0.01	0.894

B unstandardized regression coefficient, *SE* Standard error, *β* standardized regression coefficient

Bold indicates significant

$F_{(25,427)} = 3.83$

$p < 0.001$, $R^2_{Adj} = 0.1353$

participate in regular physical activity regarding HIV/AIDS. It has been explained that physical exercise is known to positively impact cognitive function and mental well-being, potentially enhancing individuals' ability to acquire and retain knowledge [37]. This may reflect that people who engage in more exercise might have better overall health knowledge than people who engage in less exercise [38, 39]. Participants who engage in daily physical exercise also exhibited a more positive attitude towards HIV/AIDS prevention than those who do not. Engaging in regular physical activity is known to have various psychological and physiological benefits, which may be the factors contributing to a positive attitude [40].

Interestingly, this study is the first to identify a significant association between sleep duration and HIV/AIDS related knowledge. The study found that participants sleeping less than 7 h and those sleeping 7 to 9 h had lower HIV/AIDS knowledge scores compared to those sleeping more than 9 h. It is possible that inadequate sleep may negatively impact cognitive functions, memory retention, and information processing, which are crucial for acquiring and recalling health-related knowledge [41, 42]. Further research is needed to explore potential mechanisms underlying this association, such as the role of fatigue, stress, or lifestyle factors that may simultaneously influence both sleep patterns and knowledge.

The study also unveiled that individuals without access to social media exhibit a lower level of knowledge regarding HIV compared to those who use social media for at least less than 1 h, consistent with prior study [43]. This discrepancy in HIV/AIDS knowledge might be attributed to the fact that individuals using social media, even for a short duration, are likely to come across HIV/AIDS-related content, educational campaigns, and discussions [44]. Conversely, those without access to social media may lack exposure to such information [45, 46]. The study also found that individuals using social media for more than 2 h in a day demonstrated a higher adherence to preventive practices compared to those who didn't have access with social media. This findings is in line with previous studies [21, 47]. Social media facilitates the dissemination of timely and targeted HIV/AIDS information, promoting awareness and fostering informed preventive practices through widespread accessibility and engagement [43, 44].

The findings of the study indicated that unemployed participants exhibited a more positive attitude compared to housewives, consistent with the findings of other study in Iran [46]. Unemployed individuals may have more time to engage with educational and awareness campaigns about HIV/AIDS through various media, shaping their positive attitudes [48]. Additionally, there was a significant association between lower age and prevention practices regarding HIV/AIDS in urban slum dwellers of Dhaka city. Similar finding was found at another study conducted in India [49]. Younger individuals may be more receptive to evolving health information and preventive strategies [50]. Tailoring interventions to address age-specific needs and preferences can enhance the overall effectiveness of preventive initiatives.

The study revealed a disparity of attitudes and prevention practices towards HIV/AIDS between the participants who have and who don't have family members with STDs. Participants with family members having STDs tend to exhibit a more positive attitude than those without such family history, as indicated by the findings. This

