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ASSESSMENT OF KNOWLEDGE AND ATTITUDE REGARDING HIV/AIDS AMONG THE "PRE-MEDICAL" COLLEGE STUDENTS OF QUETTA, BALUCHISTAN

Original Article

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ABSTRACT

Background: Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) continue to pose a significant public health challenge, especially in developing countries like Pakistan. The adolescent population remains highly vulnerable due to limited awareness, deep-rooted stigma, and inadequate educational initiatives. Comprehensive understanding of HIV/AIDS among youth is essential for effective prevention, timely diagnosis, and reduction of transmission. In Pakistan, the rising incidence of HIV among young people calls for an urgent evaluation of their knowledge and attitudes toward the disease.

Objective: To assess the knowledge and attitudes regarding HIV/AIDS among pre-medical college students in Quetta, Baluchistan.

Methods: A questionnaire-based cross-sectional study was conducted among first- and second-year pre-medical students enrolled in four public and private intermediate colleges in Quetta. A structured, self-administered questionnaire comprising four sections—consent, demographics, knowledge (24 items), and attitude (11 items)—was used for data collection. A total of 400 questionnaires were distributed using random sampling; 356 fully completed responses were included in the final analysis. Data were analyzed using SPSS version 20, applying descriptive and inferential statistics. Chi-square, Mann-Whitney, and Kruskal-Wallis tests were used to determine statistical significance ($p<0.05$).

Results: Among 356 participants, 199 (56%) were female and 157 (44%) were male, with a mean age of 17.6 years. Overall, 326 students (91.6%) demonstrated adequate knowledge; however, 50% believed HIV and AIDS are the same, 64% believed AIDS causes HIV, and 43% believed there is a cure. Misconceptions were common: 37.1% cited toilet seats, 38.5% coughing/sneezing, 20.2% mosquito bites, and 38.5% sharing water as transmission routes. A significant proportion held stigmatizing views—57% favored isolating HIV-positive individuals, and 69% would stop meeting an infected friend.

Conclusion: While the majority of students possessed basic awareness about HIV/AIDS, critical misconceptions and negative attitudes persisted. Targeted awareness campaigns and integration of accurate sexual health education within academic curricula are crucial to address these gaps and reduce stigma.

Keywords: Adolescent; Attitude; HIV Infections; Knowledge; Pakistan; Public Health; Students.

INTRODUCTION

Acquired Immunodeficiency Syndrome (AIDS), a chronic and potentially life-threatening illness, results from infection with the Human Immunodeficiency Virus (HIV), a pathogen that profoundly compromises the immune system through progressive depletion of CD4+ T cells and sustained immune hyperactivation (1,2). HIV infection progresses through three clinically defined stages: acute infection, clinical latency, and finally AIDS, the most severe phase, marked by a CD4+ T cell count below 200 cells/μL. At this terminal stage, individuals become highly susceptible to opportunistic infections and virus-associated malignancies, including Kaposi's sarcoma, Burkitt's lymphoma, primary central nervous system lymphoma, and cervical cancer. Despite significant global efforts in controlling the epidemic, HIV/AIDS remains one of the most formidable public health challenges of the modern era, especially in low- and middle-income countries (3). An overwhelming 95% of HIV infections have been documented in developing regions, with sub-Saharan Africa alone accounting for nearly two-thirds of global cases, where over 28 million people are living with the virus. Asia and the Pacific contribute more than 7 million infections to the global burden (4). Structural and socioeconomic factors such as poverty, low literacy rates, inadequate healthcare services, and poor infrastructure have further fueled the spread of HIV in these regions (5). Pakistan, a low-prevalence but high-risk country, finds itself geographically surrounded by nations with substantial HIV burdens—Afghanistan, China, and India—while Iran remains a relatively low-risk neighbor. The first diagnosed case of HIV/AIDS in Pakistan dates back to 1986 (6,7), followed by a concerning rise in reported cases, as highlighted by the Pakistan National AIDS Control Program (8).

