

# Effectiveness of structured teaching programme on transmission and prevention of human immunodeficiency virus/acquired immune deficiency syndrome among adolescent girls in Lowry Memorial High School, Bengaluru

Nanbur Stephen, Nanle Joseph Gusen, Patience Ringkat Kumzhi, Bonji Gaknung, Dauda Abimiku Auta<sup>1</sup>, Lydia B. Bulndi<sup>2</sup>, Champion Mbursa<sup>3</sup>, Vasantha P. Kumari<sup>3</sup>, Nannim Nanvyat<sup>4</sup>  
Department of Nursing Sciences, Faculty of Medical Sciences, University of Jos, Plateau State, <sup>1</sup>Department of Nursing Sciences University of Benin Teaching Hospital, Benin City, <sup>4</sup>Department of Zoology, Applied Parasitology Unit, Faculty of Natural Sciences, University of Jos, Jos, Plateau State, Nigeria, <sup>2</sup>Department of Nursing Sciences, Lincoln University College, 47301 Selangor, Malaysia, <sup>3</sup>Department of Paediatric Nursing, Faculty of Nursing Sciences, Rajiv Gandhi University of Health Sciences, Bengaluru, Karnataka, India

## Address for correspondence:

Mr. Nanbur Stephen, Department of Nursing Sciences, Faculty of Medical Sciences, University of Jos, P. M. B 2084, Jos, Plateau State, Nigeria. E-mail: [snanbur@gmail.com](mailto:snanbur@gmail.com)

## Abstract

**Background:** Adolescence is a critical stage in human development. Most young people become sexually active during adolescence and are more likely to have multipartner and unprotected sex with high-risk behavior that predisposes them to sexually transmitted infections such as human immunodeficiency virus (HIV). **Objectives:** The objective of the study was to evaluate the effectiveness of a structured teaching programme on transmission and prevention of HIV/acquired immune deficiency syndrome (HIV/AIDS) among adolescent girls. **Methods:** An evaluative research approach was adopted, in which a preexperimental, one group pre- and post-test research design was used to evaluate the effectiveness of the structured teaching programme on transmission and prevention of HIV/AIDS among adolescent girls studying at Lowry Memorial High School, Bengaluru. A self-administered structured questionnaire was used for data collection. Data were presented in frequency tables and statistical graphs (bar charts) and analyzed using descriptive statistics (mean, standard deviation) and inferential statistical methods (Chi-square and paired “t”-tests) using SPSS version 21. **Results:** The findings of the study revealed that the mean percentage difference in the pre- and post-test knowledge scores was statistically significant at 5% level ( $P < 0.05$ ). The overall mean post-test knowledge score of adolescent girls on transmission and prevention of HIV/AIDS was 88.83%. It is apparently higher compared to the pretest knowledge score, which was 67.67% with enhancement of 21.16%. This implies that the structured teaching programme was effective in gaining knowledge of adolescent girls regarding transmission and prevention of HIV/AIDS. **Conclusion:** Our study suggests that structured teaching programme enhanced the knowledge of the adolescent girls on transmission and prevention of HIV/AIDS. We, therefore, recommend that structured teaching programmes

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**How to cite this article:** Stephen N, Gusen NJ, Kumzhi PR, Gaknung B, Auta DA, Bulndi LB, *et al.* Effectiveness of structured teaching program on transmission and prevention of human immunodeficiency virus/acquired immune deficiency syndrome among adolescent girls in Lowry Memorial High School, Bengaluru. Indian J Sex Transm Dis 0;0:0.

## Access this article online

### Quick Response Code:



### Website:

[www.ijstd.org](http://www.ijstd.org)

### DOI:

10.4103/ijstd.IJSTD\_102\_17

on transmission and prevention of HIV/AIDS should be encouraged among adolescents and youths to reduce the spread of HIV infection.

