Content available at: https://www.ipinnovative.com/open-access-journals

IP International Journal of Medical Microbiology and Tropical Diseases

Journal homepage: https://www.ijmmtd.org/

Original Research Article

Youth health literacy: Assessing the impact of an interventional campaign on HIV/AIDS and STI awareness in urban schools of Waghodia, Vadodara, Gujarat

Himani Bhardwaj Pandya[1]*, Nidhi Mihirkumar Bhalodia[1], Rachana Bhavin Patel[1], Binda Prakashbhai Pipaliya[1], Saurabh Chhotalal Norris[1]

[1]Dept. of Microbiology, Smt. B.K.Shah Medical Institute and Research Centre, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India

Abstract

Background: Adolescents are particularly vulnerable to misinformation and stigma regarding reproductive health, HIV/AIDS, and sexually transmitted infections (STIs). This study evaluates the impact of a structured interventional campaign on the knowledge, attitudes, and perceptions of school-going adolescents in Waghodia, Vadodara, Gujarat.

Materials and Methods: An educational intervention study was conducted over three months, from July 1 to September 30, 2022, involving 210 students from grades 8 to 12 across three English-medium schools in Vadodara, Gujarat. A validated, structured questionnaire assessed baseline knowledge, attitudes, and perceptions about sexually transmitted infections (STIs) and HIV/AIDS through a pre-test, which was followed by interactive awareness sessions, including PowerPoint presentations and role-plays. Post-intervention changes were measured using the same questionnaire. Statistical analyses were conducted using the chi-square test and p-value to assess significance and strength of associations.

Results: Following the intervention, there was a statistically significant improvement ($p < 0.0001$) across all domains. Knowledge about activities that can transmit HIV saw a sharp rise from 15.2% to 65.7% ($p < 0.0001$), and understanding of non-transmissible routes (e.g., HIV is not transmitted through casual contact) improved from 40.5% to 88.6% ($p < 0.0001$). The ability to distinguish between HIV and AIDS rose from 36.7% to 85.2% ($p = 0.00002$). Misconceptions about HIV transmission through hugging, kissing, or handshakes decreased drastically, with correct responses rising from 42.4% to 97.6% ($p < 0.0001$). The intervention also resulted in significant positive shifts in students' attitudes toward people living with HIV/AIDS. The percentage of students who opposed the idea that people with HIV should be kept out of school rose from 74.3% to 96.2%. Misconceptions related to stigma, such as ending friendships due to HIV status, have reduced drastically.

Conclusion: The educational intervention was highly effective in enhancing knowledge, correcting misconceptions, and fostering more inclusive and empathetic attitudes among adolescents. This emphasizes the urgent need for integrating age-appropriate, interactive sexual health education into school curricula.

Keywords: Adolescents, HIV/AIDS, Stigma, School-based intervention, Youth awareness.

Received: 03-06-2025; **Accepted:** 19-07-2025; **Available Online**: 04-09-2025

1. Introduction

Sexually Transmitted Infections (STIs) are primarily spread through vaginal, oral, or anal sex but can also be transmitted through other forms of close physical contact.[1] The Centre for Disease Control and Prevention (CDC) makes a distinction between STIs and sexually transmitted diseases (STDs): STIs refer to the presence of infection, whereas STDs describe the resulting disease once symptoms develop.[1] Over 20 types of STDs exist, including Chlamydia, Genital herpes, Gonorrhoea, AIDS, HPV, Pubic lice, Syphilis, and Trichomoniasis. Many STIs are initially asymptomatic and can be confused with non-sexually transmitted infections, but even symptomless STIs can spread and later cause chronic or serious health conditions.[2] STIs are a significant public health issue, especially among adolescents and young adults worldwide. According to the World Health Organization