Currently, an estimated 132,000 individuals are living with HIV in Pakistan, yet only a fraction—approximately 20,322—are officially registered, and fewer than 10,000 are actively receiving antiretroviral therapy (9). The predominant mode of transmission is heterosexual contact (52%), followed by blood-borne routes (11%), bisexual relationships (4%), intravenous drug use (2%), mother-to-child transmission (2%), and a significant proportion with unknown sources (27%). Religious demographics indicate that Muslims make up the vast majority (97%) of the HIV-positive population, with religious minorities comprising the remaining 3% (10). Among the provinces, Baluchistan presents a particularly alarming scenario. Although it has a sparse population, the prevalence of HIV/AIDS is on a steep rise. As of December 2024, 2,823 individuals had been officially registered, but health experts estimate the actual figure to be between 7,000 and 9,000, suggesting significant underreporting (11). High-risk districts identified within Baluchistan include Quetta, Gwadar, Turbat, Zhob, Sherani, and Nasirabad. Young people, especially those in their early 20s, constitute a substantial proportion of new infections, implying that many may have contracted the virus during adolescence due to its long incubation period (11,12). Several behavioral and psychosocial factors have been implicated in increasing vulnerability among youth, including early sexual activity, drug experimentation, peer pressure, and socioeconomic distress (12). Amidst these challenges, understanding the knowledge and attitudes of young individuals—especially those pursuing pre-medical education—is critical, as they are both vulnerable to infection and potentially influential in future health promotion. This study, therefore, aims to assess the awareness, perceptions, and preventive attitudes regarding HIV/AIDS among pre-medical college students in Quetta. The findings will help identify educational gaps and guide the development of targeted interventions for improving HIV-related literacy among the youth.

METHODS

This questionnaire-based cross-sectional study was conducted to evaluate the knowledge and attitudes regarding HIV/AIDS among pre-medical students enrolled in four intermediate colleges located in Quetta, Pakistan. The selected institutions included two government colleges—Government Science College and Government Girls Degree College—and two private colleges—Tameer-i-Nau Public College and Islamia Girls College. The study population comprised exclusively of 1st and 2nd year pre-medical students. Students from other academic disciplines were excluded to maintain focus on the relevant target group. Participants were selected based on voluntary participation, following an open invitation during classroom sessions. All eligible students were invited to participate without discrimination or subjective selection. The research was conducted over a four-month period from October 11, 2024, to February 20, 2025, with data collection taking place during the initial two months. Prior to initiating the study, ethical approval was obtained from the Institutional Review Board, ensuring compliance with national and international ethical standards for research involving human participants. Written consent was obtained from the principals of each participating college, and informed consent was also secured from each student prior to participation. Confidentiality, anonymity, and voluntary participation were emphasized, and no personally identifiable data were collected at any stage of the study.

A sample size of 400 students was calculated based on a 95% confidence interval to ensure statistical reliability. The questionnaires were evenly distributed across the four institutions, with 100 questionnaires allocated per college. Within each college, an equal number of questionnaires (n=50) were randomly distributed to 1st and 2nd year pre-medical students. The final dataset included 356 fully

completed questionnaires, resulting in an overall response rate of 89%, with an 11% non-response rate. The study tool was a self-developed structured questionnaire consisting of four sections. The first section covered informed consent; the second included demographic details; the third comprised 24 questions assessing knowledge related to HIV/AIDS; and the fourth contained 11 items evaluating attitudes. All questions were close-ended. Most questions used a three-option response scale: 'Yes,' 'No,' and 'Don't Know.' Questions 8 to 11 in the attitude section provided multiple-choice options, out of which respondents were instructed to select only one answer per question. The questionnaire was administered in classroom settings under the supervision of both teaching staff and the research team to ensure a consistent and neutral environment for response collection (13). Data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS), version 20. Descriptive statistics were utilized to summarize the demographic characteristics and response patterns. Frequencies and percentages were calculated for categorical variables, while means and standard deviations were computed for continuous data. Inferential statistics included the Kruskal-Wallis test, Mann-Whitney U test, and Chi-square test, with statistical significance set at $p<0.05$.

RESULTS

A total of 356 pre-medical students participated in this study, comprising 157 males (44%) and 199 females (56%). The participants were aged between 15 and 26 years, with a mean age of 17.6 years. Among them, 170 students (48%) were enrolled in the first year and 186 students (52%) in the second year of their pre-medical education. Students were nearly equally distributed between government institutions (n=171, 48%) and private institutions (n=185, 52%). The assessment of HIV/AIDS-related knowledge revealed that the majority of students (62%) had an average level of knowledge, while 29% demonstrated good knowledge and 9% showed poor understanding. A significant number of students were unaware of fundamental distinctions, with 50% unable to differentiate between HIV and AIDS and 43% believing there is a cure for HIV. Despite 86.5% recognizing HIV as a virus and 74.7% acknowledging its role in immune system failure, misconceptions were still prevalent. Notably, 20% of respondents did not believe HIV must enter the bloodstream to cause infection, and many wrongly associated transmission with non-bloodborne routes such as toilet seats (37.1%), coughing or sneezing (38.5%), mosquito bites (20.2%), sharing water (38.5%), and handshakes (21.1%). Furthermore, 18% believed that HIV cannot be transmitted from a pregnant woman to her fetus.