Table 4 Regression analysis predicting prevention practices

Variables	Overall	*Bivariable regression analysis*					*Multivariable regression analysis*				
	Mean (SD)	B	SE	t	β	*p*-value	B	SE	t	β	*p*-value
Age		−0.12	0.02	−5.73	−0.26	**< 0.001**	−0.08	-.02	−3.16	−0.02	**0.002**
Gender											
Male	20.61(5.69)	1.15	0.49	2.36	0.11	**0.019**	2.11	0.74	2.86	0.20	**0.004**
Female	19.45(4.76)	Ref					Ref				
Educational qualification											
illiterate	20.31(5.39)	Ref					Ref				
Primary level	19.69(5.38)	−0.61	0.61	−0.99	−0.05	0.321	−0.18	0.58	−0.32	−0.01	0.750
Secondary	20.19(4.98)	−0.12	0.72	−0.17	< 0.01	0.866	0.09	0.69	0.14	< −0.01	0.891
Higher secondary or more	20.18(4.93)	−0.13	0.97	−0.13	< 0.01	0.894	0.18	0.94	0.20	0.01	0.843
Monthly family income											
Less than 10,000 BDT	19.68(5.27)	Ref					Ref				
10,000 to 20,000 BDT	20.03(5.25)	0.35	0.52	0.67	0.07	0.503	0.20	0.51	0.39	0.01	0.700
More than 20,000 BDT	21.10(5.13)	1.41	0.90	1.56	0.06	0.119	1.00	0.91	1.10	0.05	0.273
Occupation											
Housewife	18.75(4.27)	Ref									
Day labour	20.14(5.45)	1.38	0.71	1.93	0.14	0.054	0.33	0.86	0.39	0.02	0.700
Rickshaw puller	20.21(6.37)	1.45	1.01	1.43	0.08	0.152	0.97	0.86	0.83	0.04	0.407
Employee	20.84(4.91)	2.08	0.71	2.92	0.14	**0.004**	1.35	1.16	1.85	0.10	0.065
Other	20.08(5.81)	1.32	0.71	1.86	0.20	0.063	0.39	0.73	0.49	0.03	0.628
Unemployed	23.17(4.82)	4.41	1.57	2.80	0.16	**0.005**	1.53	0.81	0.98	0.04	0.329
STDs											
Yes	21.97(4.74)	2.26	0.72	3.15	0.14	**0.002**	1.68	0.72	2.33	0.10	**0.020**
No	19.70(5.26)	Ref					Ref				
Family with STDs											
Yes	22.79(4.50)	3.05	0.86	3.52	0.16	**< 0.001**	2.37	0.85	2.78	0.12	**0.006**
No	19.74(5.24)	Ref					Ref				
Cooperative family members											
Yes	20.85(4.93)	0.98	0.70	1.41	0.06	0.161	−0.13	0.71	−0.19	< −0.01	0.846
No	19.86(5.29)	Ref					Ref				
Known to any HIV patient											
Yes	22.64(5.50)	2.79	1.07	2.60	0.12	**0.010**	2.47	1.13	2.19	0.10	**0.029**
No	19.85(5.20)	Ref					Ref				
Smoking											
Yes	20.23(5.06)	Ref					Ref				
No	19.50(5.63)	0.72	0.53	1.37	0.06	0.171	2.15	0.67	3.20	0.19	**0.001**
Alcohol intake											
Yes	21.43(5.96)	Ref									
No	19.87(5.17)	−1.55	0.88	−1.75	−0.08	0.081	−0.62	0.97	−0.64	−0.03	0.522
Daily physical exercise											
Yes	21.42(4.86)	1.79	0.60	2.99	0.13	**0.003**	1.08	0.60	1.79	0.08	0.075
No	19.62(5.29)	Ref					Ref				
Average sleeping time											
Less than 7 h	19.17(5.29)	Ref					Ref				
7 to 9 h	21.10(4.91)	1.92	0.51	3.78	0.17	**< 0.001**	−1.24	1.15	−1.07	−0.11	0.285
More than 9 h	21.57(5.59)	2.39	1.17	2.05	0.09	**0.041**	−0.39	1.17	−0.34	−0.03	0.737
Social media using time											
Less than 1 h	19.66(5.05)	0.33	0.70	0.47	< 0.01	0.893	−0.02	0.85	−0.03	< −0.01	0.974
1 to 2 h	20.10(5.30)	0.77	0.69	1.11	0.04	0.437	0.59	0.69	0.86	0.05	0.389

Table 4 (continued)

Variables	Overall	*Bivariable regression analysis*					*Multivariable regression analysis*				
	Mean (SD)	B	SE	t	β	*p*-value	B	SE	t	β	*p*-value
More than 2 h	22.23(4.67)	2.90	0.67	4.30	0.29	**< 0.001**	1.95	0.86	2.28	0.15	**0.023**
Don't have access	19.33(5.30)	Ref					Ref				
BMI											
Under weight	20.18(5.26)	1.74	1.60	1.09	0.11	0.277	−0.13	1.56	−0.09	< 0.01	0.931
Normal	20.13(5.25)	1.68	1.34	1.25	0.07	0.210	0.60	1.29	0.47	0.05	0.639
Over weight	19.72(5.18)	1.28	1.44	0.89	−0.11	0.373	0.43	1.35	0.32	0.03	0.751
Obese	18.44(5.70)	Ref					Ref				
Narcotic drug usage											
Yes	20.52(5.86)	Ref					Ref				
No	19.95(5.19)	0.57	0.85	0.68	0.03	0.498	0.68	0.95	0.72	0.03	0.471