*Corresponding author: Himani Bhardwaj Pandya
Email: himanibhardwaj2224@gmail.com

https://doi.org/10.18231/j.ijmmtd.v.11.i.3.4

(WHO), over 1 million STIs are acquired daily. [3] In India, over 35% of HIV/AIDS cases occur in individuals aged 15-24. STIs impact sexual health by causing stigmatization, infertility, cancer, and more.[3] WHO defines adolescence as the period from 10 to 19 years, during which individuals undergo physical, emotional, psychological, and social changes, making them a vulnerable group.[3] Adolescents, comprising about 22% of the population, often lack access to reproductive health information and care.[4] The source of sexual health knowledge significantly influences adolescent behaviours. Parents, peers, and the mass media play crucial roles in shaping adolescents' understanding of sexuality. However, conversations between parents and their children about sexuality often focus on negative aspects like unwanted pregnancy and STIs, rather than positive aspects like healthy relationships. Media exposure can create a conflict between conservative Indian culture and Western influences, leading to confusion and anxiety among adolescents.[5] India's formal education system continues to fall short in delivering comprehensive, age-appropriate reproductive health education. This knowledge gap contributes to unsafe sexual practices, unwanted pregnancies, substance abuse, and even unsafe abortions. Adolescent girls, in particular, face increased risks due to both limited awareness and biological vulnerability to infections. Recognizing this, the National AIDS Control Organization (NACO) promotes the use of information, education, and communication (IEC) strategies to raise awareness and empower youth to seek timely testing, treatment, and support. Effective communication strategies can help foster safer sexual behaviours, reduce stigma, and cultivate positive, informed attitudes.[6] Against this background, our study focuses on evaluating the knowledge, attitudes, and perceptions of adolescents, specifically school students from grades 8 to 12, regarding reproductive health, HIV/AIDS, and other STIs. Using a structured questionnaire, we assessed their baseline understanding and followed up with tailored awareness workshops to address identified gaps and promote healthier behaviours.

2. Materials and Methods

2.1. Study design

It was an educational interventional study aimed at evaluating and refining the knowledge, attitudes, and perceptions regarding HIV/AIDS, sexually transmitted infections (STIs), and reproductive health among urban adolescents of Vadodara.

2.2. Study population

The study targeted urban adolescents studying in grades 8 to 12 from selected English-medium schools in Waghodia, Vadodara, Gujarat. Six MBBS students from the Third year also participated in the conduct of this study.

2.3. Study setting

The intervention was carried out in the following English-medium schools located in or around Waghodia:

1. Avalon World School, Waghodia
2. Amicus International School, Waghodia
3. Gujarat Public School, Waghodia

2.4. Duration of the study

The study was conducted over three months from 1st July 2022 to 30th September 2022.

2.5. Ethical considerations

The study got the ethical clearance from the Sumandeep Vidyapeeth Institutional Ethical Committee (SVIEC/ON/medi/SRP/22059) on 30th June 2022. We also received the written permission from the Dean of our medical college, as well as the respective school authorities, through formal communication (email and in-person meetings). Informed assent was obtained via assent forms, filled out by the class teacher of the respective classes and by the coordinator of that section on behalf of the participating students.

2.6. Sample size

A convenience sampling approach was adopted for this interventional study. A total of 210 students from three urban schools in Waghodia, Vadodara, Gujarat, participated in the study.

2.7. Inclusion criteria

1. Students enrolled in grades 8 to 12 at the selected schools.
2. Physically present on the day of the educational intervention.
3. Those who provided verbal or written assent**,** and their schools granted formal institutional consent for participation.

2.8. Exclusion criteria

Participants for whom either student assent or school consent was not obtained were excluded from the study.

2.8.1. Data collection

A structured questionnaire was developed to assess students' baseline knowledge, perceptions, and attitudes toward HIV/AIDS and other sexually transmitted infections (STIs). To ensure the appropriateness and sensitivity of the content, the questionnaire was reviewed and validated by a senior faculty member with subject expertise in microbiology, as well as a mental health professional. Their input helped ensure that the questions were age-appropriate, non-triggering, and posed in a manner that would not cause

psychological discomfort or distress among the adolescent participants.

2.9. Methodology

The study followed a pre-test, intervention, post-test, and feedback design.

2.9.1. Pre-test

Before we began our session, each student was asked to complete a structured and validated multiple-choice questionnaire based on knowledge, attitudes, and perceptions about HIV/AIDS, and STIs in a defined timeline, and were collected from them. At this point, the answers were not discussed here.

