

HIV awareness among school going middle and late adolescents in Chennai: A cross-sectional analysis

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ABSTRACT

Background: Adolescent individuals are at a greater risk of acquiring sexually transmitted infections including Human Immunodeficiency Virus (HIV) due to physiological, psychological, and behavioral changes associated with puberty, worsened by inadequate knowledge of safe sexual practices. With India having the third-largest population of people living with HIV, and a significant proportion of its population in adolescence, assessing awareness of HIV in this age group is crucial for planning effective public health intervention.

Methods: A cross-sectional study was conducted among 302 school-going adolescents (aged 15–19 years) in Chennai, comprising 188 males and 114 females. HIV awareness was assessed using the validated HIV-KQ-45 questionnaire. Scores were categorized as low (1–15), middle (16–30), or high (31–45). Associations between awareness scores and demographic variables such as sex and phase of adolescence were analyzed using the chi-square test.

Results: Most participants (73.2%) were from middle adolescence. A majority (53.9%) of participants had low HIV awareness scores. Females had significantly higher awareness than males in the high score range ($p = 0.001$), and late adolescents demonstrated significantly greater awareness than middle adolescents ($p = 0.01$).

Conclusion: The study revealed a substantial knowledge gap regarding HIV among adolescents in Chennai, particularly among males and middle adolescents. These findings underscore the urgent need for comprehensive, age-appropriate, and gender-sensitive sex education in schools. Structured educational interventions, involving teachers and parents, are essential to improve awareness of HIV and promote safe sexual practices among adolescents.

Keywords: HIV Infections, Adolescence, Health Knowledge, Sex Education, Cross-Sectional Studies

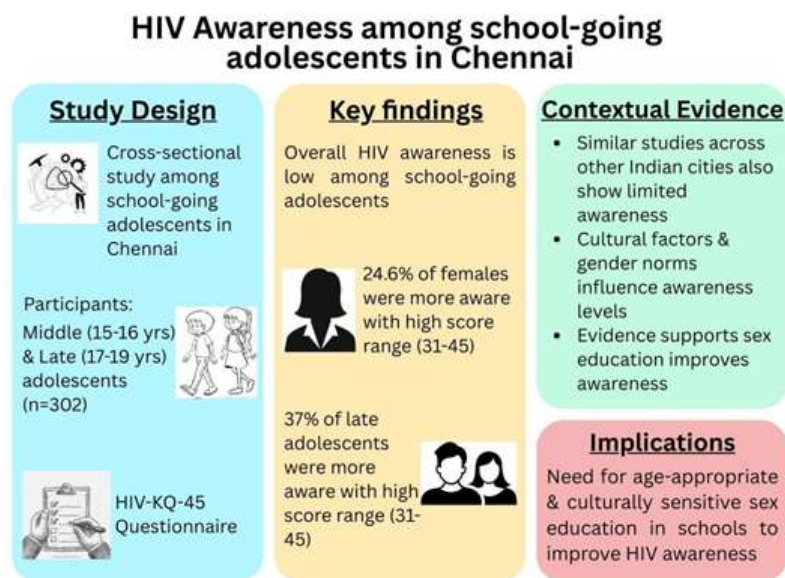
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GRAPHICAL ABSTRACT



INTRODUCTION

Based on growth and development, human life can be divided into five major phases: infancy, childhood, adolescence, adulthood, and old age. Adolescence plays a crucial role in shaping an individual's future. According to the World Health Organization (WHO), adolescence is the period between 10-19 years of life ⁽¹⁾. This is a transition period in which an individual is transformed from a dependent childhood to an independent mature adult.

This phase is characterized by rapid and enormous physical and psychosocial changes, most of which are driven by puberty.

Puberty is a physiological process that makes an individual sexually mature and capable of reproducing. This process is regulated by the hypothalamic-pituitary-adrenal (HPA) axis. According to a theoretical framework, mature gonadotropin-releasing hormone (GnRH) neurons in the hypothalamus secrete GnRH, which in turn stimulates the pituitary gland to release follicle-stimulating hormone (FSH) and luteinizing hormone (LH). FSH and LH stimulate the gonads and cause a sudden release and surge in steroidal sex hormones.