**Key words:** Adolescent girls, knowledge, structured teaching programme, transmission and prevention of human immunodeficiency virus/acquired immune deficiency syndrome

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## INTRODUCTION

Adolescence has been defined by the WHO as a period of life between 10 and 19 years. It is variously described as neither children nor adults, but growing up years. It is also a period of critical life junction when opinions and attitudes are formed. These are formative years when the maximum physical, psychological, and behavioral changes take place. These are also a time of explorative and widening horizons and a time to ensure “health” in all-round development.<sup>[1]</sup>

Approximately one-fifth of the world’s population comprises adolescents. India has one of the fastest growing youth populations in the world. In India, there are 200 million adolescents comprising over one-fourth of the entire population; out of which, girls below 19 years of age constitute 22% of the female population.<sup>[2]</sup> Adolescence is a period fraught not only with mental and physical transitions but also with issues that prematurely catapult young people into adulthood. Adolescent girls face poverty, child or forced marriage, pregnancy at a young age, risk of HIV infection, and violence, often without the benefit of an education. Adolescent girls are at high risk for sexual and reproductive health problems in India.<sup>[2]</sup>

The acquired immune deficiency syndrome (AIDS) (sometimes called “slim disease” or “a wasting disease”) is a fatal illness caused by retrovirus known as the human immunodeficiency virus (HIV) which breaks down the body’s immune system, leaving the victim vulnerable to a host of life-threatening opportunistic infections, neurological disorders, or unusual malignancies. The danger of HIV infection is that: once infected, it is likely that the person will remain infected for life. The term AIDS refers only to the last stage of HIV infection. AIDS can be termed as our modern pandemic, affecting both industrialized and developing countries.<sup>[3]</sup>

HIV/AIDS has emerged as the single most formidable challenge to public health, human rights, and development in the new millennium. The WHO and UNAIDS at the end of 2008 estimated that 33.4 million people were living with HIV in the world. That same year, some 2.7 million people

became newly infected, and 2.0 million died of AIDS, including 280,000 children. Approximately 5.2 million people in low- and middle-income countries were receiving HIV antiretroviral therapy at the end of 2009.<sup>[4]</sup>

HIV infection is indeed a unique disease: Its association with behaviors that are not easily accepted by the society; fears of transmission to others; its multisystem affection; and nonavailability of curative drugs and/preventive vaccines create hindrance in every sphere of life.<sup>[5]</sup>

The rate of HIV infection is rapidly increasing and more number of people are getting ill and dying from AIDS. Trends in HIV incidence show important difference between the regions of the world with more than 95% of new cases remaining in the developing countries. The HIV/AIDS epidemic continues to spread with alarming rates in many parts of Southeast Asia and the number of reported cases continues to increase.<sup>[3]</sup>

In India, young people in the age group 15–24 years comprise almost 25% of the country’s population. However, they account for 31% of the AIDS burden in 2009. Well-known factors such as peer pressure, increasing levels of social interaction with the opposite sex, and even household factors such as broken families and poverty, contribute to increased sexual activity and promiscuity. In a conservative society where sex-related issues constitute a taboo for discussion, young people are hindered from actively seeking counseling regarding sexual health. Social ostracism and disease-associated stigma have created an attitude of negativity and shame in the minds of young people. This results in lack of knowledge about self-protective measures, leading to silent spread of the disease. Despite these worrisome statistics, some Indian states have banned sex education in schools, following protests from legislators that it would have a negative impact on the vulnerable minds of school students. Widespread ignorance about the disease is still prevalent, even among youth belonging to the affluent sections of the society.<sup>[6]</sup>

At present, there are 2.47 million people infected with HIV in India and India accounts for over 13%

of all HIV-infected individuals in the Asian region.<sup>[4]</sup> Until now, the total number of AIDS cases reported in India is 5,310,000 (WHO) with majority people in the age group of 20–45 years. About 35% of HIV cases in India are among the 15–24 years age group. The males and females are equally accountable for the spread of the disease. As per estimation, adult HIV prevalence among men is 0.36% while among women, it is 0.25%.<sup>[7]</sup>

Karnataka, a diverse state of Southwest India, has a population of around 53 million out of which 253,000 people are HIV positive. Its capital city Bengaluru, formally famous as the garden city, has around 23,877 HIV-positive people out of 96,189 total populations. The HIV prevalence rate in Bengaluru for adult general population is 0.29%, for men is 0.36% as well as for women is 0.22%; as per the provisional HIV Sentinel Surveillance-2010 by Karnataka State AIDS Prevention Society.<sup>[8]</sup>

The routes of HIV transmission in Karnataka have been established as: sexual – 78.56%, perinatal – 2.49%, blood transfusion – 3.23%, infected syringe and needles – 0.57%, and others not specified – 15.15%.<sup>[9]</sup>