2.9.2. Educational intervention

Following the pre-test, awareness sessions were conducted using visually engaging PowerPoint presentations. We first revised the anatomy and physiology of the reproductive system in males and females, followed by STIs, methods of transmission, HIV/AIDS, myths and taboos, the difference between HIV and AIDS, preventive strategies, etc. Interactive teaching methods, such as open discussions and Q&A, were used to engage students. We got a positively overwhelming response from all the students. They all interacted with us and cleared many doubts regarding HIV/AIDS.

2.9.3. Role play

A brief role-play activity was conducted to highlight the risk of HIV transmission through tattooing. Performed by MBBS students, the scenario depicted a 12th-grade student who contracted HIV after getting a tattoo. The narrative followed the student's return to school and showcased the negative reactions and stigma he faced from his classmates. Students were further asked what was not apt in this situation. The act then transitioned to demonstrate the appropriate, empathetic way to treat people living with HIV. This dramatized segment aimed to enhance awareness, empathy, and understanding among participants through impactful, experiential learning.

2.9.4. Post-test and feedback

The same questionnaire used in the pre-test was administered again to evaluate any change in student knowledge and attitudes, and perception following the intervention. Feedback on the session's effectiveness and student suggestions were also collected for evaluation.

3. Results

A total of 210 students were involved in this study, with 59.7% males and 40.3% females.

*3.1. Knowledge outcomes (**Table 1**)*

Across all knowledge-based multiple-choice questions, there was a notable increase in the proportion of students answering correctly from pre-test to post-test, with all changes being statistically significant ($p < 0.001$). For example, awareness of the male reproductive organ increased from 80.5% to 95.2% ($\chi^2 = 21.45$, $p = <0.0001$), and identification of the female reproductive organ improved from 82.9% to 96.2% ($\chi^2 = 19.90$, $p = <0.0001$). Knowledge about activities that can transmit HIV saw a sharp rise from 15.2% to 65.7% ($\chi^2 = 111.04$, <0.0001), and understanding of non-transmissible routes (e.g., HIV is not transmitted through casual contact) improved from 40.5% to 88.6% ($\chi^2 = 106.10$, <0.0001). Knowledge that HIV is not transmitted through insect bites improved from 48.1% to 92.9% ($\chi^2 = 101.11$, <0.0001). The ability to distinguish between HIV and AIDS rose from 36.7% to 85.2% ($\chi^2 = 22.25$, $p = 0.00002$), and awareness of preventive contraceptive methods increased from 44.8% to 92.4% ($\chi^2 = 110.48$, <0.0001).

*3.2. Perception outcomes (**Table 2**)*

Perception-related improvements were equally considerable. Misconceptions about HIV transmission through hugging, kissing, or handshakes decreased drastically, with correct responses rising from 42.4% to 97.6% ($\chi^2 = 152.56$, $p < 0.0001$). while the belief that HIV could be spread via coughing or sneezing declined from 55.2% to 11.4%, indicated by an increase in correct perception from 44.8% to 88.6% ($\chi^2 = 90.69$, $p < 0.0001$). Understanding of actual transmission routes, such as open wounds (from 25.7% to 50.5%, $\chi^2 = 27.3$, $p < 0.0001$), and vertical transmission (mother-to-child) improved markedly (from 53.8% to 91.4%, $\chi^2 = 74.73$, $p < 0.0001$). Furthermore, the correct belief that condoms reduce the risk of STIs rose from 16.2% to 90.5% ($\chi^2 = 232.81$, $p < 0.0001$), and awareness about risky behaviours associated with substance use improved from 16.7% to 92.4% ($\chi^2 = 242.76$, $p < 0.0001$).

*3.3. Attitude outcomes (**Table 3**)*

The intervention also resulted in significant positive shifts in students' attitudes toward people living with HIV/AIDS. The proportion of students disagreeing with exclusionary statements increased markedly after the educational sessions. For example, the percentage of students who opposed the idea that people with HIV should be kept out of school rose from 74.3% pre-test to 96.2% post-test ($\chi^2 = 40.04$, $p < 0.0001$). Similarly, willingness to maintain friendships with people who have AIDS improved, with agreement increasing from 70.0% to 98.1% ($\chi^2 = 61.82$, $p < 0.0001$). Positive attitudes toward volunteering with AIDS patients grew from 50.0% to 81.9% ($\chi^2 = 47.60$, $p < p < 0.0001$). The proportion disagreeing with the notion that a family member with HIV should move out increased from 59.5% to 97.1% ($\chi^2 = 87.55$, $p < 0.0001$). Notably, acceptance of HIV-positive individuals working in restaurants rose from 54.3% to 81.9% ($\chi^2 = 41.30$, $p < 0.0001$). However, one attitude statement related to whether people with STIs should stay home or in the hospital showed no significant change ($p = 0.85$), indicating an area needing further focus.