Knowledge about preventive strategies also showed considerable gaps. About 31% believed that exercise and healthy diet could prevent HIV/AIDS, while 45% believed in the existence of a vaccine. Though 52% knew that treatment options for HIV are available, 41% mistakenly thought antibiotics could prevent or cure HIV infection. Moreover, 43.8% believed that symptoms appear immediately after infection, which is clinically inaccurate. Gender, academic year, and institutional affiliation were significantly associated with knowledge levels ($p<0.05$). Male students from government colleges were more likely to have poor knowledge scores, whereas female students from private institutions had better knowledge levels. Second-year students also demonstrated significantly higher knowledge scores compared to first-year students. Regarding attitudes toward HIV/AIDS, a predominantly negative perspective was observed, with 81% of the respondents expressing stigmatizing attitudes toward individuals living with HIV. Male students (83%) exhibited a significantly higher negative attitude than female students (79%) ($p=0.001$). More than half of the students (57%) supported isolation of infected individuals, 29% believed HIV-positive individuals were morally corrupt, and 39% indicated they would sever contact with an HIV-positive acquaintance. Alarmingly, 69% stated they would stop interacting with an HIV-positive friend, 24% believed such individuals should be denied education, and 35% refused to buy from HIV-positive vendors. Additionally, 33% expressed discomfort in sitting next to an HIV-positive person.

When asked about community responses, 67% believed their community would support individuals with HIV/AIDS, 29% expected avoidance, and 10% anticipated outright rejection. Emotional reactions to a hypothetical HIV diagnosis varied: 37% would feel fear, 33% sadness and hopelessness, 20% surprise, and 13% shame. Only 1% indicated they would respond with hope and resilience. In response to potential symptoms of HIV, 70% of the participants reported they would seek medical help, whereas 11% would consult spiritual healers, 8% would self-medicate, and 4% would turn to homeopathy. Barriers to seeking healthcare included lack of knowledge about where to go (26%), fear of social isolation (25%), and embarrassment (22%). A strong and statistically significant correlation was observed between the level of knowledge and attitude toward HIV/AIDS ($p=0.000$). Students with lower knowledge scores demonstrated more stigmatizing attitudes, suggesting that educational gaps directly influence social perceptions of HIV-positive individuals.

A comparative subgroup analysis revealed significant variations in HIV/AIDS knowledge levels across gender, type of institution, and academic year. Male students from government colleges exhibited the highest proportion of poor knowledge scores (22.4%), while their counterparts in private institutions showed markedly better outcomes, with 44.4% falling in the good knowledge category. Female students demonstrated overall superior knowledge compared to males, particularly those in private colleges, where 42.3% scored in the

good category. Among females in government colleges, 71.6% had average knowledge, with only 5.3% falling into the poor category. When comparing academic levels, second-year students showed a substantially higher rate of good knowledge (42.5%) compared to first-year students (14.7%), highlighting a strong association between academic progression and knowledge acquisition. In terms of misconceptions, a notable proportion of students held scientifically incorrect beliefs. Half of the respondents (50%) believed that HIV and AIDS are the same, and 43% incorrectly assumed that HIV is curable. Misunderstandings about transmission routes were also common: 38.5% believed HIV could be spread through coughing or sneezing, and the same percentage believed sharing a glass of water could transmit the virus. Approximately 37.1% believed that toilet seats could serve as a transmission source, while 20.2% attributed transmission to mosquito bites. Alarmingly, 40.7% thought antibiotics could prevent or treat HIV, and 44.9% believed a vaccine for HIV already exists. These widespread misconceptions emphasize the urgent need for targeted educational interventions to address knowledge gaps and combat misinformation among students.