A cross-sectional study was conducted on adolescents' knowledge and awareness about HIV/AIDS in Bangladesh. A multistage cluster sampling technique was used to select the sample. Data from 3362 female adolescents was analyzed. The study found that a large proportion of adolescents were not aware of sexually transmitted diseases and AIDS. More than half (54.8%) of the adolescents never heard of AIDS and only one-tenth of them had moderate knowledge on AIDS in terms of mode of transmission and prevention. Useful and fruitful mass media campaigns regarding the health consequences of sexually transmitted diseases including HIV/AIDS was strongly suggested for creating awareness on the spread of HIV/AIDS among adolescents in Bangladesh.<sup>[10]</sup>

A cross-sectional study was done to determine the knowledge of HIV/AIDS and sexual practices of adolescents in Benin City, Nigeria. Using the systematic sampling method, 852 students consented to participate, giving a response rate of 92.6%. An overwhelming majority of the adolescents were aware of HIV/AIDS but only 16.2% knew the cause of the disease. The submission report revealed that kissing, living with infected persons, and sharing their utensils leads to infection was the indication of their ignorance. The study concluded that the knowledge of the studied population was poor

and required better information for the youths on HIV/AIDS.<sup>[11]</sup>

Young people in many parts of the world have been denied sex and health education in schools because parents and other authorities fear it encourages early sexual activity. However, there is compelling evidence from studies conducted around the world and in many different cultures that, in fact, sex education encourages responsibility. Knowledgeable young people tend to postpone intercourse, or if they do have sex, they take precautionary steps such as use of condoms.<sup>[12]</sup>

A study was conducted on impact of health education program on knowledge about AIDS and HIV transmission among students of secondary schools in Buraidiah City, Saudi Arabia. The results of this study suggested that this type of health education program on AIDS for students greatly and significantly improved their scores in general knowledge of AIDS views on its transmission and misperception of AIDS. Hence, they recommended a continuous health education program for secondary school students.<sup>[13]</sup>

A study was conducted on impact of sex education on HIV knowledge and condom use among adolescent females in the Dominican Republic. Data were analyzed from 1608 female adolescents. Results noted that respondents who reported receiving sex education were 1.72 times more likely to have high HIV/AIDS knowledge than respondents who reported not receiving sex education (confidence interval [CI]: 1.36–2.18,  $p < 0.05$ ). Respondents who reported receiving sex education were 2.52 times more likely to report currently using condom than respondents who reported not receiving sex education (CI: 1.65–3.85,  $p < 0.05$ ). The study concluded that sex education program would be effective in increasing HIV/AIDS knowledge and condom use in young women.<sup>[14]</sup>

A quasi-experimental study was conducted to assess the knowledge, attitudes, and self-efficacy of senior secondary school students toward people living with HIV in Vinnitsa, Ukraine. A nonequivalent control group design with pre- and post-test components was employed on randomly selected sample of 15–16-year-old students from two secondary schools (intervention and control). In addition, 3 months of follow-up questionnaire was administered in both schools to assess longevity of the intervention. Results indicated significantly higher knowledge, attitudes, and self-efficacy scores among students in the intervention school than

in the control school (standard deviation [SD] 96.2 vs. 82.6, respectively,  $P < 0.01$ ; 24.4 vs. 21.7, respectively,  $P < 0.01$ ; 21.9 vs. 20, respectively,  $P < 0.01$ ). The study concluded that HIV education program considerably improved students' knowledge, attitudes, and self-efficacy, and promoted positive changes in the participants, and therefore, it is suggested that the study should be extended to more schools to multiply its effects.<sup>[15]</sup>

A study on HIV/AIDS prevention through peer education and support in secondary schools in South Africa was conducted to provide accurate information about HIV/AIDS that could prevent high-risk behavior among adolescents. A quasi-experimental design involving an experimental and control group, as well as pre- and post-assessments, was used to evaluate the impact of the program on high-risk behavior of learners, aged between 13 and 20 years. The results showed that the percentage of learners in the experimental group who were sexually experienced remained unchanged over 18 months. In contrast, a significantly increased percentage of learners in the control group were sexually experienced after the same period. The study suggested peer education in contributing to the prevention of HIV/AIDS amongst adolescents.<sup>[16]</sup>