This hormonal activity induces psychophysiological changes, most notably, the development of secondary sexual characteristics. These secondary sexual changes include an increase in height and weight, enhanced muscle growth and fat deposition, development of axillary and pubic hair, enlargement of internal and external sex organs, and increased interest in sexual activity. These biological changes also bring about behavioral and emotional transformations, especially increased sexual curiosity and emotional sensitivity, which

have important health implications.

As adolescents begin to explore their emerging sexuality, they may engage in sexual behaviors without adequate knowledge of safe sexual practices. Hormonal changes and psychosocial development can increase vulnerability to risky behaviors, including unprotected sex. Consequently, adolescence is a period of heightened risk for sexually transmitted infections (STIs), emphasizing the need for timely and comprehensive sex education.

STIs are infections that are transmitted primarily through sexual contact and are a major global public health concern because of their high morbidity and mortality. Most STIs are caused by bacteria, viruses, and other microorganisms. While some STIs are curable, others, such as those caused by Human Immunodeficiency Virus (HIV), are incurable and life-threatening. HIV, identified in 1983 by Luc Montagnier and Françoise Barré-Sinoussi, is a retrovirus with a complex structure that targets lymphocytes and weakens the immune system. Due to its long asymptomatic incubation period, HIV can be transmitted unknowingly, eventually progressing to acquired immunodeficiency syndrome (AIDS) if left untreated. Understanding HIV transmission and pathophysiology is essential to prevent its spread, especially among adolescents.

Adolescence is not only marked by a surge in sex hormone production, but also by growing curiosity in romantic and sexual relationships. Studies have consistently shown an increasing prevalence of STIs among adolescents ⁽²⁾. 50% of newly diagnosed STI cases worldwide (20 million approximately) occur between 15 and 24 years of age ⁽³⁾. India ranks third with highest number of

people living with HIV in the world (2.1 million) ⁽⁴⁾ and comprises nearly one-fifth of the population with adolescents ⁽⁵⁾, making HIV awareness a public health priority. Adequate knowledge and awareness of HIV and other STIs are essential to equip young individuals with the tools needed to make informed decisions and maintain their health ⁽⁶⁾. Therefore, this study aimed to assess the knowledge and awareness of HIV among school-going middle and late adolescents in Chennai, a population segment that is both developmentally vulnerable and critically important for long-term public health intervention.

MATERIALS AND METHODS

This cross-sectional study was initiated after obtaining permission from the Institutional Ethics committee (IEC-NI/17/APR/59/46 dated 6.10.2017). A total of 302 middle and late adolescents (15-19 years) from a private school in Chennai were included as study participants (males:188; females:114). After explaining the need, protocol, and benefits of the study, written permission to conduct the study was obtained from the school authority. Parental informed consent and participant assent were obtained from all the

participants.

Awareness of HIV was assessed using the HIV Knowledge questionnaire - 45 (HIV-KQ-45)

⁽⁷⁾. It has 45 questions related to HIV/AIDS, its mode of transmission, and the available treatment options. For each question, the participants were asked to select either the True/False/Don't know option. Each correct answer was assigned one point (total score: 45). Based on their responses, their total scores were calculated and categorized as: Low score (1-15), Middle score (16-30) and High score (31-45). Demographic variables were documented and expressed as frequencies and percentages. A chi-square test of independence was conducted to explore the association between sex and HIV-KQ-45 scores, and between phases of adolescence and HIV-KQ-45 scores. SPSS Software (version 19.0) was used for the statistical analysis ($p < 0.05$).

RESULTS

This cross-sectional study was conducted among school-going middle-aged (221) and late adolescents (81) in Chennai.