Table 1: Demographic characteristics of the 356 pre-medical college students enrolled in the study

Characteristics	**Frequency n=356 (%)**
Gender	
Male	157 (44)
Female	199 (56)
Age Groups	
Below 20	316 (89)
Above 20	40 (11)
Educational Level	
1st Year	170 (48)
2nd Year	186 (52)
Institute	
Boys	
Govt. Secondary School	76 (21)
Private Secondary School	81 (23)
Girls	
Govt. Secondary School	95 (27)

Table 2: Questions for assessing HIV/AIDS-related knowledge of the students

Question	Yes N (%)
HIV and AIDS are the same thing	178 (50.0)
AIDS stands for Acquired Immunodeficiency Syndrome	278 (78.1)
AIDS is the cause of HIV	228 (64.0)
HIV is a virus	308 (86.5)
There is a cure for HIV	153 (43.0)
HIV causes immune system failure	266 (74.7)
For HIV to cause infection it must get into the blood	236 (66.3)
HIV is a retrovirus	226 (66.5)
HIV mainly attacks CD4 T-Lymphocytes	197 (55.3)
A person can get HIV from a toilet seat	132 (37.1)
Coughing and sneezing cause spread of HIV	137 (38.5)
HIV can be spread by mosquitoes	72 (20.2)
HIV can spread by sharing glass of water	137 (38.5)
HIV can spread by handshakes	75 (21.1)
A person can get HIV by blood transfusion	283 (79.5)
HIV is spread mainly by unprotected sex	266 (74.7)
HIV transmission is possible by getting tattoo	164 (46.1)
Sharing syringes causes transmission of HIV	276 (77.5)
Pregnant woman with HIV can transmit virus to her foetus	240 (67.4)
Exercise and healthy diet can prevent HIV	110 (30.9)

Question	Yes N (%)
HIV patients immediately show signs and symptoms	156 (43.8)
There is a vaccine for HIV	160 (44.9)
There are drugs for the treatment of HIV	186 (52.2)
Taking antibiotics prevents HIV/AIDS	145 (40.7)

Table 3: Questions for assessing HIV/AIDS-related attitude of the students

Attitude	Responses
Infected patients should be kept in isolation	
Yes	204 (57)
No	97 (27)
Don't Know	55 (15)
Do you regard people with HIV/AIDS as morally corrupt	
Yes	102 (29)
No	181 (51)
Don't Know	72 (20)
If an acquaintance gets HIV would you stop contacting	
Yes	139 (39)
No	186 (52)
Don't Know	31 (9)
If a friend gets HIV would you stop meeting	
Yes	246 (69)
No	74 (21)
Don't Know	36 (10)
Would you buy from an HIV positive seller	
Yes	185 (52)
No	124 (35)
Don't Know	47 (13)
Should HIV positive student be allowed to continue studies	
Yes	229 (64)
No	85 (24)
Don't Know	42 (12)
Would you be comfortable sitting next to an HIV positive	
Yes	186 (52)
No	117 (33)
Don't Know	53 (15)
In your community, how is a person treated who has HIV AIDS	
Help them	239 (67)
Avoid them	81 (29)
Reject them	36 (10)
What would be your reaction if you find that you have HIV AIDS	
Fear	116 (37)

Attitude	Responses
Surprise	70 (20)
Shame	47 (13)
Sadness and hopelessness	119 (33)
Be hopeful and fight the disease	4 (1)
What will you do if you had symptoms of HIV AIDS	
Go to a doctor	248 (70)
Go to a medical store (pharmacist)	11 (3)
Spiritual healers	38 (11)
Traditional healers	15 (4)
Homeopathy	14 (4)
Self-treatment	30 (8)
Reasons for not visiting health facility	
Social embarrassment	78 (22)
Fear of isolation	90 (25)
No idea where to go	93 (26)
Affordability issues	33 (9)
Do not trust medical workers	30 (8)
Do not like the attitude of medical workers	32 (9)

Table 4: Gender, sector (government/private) and education year correspondence with degree of knowledge

	Score Group (Knowledge)			
	Poor (1-8)	Average (9-16)	Good (17-24)	P value
Gender				
Male	21	98	38	0.005
Female	9	124	66	
Males				
Govt. Secondary School	17	57	2	0.001
Private Secondary School	4	41	36	
Females				
Govt. Secondary School	5	68	22	
Private Secondary School	4	56	44	
Class				
1st Year Students	16	129	25	0.001
2nd Year Students	14	93	79	
Total	30	222	104	

Table 5: Attitude scores of male and female students.