A nationwide cross-sectional survey was carried out to assess the knowledge, attitudes, and beliefs about HIV/AIDS among the Malaysian young adults. A total of 1075 young adult respondents aged 15–24 years participated in the survey and the response rate were 82.2%. The results indicated that HIV/AIDS knowledge among the respondents were moderate, with a mean knowledge score of 20.1 out of 32 points. The greater majority had adequate knowledge of the major routes of HIV transmission. Only few were aware of other modes of transmission such as tattooing, piercing, sharing personal items, and breastfeeding from an infected mother. The greater majority knew that HIV is not transmitted by mosquito bites, sharing meals, casual contact, and using public swimming pools and toilets. Misconceptions about HIV/AIDS exist among young adults. Education and intervention programs are needed to increase the level of knowledge and awareness on HIV/AIDS.<sup>[17]</sup>

A cross-sectional descriptive study was conducted using a questionnaire with closed-ended questions to assess knowledge and attitudes toward HIV/AIDS among senior secondary school pupils and trainee teachers in Udupi district, Karnataka, India. A total of 990 pupils and 46 trainee teachers were involved in study. However, there were many misconceptions

about transmission and prevention and 16.9% of pupils were found to possess very little knowledge of HIV/AIDS. It was found that 24.3% of pupils and 6.3% of trainee teachers thought there was a cure and 27.4% of pupils and 14% of trainee teachers thought there was a vaccine to prevent HIV infection. About 98.5% of pupils and all the trainee teachers expressed the necessity of formal sex education. The pupils, who were reassessed after receiving a talk and hand out showed significant improvement in their knowledge and a change in attitude ( $P < 0.01$ ). The mass media are important in disseminating knowledge on HIV/AIDS in India, but due to the lack of interpersonal approaches to the education system, knowledge is inadequate and misconception exists.<sup>[18]</sup>

The fight against HIV/AIDS has to happen on two main fronts – Prevention and Care. To prevent the spread of AIDS, we have to educate the people on how to prevent infection. Poverty alleviation and development are also important programs that will limit the spread of HIV infection. Government cannot fight this battle alone. Government can provide health and welfare services, conduct development programs, and provide information. It is also the responsibility of every individual to support the fight against HIV/AIDS. Public education by health personnel should aim to get as many people as possible to educate them about prevention and issues such as nondiscrimination and support for people living with HIV/AIDS.<sup>[5]</sup>

This study was designed to evaluate the effectiveness of structured teaching program on transmission and prevention of HIV/AIDS among adolescent girls in Lowry Memorial High School, Bengaluru, India.

## METHODOLOGY

The research design selected for the study was one group pre- and post-test, preexperimental research design. The independent variable was STP and dependent variables were knowledge scores in pre- and post-tests.

The sample of this study comprised 50 adolescent girls in the age group of 11–18 years, studying at Lowry Memorial High School, Bengaluru. Purposive sampling technique was used to draw the sample for the study.

The tool developed and used for data collection was self-administered structured questionnaire. Eight experts validated the tool using, the Lawshe's content validity criteria and the content validity index of the tool was found to be 0.9862. The reliability of

the tool was also established by Spearman–Brown prophecy formula ( $r$ ) and the value of “ $r$ ” was 0.9726. Thus, the tool was found to be valid, reliable, and suitable for evaluating the knowledge of adolescent girls on transmission and prevention of HIV/AIDS.

The structured teaching programme consisted of various aspects on transmission and prevention of HIV/AIDS. The teaching plan was organized in sequence and continuity. Teaching plan was prepared with a view to enhance the knowledge of adolescent girls regarding transmission and prevention of HIV/AIDS.

A pilot study was conducted, from November 23, 2016 to December 03, 2016 as a part of the main study; the tool was found to be comprehensible, feasible, and acceptable.

Data collection procedure for the main study began from December 12, 2016 to January 04, 2017, after obtaining permission from the Vice president and Head Master of Lowry Memorial High School, Bengaluru, and informed consent from each participant. The researcher personally explained the need and assured them of the confidentiality of their responses.

The pretest was administered before structured teaching programme; posttest was administered 8 days after the teaching plan, using the same self-administered structured questionnaire. The response rate was 100% in both pre- and post-test.

The data gathered were analyzed using SPSS (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp). Descriptive statistics (mean and standard deviation) were used in data summarization, while paired “ $t$ ”-test and Chi-square test were computed to test the hypothesis. Data were also presented in graphical forms such as bar charts.