Table 1: Baseline characteristics of the study population

Parameters		N	%
Gender	Males	188	62.30
	Females	114	37.70
Age	15 years	106	35.10
	16 years	115	38.00
	17 years	78	25.80
	18 years	3	1.10
Adolescent phase	Middle adolescence	221	73.20
	Late adolescence	81	26.80
Class	Class IX	9	3.10
	Class X	88	29.10
	Class XI	124	41.00
	Class XII	81	26.80

Data expressed in frequency and percentage (n=302)

Table 1 presents the demographic information of the study population. The results showed that the number of males (62.3%) was higher than that of

females (37.7%), and the majority of study participants were 16 years old (38%). A higher percentage of students were from middle adolescence (73.2%), followed by late adolescence (26.8%), and most study participants were from Class XI (41%).

Table 2: HIV awareness scores of the study population

Score range	N	%
1-15	163	53.90
16-30	97	32.10
31-45	42	14.00

Data expressed in frequency and percentage (n=302)

Table 2 shows the distribution of the HIV awareness

scores among the participants. The majority of the participants (53.9%) scored between 1-15 and followed by 32.1% who scored between 16-30.

Table 3: Category based HIV awareness scores of the study population

Parameters	Score range	N	%	Chi-square value	p-value
Males (188)	1-15	113	60.10		
	16-30	61	32.50		

Gender	Females (114)	31-45	14	7.40	18.43	0.0001*
		1-15	50	43.80		
		16-30	36	31.60		
		31-45	28	24.60		
Adolescent phase	Middle adolescents (221)	1-15	122	55.20	56.28	0.01*
		16-30	87	39.40		
		31-45	12	5.40		
	Late adolescents (81)	1-15	41	50.60		
		16-30	10	12.40		
		31-45	30	37.00		

Data expressed in frequency and percentage

This study found that the awareness of HIV among the participants was generally low.

Subsequent analysis revealed that a higher proportion of males had lower HIV awareness than females in the low score range. Regarding the medium score range, both males and females had similar scores. However, in the high score range, females (24.6%) had a significantly higher HIV awareness than males ($p = 0.001$). Similarly, late adolescents (37%) demonstrated significantly higher levels of HIV awareness than middle adolescents ($p = 0.01$) (Table 3).

DISCUSSION

This cross-sectional study was conducted to assess HIV awareness among school-going middle and late adolescents in Chennai. During data collection, participants were instructed, and it was also ensured that they did not discuss the answers so that the data collected was a true representation of their knowledge and awareness about HIV. The majority of study participants were found to be males. As per population census of Chennai in 2011, males were higher in number than females (986 females per 1000 males)⁽⁸⁾, which could have been the possible cause for the higher male participation in our study. In addition, the highest participation rate was found among middle-aged adolescents (73.2%). Middle adolescence is the age group of 15-16 years and late adolescence is the age group between

17-19 years. Most students pursue school education during early and middle adolescence. With the exception of a few, most late adolescents will be in college education, leading to more middle adolescents participating in the present study.

The total score of the HIV-KQ-45 was categorized into three groups, and the majority of the participants (53.9%) were found to have low scores between 1-15 indicating that adolescents have low awareness of HIV. A similar study conducted among 1000 school adolescent students in Guwahati showed that knowledge of HIV and AIDS was poor⁽⁹⁾. Another study conducted among 107 middle and late adolescents in Dehradun, Uttarakhand reported that 73% of them were under the idea that HIV could be completely cured, indicating their low knowledge of HIV⁽¹⁰⁾. However, a study in Tamil Nadu showed that 54%

of adolescents were aware of HIV and its mode of transmission⁽¹¹⁾. A study done by Kumar et al. in 2015 among 203 school-going adolescents in Tamil Nadu utilizing the HIV-KQ-45 questionnaire revealed that 62.36% were aware of HIV and its modes of transmission and 62.07% possessed knowledge that condoms could prevent HIV infection⁽¹²⁾. However, Kumar et al. did not pursue a sex-based HIV awareness. From these findings it is clear that adolescents are not completely aware of the cause, mode of spread, treatment, and preventive aspects of HIV, establishing the existence of knowledge gap in the HIV awareness.

Studies conducted with Indian women of different age groups found that women have lower awareness about HIV than men. The factors such as poor education, place of residence (urban/rural), restricted access to media and poor social communication with peers and family members regarding sexual issues were attributed for their low awareness⁽⁴⁾.