Overall, these results demonstrate that the educational intervention significantly improved empathy and reduced stigma toward individuals affected by HIV/AIDS and STIs among adolescents. These findings collectively highlight the significant positive impact of the educational intervention on both factual knowledge and perceptions related to HIV/AIDS and STI prevention.

Table 1: Knowledge of HIV/AIDS and sexually transmitted infections among urban adolescents (n=210)

No.	Question	Pre-Test Correct (n=210)	Post-Test Correct (n=210)	Chi-square (χ^2)	p-value	Cramér's V*
1	Which of the following is the Male reproductive organ?	169	200	21.45	<0.0001	0.310
2	Which of the following is the Female reproductive organ?	174	202	19.90	<0.0001	0.297
3	All of the below are examples of STDs, EXCEPT	65	123	31.286	<0.0001	0.386
4	Which of the following activities can transmit HIV/AIDS?	32	138	111.04	<0.0001	0.721
5	Through which route is HIV NOT TRANSMITTED	85	186	106.10	<0.0001	0.710
6	The highest risk of transmission of HIV is through which method	46	130	67.376	<0.0001	0.567
7	Is there any difference between HIV and AIDS?	77	179	102.049	0.00002	0.698
8	Use of which contraceptive method can prevent HIV?	94	194	108.281	<0.0001	0.722
9	Why do you think that in a report of an HIV patient, they do not write HIV Positive?	48	105	32.242	<0.0001	0.383

The p-value < 0.05 is considered significant
Cramer's V- Values >0.5 indicate a strong association, and values between 0.3 and 0.5 indicate a moderate association.

Table 2: Perception of HIV transmission and prevention among urban adolescents (n=210)

No.	Question	Pre-Test Correct	Post-Test Correct	Chi-Square	P value	Cramér's V
1	HIV is transmitted by shaking hands, hugging, and kissing	89	205	152.56	<0.0001	0.845
2	HIV is transmitted by an insect bite	101	195	98.970	<0.0001	0.689
3	HIV is transmitted by coughing and sneezing	94	186	90.69	<0.0001	0.654
4	HIV spreads by sharing a toothbrush	76	170	84.865	<0.0001	0.641
5	HIV is transmitted through an open wound	54	106	27.3	<0.0001	0.282
6	HIV is transmitted from mother to baby	113	192	72.852	<0.0001	0.600
7	HIV is transmitted by sharing a restroom or a pool	58	140	62.690	<0.0001	0.575
8	Reducing STI risk by condom use	34	190	232.81	<0.0001	0.940
9	Substance misuse affects judgment, leading to sexual behaviour	35	194	242.76	<0.0001	0.950
10	AIDS prevention by safe sex and education	36	196	243.443	<0.0001	0.953
11	Life is normal for HIV HIV-positive person without AIDS	26	171	198.245	<0.0001	0.883
12	High-risk groups for HIV and other STDs	43	193	214.730	<0.0001	0.909

P value for the above table is < 0.0001, a highly significant association
Cramer's V- Values >0.5 indicate a strong association, and values between 0.3 and 0.5 indicate a moderate association.

Perception: All respondents had perceived HIV-AIDS differently. To evaluate participants' perceptions of HIV-AIDS and other STIs, respondents were asked to fill out a pre-formed questionnaire. The answers were in the format of either YES or NO. Those who have perceived correctly were marked as 1, and those who have perceived incorrectly were marked 0 accordingly.