## RESULTS

Table 1 depicts that among 50 respondents, 30% of them were 17–18 years old; another 30% were 15–16 years; 20% were 13–14 years; and 20% were 11–12 years old. The mean age was 14.9 years. In terms of religion, a larger number (46%) were Christians as compared to 34% Hindus; 12% Muslims; and 8% from other religion. More than half of respondents (54%) were from joint family, followed by 12% from extended family and the remaining (22%) were from nuclear family. A larger number of them (38%) were in the second ordinal position in the family; followed by 24% in the third ordinal position; 22% in the first ordinal position; and 16% in the fourth ordinal position.

**Table 1: Sociodemographic characteristics of respondents (n=50)**

Characteristics	Category	Respondents, frequency (%)
Age (years)	11-12	10 (20)
	*Mean age=14.9 years	
	13-14	10 (20)
	15-16	15 (30)
Religion	17-18	15 (30)
	Hindu	17 (34)
	Muslim	6 (12)
	Christian	23 (46)
Type of family	Others	4 (8)
	Joint	27 (54)
	Nuclear	11 (22)
	Extended	12 (24)
Ordinal position in the family	First	11 (22)
	Second	19 (38)
	Third	12 (24)
	Fourth	8 (16)
Educational level	Middle	10 (20)
	Secondary	10 (20)
	Higher secondary	30 (60)
Friendship	Male	10 (20)
	Female	12 (24)
	Both	28 (56)
Source of information	Mass media	18 (36)
	Family	7 (14)
	Friends	13 (26)
	Contact with health personnel	12 (24)

Most of them (60%) had qualified higher secondary education as compared to 20% who had secondary education and another 20% with middle school educational qualification. Most (56%) of them had both male and female friends, followed by 24% had only female friends and 20% had only male friends. The major source of information for the respondents about HIV/AIDS was from mass media (36%) followed by 26% from friends, 24% through contact with health personnel, and 14% from family.

Table 2 and Figure 1 indicate the overall mean percentage knowledge score of post- and pre-test which reveal that the posttest mean percentage knowledge score was found higher (mean percentage knowledge score 88.83% and SD = 1.88) when compared to the pretest mean percentage knowledge score which was 67.67% with SD of 2.31.

The mean percentage knowledge enhancement score was 21.16% with SD of 0.42. There exists a statistical significance in the enhancement knowledge score, indicating positive impact of the intervention program.

**Table 2: Overall mean percentage knowledge scores of pre- and post-test on transmission and prevention of human immunodeficiency virus/acquired immune deficiency syndrome among respondents (n=50)**

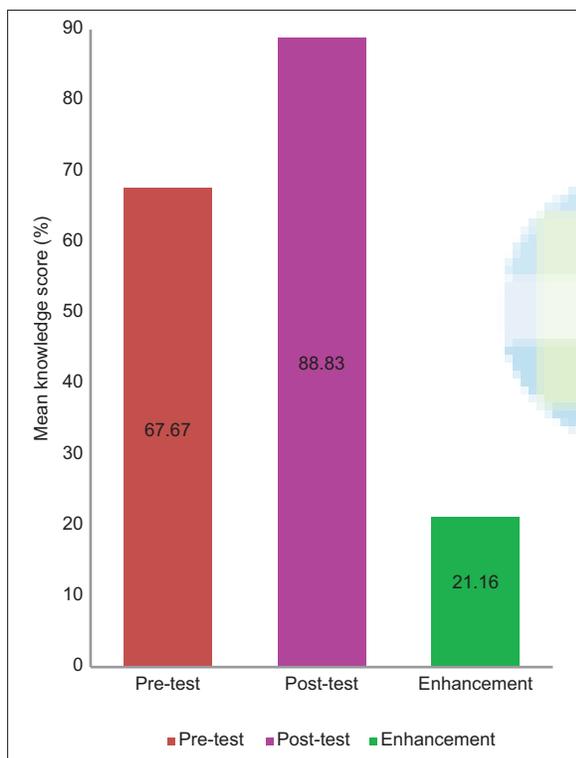
Aspects	Number of items	Maximum score	Range of scores	Mean score	Knowledge score	
					Mean percentage	SD
Pretest	45	45	18-25	21.06	67.67	2.31
Posttest	45	45	37-43	40.02	88.83	1.88
Enhancement				18.96	21.16	0.42

SD=Standard deviation

**Table 3: Paired t-test values between pre- and post-test on transmission and prevention of human immunodeficiency virus/acquired immune deficiency syndrome among respondents (n=50)**

Aspects	Maximum score	Range of scores	Mean score	Knowledge score		Paired t-test
				Mean (%)	SD	
Pretest	45	18-25	21.06	67.67	2.31	51.20
Posttest	45	37-43	40.02	88.83	1.88	P<0.05
Enhancement			18.96	21.16	0.42	

SD=Standard deviation



**Figure 1: Overall pre- and post-test and enhancement mean knowledge scores on transmission and prevention of human immunodeficiency virus/acquired immune deficiency syndrome**

Table 3 indicates that the overall mean of the posttest knowledge score 40.02 (88.83% and SD = 1.88) was found to be apparently higher when compared to pretest mean knowledge score value which was 21.06 (67.67% and SD = 2.31). The mean knowledge enhancement score was 18.96 (21.16% and SD = 0.42).