However, in the present study, females in the younger age group were found to have higher scores (31-45) in the HIV questionnaire than males, indicating their better awareness of HIV. Our findings are strengthened by two another studies. A study conducted with non-standardized questionnaire among 1440 school- and college-going students in Chennai showed that females had significantly better awareness of HIV and safer sex practices than males ($p < 0.01$)⁽¹¹⁾. Another study conducted among 478 pre-university students in Ballari city, Karnataka reported that 66.70% of girls had better awareness about HIV transmission than boys ($p = 0.02$)⁽¹³⁾. In Indian culture, the occurrence of puberty in females is recognized as a socio-cultural event, and they are well sensitized about the menstrual cycle, hygiene, sexual life, and safety by parents and family. Further, education and exposure to social media influences the sexual and reproductive health of the adolescents, especially those living in urban areas⁽¹⁴⁾. Hence, females from urban area like Chennai could have had a better idea of sexual health and HIV.

Late adolescents were found to have higher scores (31-45), indicating better awareness of HIV than middle adolescents. Late adolescence is a post-pubertal period in which there is full development of secondary sexual characteristics. In addition,

mental maturity, greater gender and social exposure, family dynamics, education, and information on sex through media, peers, and other sources provide better awareness of HIV among late adolescents than among middle adolescents. A study conducted among 350 college students (late adolescents) showed that 90% had better HIV awareness ⁽¹⁵⁾. A study conducted among 550 school-going adolescents in Kashmir showed that the higher the class, the better their knowledge of STIs, indicating that late adolescents have better knowledge of HIV ⁽¹⁶⁾.

This study clearly demonstrated a significant gap in knowledge and awareness regarding HIV/AIDS among school-going adolescents. Given these findings, the role of sex education in addressing these knowledge gaps and reducing adolescents' vulnerability to STIs, including HIV, gains prominence. Sex education, including information about HIV transmission, the importance of using condoms to prevent STIs, and removing myths surrounding HIV/AIDS, could be beneficial ^(6, 17). Furthermore, sex education should be age-appropriate, culturally sensitive, and inclusive, and address the needs of both male and female adolescents ⁽¹⁸⁾. Further, policymakers should ensure that sex education programs are implemented in a structured manner with the involvement of teachers and parents to reinforce learning ⁽¹⁹⁾. Providing comprehensive sex education will empower adolescents to make informed decisions about their sexual health, engage in safe sex practices, and lead healthy lives.

LIMITATIONS

The primary limitations of this study include its single-center design, small sample size, and cross-sectional nature. Conducting multicentric longitudinal studies with larger sample sizes and examining the impact of sex education on awareness could offer more comprehensive insights into the knowledge gaps regarding adolescent HIV awareness, thereby influencing the future interventions.

CONCLUSION

This study highlights a critical gap in HIV awareness among school-going middle and late adolescents in Chennai, with particularly low scores among males and younger adolescents. Females and late adolescents were found to have better HIV awareness. These findings highlight the urgent need for comprehensive, age-appropriate, and gender-sensitive sex education as an important component of adolescent public health strategies. It also emphasizes the establishment of regular monitoring and feedback mechanism to ensure educational interventions remain responsive to the evolving needs of the adolescent.

Educational content should place greater emphasis on HIV transmission, prevention strategies such as condom use, the incurable nature of HIV, and the

dispelling of myths surrounding the disease. The study also suggests that policymakers should ensure that these educational programs are implemented in a structured manner with the involvement of teachers and parents to reinforce learning.

AUTHORS CONTRIBUTIONS

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AUTHORS CONTRIBUTIONS

SR designed and supervised the study. DB conducted the study. MS and SR wrote the manuscript. All the authors have read and approved the final manuscript.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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ETHICAL STATEMENT

This study was conducted in accordance with ethical principles of research involving human participants. The study protocol was approved by the Institutional Ethics Committee of the Sri Ramachandra Institute of Higher Education and Research, Chennai (approval number IEC-NI/17/APR/59/46 dated 06.10.2017) before the commencement of the study.

Assent and informed consent were obtained from all participants and their parents before participating in the study.

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