Table 3: Attitudes towards individuals living with HIV/AIDS among urban adolescents (n=210)

No.	Question	Pre-Test	Post-Test	Chi-Square	P-Value	Cramér's V
1	People with HIV should be kept out of school?	156	202	40.040	< 0.001	0.437
2	I would end my friendship if my friend had AIDS?	147	206	61.816	< 0.001	0.543
3	I am willing to do volunteer work with AIDS patients.	105	172	47.597	< 0.001	0.476
4	If a family member contracts HIV, should they move out?	125	204	87.552	< 0.001	0.646
5	People with STIs should stay home or in a hospital.	136	180	0.037	0.847	0.013
6	Is it OK to eat in a restaurant where an HIV positive man works?	114	172	41.297	< 0.001	0.443

The p-value < 0.05 is considered significant
Cramer's V- Values >0.5 indicate a strong association, and values between 0.3 and 0.5 indicate a moderate association.

4. Discussion

The youth of our nation today is the future of our country tomorrow. This youth is faced with many challenges and is exposed to many risk factors. One major risk factor is a lack of knowledge about reproductive health and sexually transmitted infections, of which HIV-AIDS is the most serious problem.[7] In today's world, where social media is easily accessible to adolescents, they might be exposed to false or incomplete facts about sexual practices and health. This makes it our collective social responsibility—both at home and in educational institutions—to provide accurate, age-appropriate information. This underscores the urgent need for comprehensive, accurate sexual education delivered in a structured and supportive environment, such as schools or homes, to guide them toward healthy reproductive behaviours and decisions.[7] In our study, we noticed a significant increase in the knowledge, perception, and attitude of adolescents towards reproductive health, HIV-AIDS, and other sexually transmitted infections when given education about the topic effectively.

Our study revealed a substantial improvement in the knowledge, perception, and attitudes of urban school-going adolescents in Waghodia, Vadodara, following a structured educational intervention on HIV/AIDS and STIs. Before the intervention, significant gaps in basic reproductive health knowledge were evident. For example, approximately 19.5% and 17.1% of students failed to correctly identify male and female reproductive organs, respectively. Post-intervention, these percentages decreased to under 5%, reflecting a significant increase in fundamental biological understanding. These findings are consistent with research by Nath et al.[8] (Delhi), who reported similarly low baseline knowledge among adolescents, which improved significantly after educational sessions. Comparable results were also observed by Gao et al.[9] in Wuhan, China, where targeted health education increased knowledge scores among youth. Our study also found that students had misconceptions about HIV transmission routes. For instance, a majority initially believed that HIV could be spread through casual contact such as handshaking or hugging—a finding echoed by studies in other settings, including Nigeria[10] and Kenya,[11] where misconceptions about transmission routes remain prevalent among adolescents. After intervention, the number of students holding these incorrect beliefs dropped sharply, highlighting the power of targeted awareness campaigns.

Our perception data underscore the persistence of myths about HIV transmission. Initially, over half of the participants incorrectly thought that HIV could be transmitted by shaking hands, hugging, or kissing, reflecting stigma and misinformation. These perceptions are comparable to findings from studies in Ethiopia[12] and South Africa,[13] where such misconceptions hinder effective prevention efforts. Post-intervention, the significant decline in these misperceptions ($p < 0.00001$) demonstrates the efficacy of interactive and culturally sensitive educational programs.

Attitudinal stigma toward people living with HIV/AIDS remains a major barrier to effective prevention and care. Before the intervention, one-quarter of students believed HIV-positive individuals should be excluded from school, and 30% would end friendships if a friend tested HIV-positive. Similar stigmatizing attitudes have been documented in adolescent populations worldwide, including studies in Uganda.[14] Encouragingly, our intervention led to a marked reduction in such stigmatizing attitudes, aligning with results from studies in Thailand,[15] where education improved empathy and reduced discrimination.

Overall, our findings affirm that school-based, interactive educational interventions can substantially improve adolescents' knowledge, correct false perceptions, and foster positive attitudes toward HIV/AIDS and STIs. This holistic improvement is vital for encouraging safer sexual behaviours and reducing stigma, which are essential components in controlling the spread of HIV and other STIs.

5. Conclusion

The results of this study affirm that educational interventions significantly enhance adolescents' knowledge, perceptions, and attitudes regarding HIV/AIDS and STIs. Given the critical developmental phase of adolescence, delivering accurate and comprehensive sexual health education is essential for fostering healthy behaviours and reducing stigma.