The statistical paired “t”-test implies that the difference in the pre- and post-test value was found

statistically significant at 5% level ( $P < 0.05$ ) with a paired “t”-test value of 51.20 at 49 degree of freedom. There exists a statistical significance in the enhancement of knowledge score, indicating positive impact of the intervention program. Hence, the research hypothesis is accepted. The structured teaching programme on transmission and prevention of HIV/AIDS was effective among adolescent girls studying at Lowry Memorial High School Bengaluru.

Table 4 and Figure 2 shows that the pre- and post-test knowledge scores of respondents by age were subjected to Chi-square test. There exists a significant association between age and knowledge level of respondents both in pretest ( $\chi^2 = 12.8^*$ ,  $P < 0.05$ ) and posttest ( $\chi^2 = 13.09^*$ ,  $P < 0.05$ ).

Table 5 shows that there exists a nonsignificant association between religion and knowledge level in both pretest ( $\chi^2 = 0.53$ ,  $P > 0.05$ ) and posttest ( $\chi^2 = 5.63$ ,  $P > 0.05$ ) evaluation of knowledge on transmission and prevention of HIV/AIDS.

Table 6 shows that the pre- and post-test knowledge scores of respondents by educational level were subjected to Chi-square test. There exists a nonsignificant association in pretest ( $\chi^2 = 5.91$ ,  $P > 0.05$ ) and a significant association in the posttest ( $\chi^2 = 10.78^*$ ,  $P < 0.05$ ) between educational level and knowledge of respondents on transmission and prevention of HIV/AIDS.

## DISCUSSION

### Sociodemographic characteristics

The sociodemographic characteristics of respondents

**Table 4: Association between age and knowledge level of respondents on transmission and prevention of human immunodeficiency virus/acquired immune deficiency syndrome (n=50)**

Age	Sample (n)	Knowledge level of respondents			
		Pretest		Posttest	
		Inadequate n (%)	Moderate n (%)	Moderate n (%)	Adequate n (%)
11-12	10	8 (80)	2 (20)	8 (80)	2 (20)
13-14	10	5 (50)	5 (50)	4 (40)	6 (60)
15-16	15	13 (86)	2 (14)	6 (40)	9 (60)
17-18	15	14 (93)	1 (7)	8 (53)	7 (47)
Total	50	40	10	26	24
$\chi^2$		12.8*		13.09*	

\*Significant at 5% level.  $\chi^2$  (0.05, 6 df)=12.49

**Table 5: Association between religion and knowledge level of respondents on transmission and prevention of human immunodeficiency virus/acquired immune deficiency syndrome (n=50)**

Religion	Sample (n)	Knowledge level of respondents			
		Pretest		Posttest	
		Inadequate n (%)	Moderate n (%)	Moderate n (%)	Adequate n (%)
Hindu	17	14 (82)	3 (18)	8 (47)	9 (53)
Muslim	6	5 (83)	1 (17)	5 (83)	1 (17)
Christian	23	17 (74)	6 (26)	12 (52)	11 (48)
Others	4	3 (75)	1 (25)	4 (100)	0
Total	50	39	11	29	21
$\chi^2$		0.53 NS		5.63 NS	

$\chi^2$  (0.05, 6 df)=12.49. NS: Not significant

**Table 6: Association between educational level and knowledge level of respondents on transmission and prevention of human immunodeficiency virus/acquired immune deficiency syndrome (n=50)**

Educational level	Sample (n)	Knowledge level of respondents			
		Pretest		Posttest	
		Inadequate n (%)	Moderate n (%)	Moderate n (%)	Adequate n (%)
Middle	10	8 (80)	2 (20)	8 (80)	2 (20)
Secondary	10	5 (50)	5 (50)	4 (40)	6 (60)
Higher secondary	30	26 (87)	4 (13)	17 (57)	13 (43)
Total	50	39	11	29	21
$\chi^2$		5.91 NS		10.78*	

\*Significant at 5% level.  $\chi^2$  (0.05, 4 df)=9.49. NS: Not significant

revealed that most of them (60%) were above 14 years (between 15 and 18 years) and the mean age was 14.9 years. A larger number of the respondents (46%) were Christians; followed by Hindus (34%). More than half of the respondents (54%) were from joint family, and significant proportion (38%) were in second ordinal position.