B unstandardized regression coefficient, *SE* Standard error, *β* standardized regression coefficient

Bold indicates significant

$F_{(25,426)} = 4.13$

$p < 0.001$, $R^2_{Adj} = 0.1476$

discovery corresponds with a previous studies that suggested the heightened positive outlook observed in individuals with family members affected by STDs towards HIV prevention may stem from shared knowledge, collective experiences, and a proactive approach within these affected families, promoting a holistic comprehension [51, 52]. The study also revealed that individuals with an STD or a family history of STDs show greater engagement in preventive practices regarding HIV/AIDS compared to those without an STD or such family background, aligned with prior study [53]. Individuals with a personal or family history of STDs may possess a heightened awareness of the risks associated with sexual health. This increased awareness could drive them to adopt more proactive preventive measures against HIV/AIDS [54]. Additionally, individuals who are acquainted with HIV patients were found more likely to engage in preventive practices compared to those who do not know any HIV patients. This is may be due to the influence of knowing someone with HIV/AIDS has been identified as a powerful factor promoting positive attitudes and safe practices [55].

In comparing these findings with existing literature, our results resonate with studies highlighting the role of gender, socio-economic factors, and health-related behaviors in shaping HIV/AIDS knowledge, attitudes, and practices. The study provides valuable insights for targeted interventions to enhance HIV/AIDS awareness and preventive behaviors among urban slum dwellers in Dhaka, Bangladesh. However, further research is warranted to explore the nuanced interplay of cultural, social, and economic factors influencing HIV/AIDS perceptions and behaviors within this specific context.

Limitations of this study

The study acknowledges several limitations. Firstly, the use of convenience sampling may introduce selection bias, limiting the generalizability of findings. Secondly, reliance on self-reported measures may lead to recall bias and social desirability bias. Additionally, the cross-sectional design impedes causal relationship establishment and understanding changes over time, suggesting the need for a longitudinal study. The absence of a comparison group and limited generalizability to other regions or countries restricts applicability. The sample population utilized in this study may not be representative of other regions across Bangladesh. Additionally, including only married participants may introduce selection bias into the study. It is important to consider these limitations when interpreting and drawing conclusions from the results.

Conclusion

In conclusion, this study underscores the critical need for targeted interventions to enhance HIV/AIDS awareness and preventive behaviors among urban slum dwellers in Dhaka, Bangladesh. The findings reveal gender disparities in knowledge and highlight the role of social media in promoting awareness and preventive practices. While offering valuable insights, the study acknowledges limitations such as convenience sampling and self-report measures, urging cautious interpretation. Further research is warranted to explore the nuanced interplay of cultural, social, and economic factors influencing HIV/AIDS perceptions within this specific context.

Abbreviations

HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
CD4 cells	Cluster of Differentiation 4 cells
STDs	Sexually Transmitted Diseases
WHO	World Health Organization
UNAIDS	United Nations Program on HIV/AIDS
BMI	Body Mass Index
BDT	Bangladeshi Taka
KAP	Knowledge, Attitudes, and Practices
SPSS	Statistical Package for the Social Sciences
STATA	Software for Statistics and Data Science
Likert scale	A psychometric scale commonly involved in research surveys
Cronbach's alpha	A measure of internal consistency reliability
IRB	Institutional Review Board
SD	Standard Deviation
CI	Confidence Interval

Supplementary Information

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Additional file 1. Survey questionnaire.

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Authors' contributions
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Data availability
The corresponding author will grant access to the supporting data of this article upon request.

Declarations

Ethics approval and consent to participate
The research protocol underwent review and approval by the Biosafety, Biosecurity, and Ethical Clearance Committee at Jahangirnagar University, Savar, Dhaka-1342, Bangladesh [Ref. No: BBEC, JU/M 2023/9–72]. The study procedures strictly adhered to human research guidelines, including the Helsinki Declaration. Informed written consent was procured from every participant, outlining the study's procedures, objectives, and confidentiality of their information. Informed written consent was taken from local guardians of the illiterate participants. Data collection was anonymous, and numerical codes were used for analysis.

Consent for publication
All participants have provided consent for the publication of their statements and data.

Competing interests
The authors declare no competing interests.

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