	Attitude Type		P value
	Negative (Score 1-5)	Positive (Score 6-11)	
Male	130	27	
Female	158	41	0.001
Total	288	68	

Table 6: Comparative Subgroup Analysis of Knowledge Scores

Group	Poor Knowledge (%)	Average Knowledge (%)	Good Knowledge (%)
Male - Govt	22.368	75	2.632
Male - Private	4.938	50.617	44.444
Female - Govt	5.263	71.579	23.158
Female - Private	3.846	53.846	42.308
1st Year	9.412	75.882	14.706
2nd Year	7.527	50	42.473

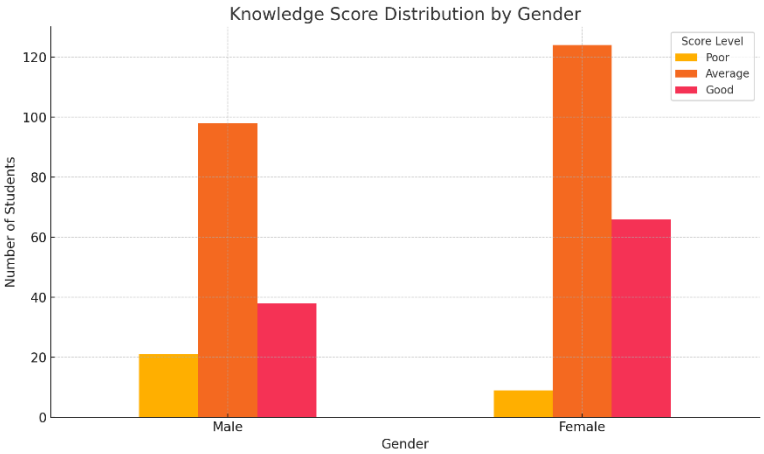

Figure 1 Knowledge Score Distribution by Gender

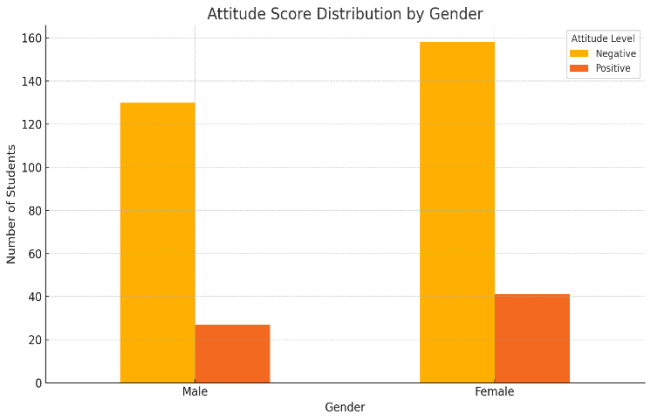

Figure2 Attitude Score Distribution by Gender

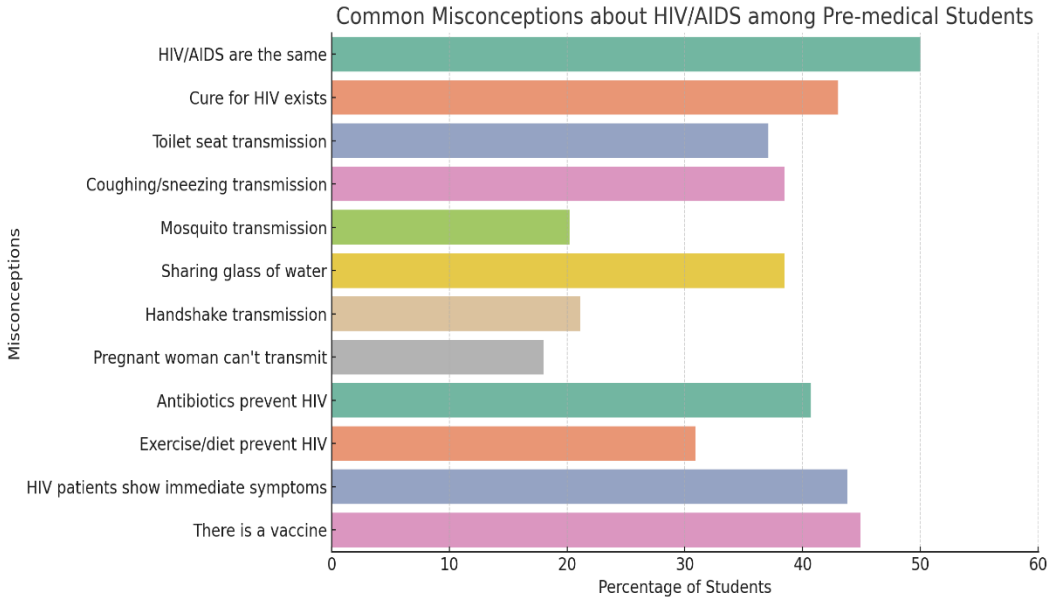

Figure 1 Common Misconceptions about HIV/AIDS among Pre-medical Students

DISCUSSION

This study assessed the knowledge and attitudes of pre-medical college students in Quetta, Baluchistan, regarding HIV/AIDS and individuals living with the virus. The findings indicated that while students possessed a generally satisfactory level of knowledge, particularly in recognizing the fundamental nature of HIV as a virus and its impact on the immune system, several critical misconceptions persisted. Misunderstandings surrounding transmission routes were particularly pronounced (14). A substantial proportion of students believed HIV could be transmitted through non-bloodborne means such as using toilet seats, coughing and sneezing, mosquito bites, handshakes, and sharing water. These misconceptions are concerning, as they perpetuate stigma and could divert attention from actual preventive behaviors. Additionally, beliefs in the existence of a cure, vaccine, or the protective role of exercise and diet against HIV reflect a superficial understanding of disease management and prevention, potentially contributing to risky behaviors under false assumptions of safety (15). The gender-based analysis revealed that female students demonstrated a slightly higher level of knowledge than males, which aligned with similar observations reported in previous studies conducted on student populations in other settings (15,16). This gender disparity could be attributed to differences in cognitive engagement, curriculum exposure, or the sociocultural tendency for females to show greater responsiveness to health education. Furthermore, the correlation between higher educational level and better knowledge scores observed in this study reinforced the role of academic progression in enhancing health literacy (17).

Despite moderate knowledge levels, the study uncovered widespread negative attitudes toward people living with HIV/AIDS. These attitudes included moral judgment, social distancing, and discriminatory preferences such as the rejection of purchasing goods from HIV-positive individuals or discomfort in sharing classroom space with them (18). More than half of the respondents supported isolating HIV-positive patients, while over two-thirds reported they would cease contact with an infected friend. Such findings underscore the deeply rooted stigma that persists even among science-focused students (19). Consistent with previous literature from both regional and international studies, this study confirmed the positive correlation between higher knowledge levels and more tolerant attitudes (20). However, the