6. Limitations of the Study

1. A key limitation of the study was the time constraint, as the project had to be completed within three months. This restricted the scope of participation to only three schools, whereas the inclusion of additional schools across Vadodara would have enhanced the generalizability of the findings.
2. As the study was conducted only in English-medium schools, the findings may not be generalizable to students from vernacular-medium schools or different socio-economic backgrounds.
3. The study relied on self-reported data from participants, which may be subject to recall bias, potentially affecting the accuracy of responses.

7. Source of Funding

None.

8. Conflict of Interest

None.

References

1. Garcia MR, Leslie SW, Wray AA. Sexually Transmitted Infections. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024.
2. Iqbal M. The level of knowledge and awareness about sex and reproductive health among adolescents in Kashmir. *J Psychosex Health*. 2021;3(1):51–6.
3. World Health Organization. Implementing the global health sector strategies on HIV, viral hepatitis, and sexually transmitted infections, 2022–2030: report on progress and gaps. Geneva: WHO; 2024.
4. Khatri D, Shenwai M, Mardikar P. Understanding attitude towards gender, sexuality, sexual health needs and information seeking behaviour amongst first-year medicine students: an observational study. *J Clin Diagn Res*. 2022;16(3):CC01–5.
5. Deshmukh DD, Chaniana SS. Knowledge about sexual and reproductive health in adolescent school-going children of 8th, 9th, and 10th standards. *J Psychosex Health*. 2020;2(1):56–62.
6. Gupta AK, Mahajan S, Bala S. Control of sexually transmitted infections, reproductive tract infections, and HIV/AIDS in India: current status and the way forward. *Epidem Int*. 2017;2(3):19–29.
7. Bozzini AB, Bauer A, Maruyama J, Simões R, Matijasevich A. Factors associated with risk behaviors in adolescence: A systematic review. *Braz J Psychiatry*. 2021;43(2):210–21.
8. Nath A, Choudhari SG, Dakhode SU, Rannaware A, Gaidhane AM, Dakhode S, et al. Substance abuse amongst adolescents: an issue of public health significance. *Cureus*. 2022;14(11):e31193.
9. Gao X, Wu Y, Zhang Y, Zhang N, Tang J, Qiu J, et al. Effectiveness of school-based education on HIV/AIDS knowledge, attitude, and behavior among secondary school students in Wuhan, China, 2012. *PLoS One*. 2012;7(9):e44881.
10. Agu IC, Mbachu CO, Okeke C, Eze I, Agu C, Ezenwaka U, et al. Misconceptions about transmission, symptoms and prevention of HIV/AIDS among adolescents in Ebonyi State, south-east Nigeria. *BMC Res Notes*. 2020;13:244.
11. Bermúdez MP, Teva I, Ramiro MT, Uribe-Rodríguez AF, Sierra JC, Buela-Casal G. Psychological and socio-demographic variables associated with sexual risk behavior for sexually transmitted infections/HIV. *Int J Clin Health Psychol*. 2012;12(2):235–49.
12. Yimer A, Kebede Kassaw AA, Surur S, Mussa E. Prevalence of misconception about HIV/AIDS transmission and associated factors among reproductive-age women in Ethiopia: a nationwide study. *BMC Infect Dis*. 2024;24(1):54.
13. Chadyiwanembwa N, Habedi DS. High school teenage girls' knowledge and awareness of HIV/AIDS in South Africa. *Afr J Gender Soc Dev*. 2023;12(3):171–94.
14. Takada S, Nyakato V, Nishi A, O'Malley AJ, Kakuhikire B, Perkins JM, et al. The social network context of HIV stigma: population-based, sociocentric network study in rural Uganda. *Soc Sci Med*. 2019;233:229–36.
15. Mathew RS, Boonsuk P, Dandu M, Sohn AH. Experiences with stigma and discrimination among adolescents and young adults living with HIV in Bangkok, Thailand. *AIDS Care*. 2020;32(4):530–5.

Cite this article: Pandya HB, Bhalodia NM, Patel RB, Pipaliya BP, Norris SC. Youth health literacy: Assessing the impact of an interventional campaign on HIV/AIDS and STI awareness in urban schools of Waghodia, Vadodara, Gujarat. *IP Int J Med Microbiol Trop Dis*. 2025;11(3):264-269.