persistence of stigma despite basic awareness suggests that information alone may be insufficient and highlights the need for comprehensive behavior-change interventions. One of the study's notable strengths was its focus on pre-medical students, a group expected to have higher baseline awareness and potential for health advocacy in the future. The use of a structured questionnaire with high response rates contributed to the reliability of the data. However, the study also faced limitations that must be acknowledged. Sociocultural sensitivities and religious beliefs restricted the scope of questions, particularly those related to personal sexual practices and orientations, which are vital components in understanding HIV risk perception and behavior. Additionally, the self-reported nature of responses introduces the possibility of social desirability bias, which may have influenced students to provide responses perceived as acceptable rather than truthful. Nonetheless, the anonymity of the questionnaire and the efforts to ensure confidentiality may have mitigated this limitation to some extent.

The findings call attention to the importance of addressing misinformation and stigma through tailored educational programs that move beyond rote memorization of facts. Integration of interactive, empathy-driven modules in pre-medical curricula could prove effective in reshaping attitudes and promoting accurate knowledge. Future research should aim to explore behavioral determinants more comprehensively, using mixed-method approaches that combine quantitative surveys with qualitative interviews or focus group discussions. Expanding the study to include non-medical students or adolescents outside academic institutions would offer broader insights into public perception and help in designing inclusive awareness campaigns. Addressing stigma and misinformation remains essential not only for reducing the incidence of HIV but also for ensuring dignity and healthcare access for those living with the virus.

CONCLUSION

This study underscores the urgent need to enhance awareness and reshape attitudes toward HIV/AIDS among young students, particularly in pre-medical institutions. While general knowledge about the virus was found to be satisfactory, persistent misconceptions and stigmatizing attitudes highlight critical gaps in understanding. Addressing these gaps requires a multifaceted and inclusive approach. Collaboration between educational institutions, healthcare professionals, media, NGOs, policymakers, and religious leaders is essential to foster informed perspectives and reduce stigma. Promoting open, accurate, and culturally sensitive dialogue about HIV/AIDS within academic settings can play a transformative role in guiding youth toward responsible behaviors and compassionate attitudes, ultimately contributing to more effective prevention and support systems.

Author Contribution

Author	Contribution
Aurang Zaib*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Hilmand Khan Tareen	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Rehan Khan Kakar	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Khushal Khan	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published

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