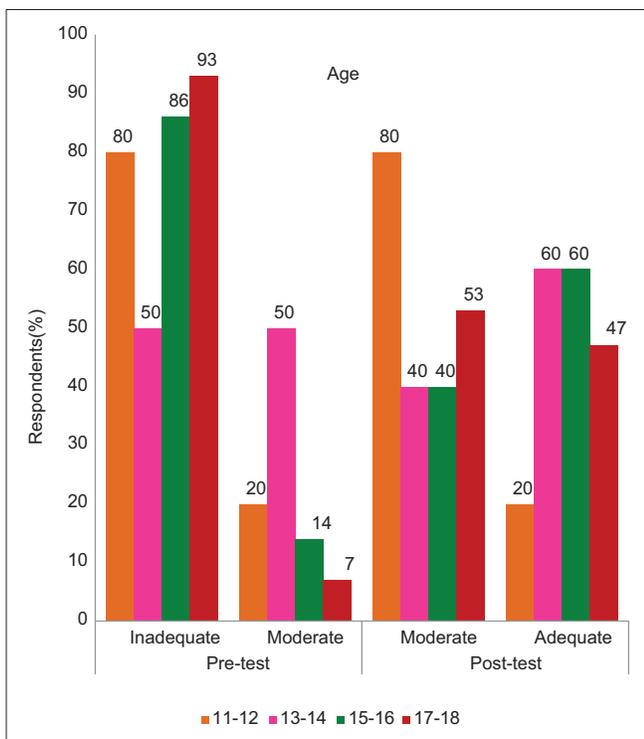
Most of the respondents (60%) had qualified higher secondary education, and most of them had (56%) both male and female friends. A significant number of the respondents had obtained information regarding transmission and prevention of HIV/AIDS through mass media (36%), friends (26%), and health personnel (24%).

A similar study was conducted to assess the current levels of knowledge about AIDS among

secondary school students in India. A questionnaire was administered to 336 ninth and tenth graders (mean age, 15 years) in three rural and three urban schools in Haryana States. Majority of the students (85%) had heard of HIV/AIDS. The study also supported to determine the common sources of information regarding HIV and its prevention method which showed that the peer group influence was greater; whereas, textbooks were also important sources of information.<sup>[19]</sup>

### Assessment of knowledge of adolescent girls regarding transmission and prevention of human immunodeficiency virus/acquired immune deficiency syndrome

The study confirmed that the overall mean knowledge score in pretest was 67.67%, which is moderate. This shows that the adolescent girls



**Figure 2: Association between age and knowledge level of respondents on transmission and prevention of human immunodeficiency virus/acquired immune deficiency syndrome**

had some knowledge regarding transmission and prevention of HIV/AIDS before the study. Although many adolescent girls partly understand general information on HIV/AIDS, they do not have a clear knowledge about risk factors and pathophysiology, signs and symptoms, mode of HIV transmission, diagnostic and preventive measures.

The findings of this study are on par with a cross-sectional study aimed to assess HIV/AIDS-related knowledge and sources among 2668 senior high school students in China. The results revealed that the level of HIV/AIDS knowledge was 6.8% for low, 29.6% for moderate, and 63.7% for high. Strengthening and improving information sources by means of health education would help create more awareness on HIV/AIDS among adolescents.<sup>[20]</sup> The present study is also supported by a cross-sectional correlation study conducted on knowledge of adolescents in Kathmandu, Nepal. Majority of the adolescents had a moderate level of overall HIV/AIDS knowledge, but inadequate knowledge in the areas of mode of transmission and prevention of HIV/AIDS.<sup>[21]</sup>

These findings are also consistent with a study conducted on adolescents' level of knowledge about HIV/AIDS among 208 high school students. Results showed that the participants' mean age

was 15.5 years; 57.2% were female. About 24.5% reported a "good" level of knowledge, 67.3% "fair" level of knowledge, and 8.2% "deficient" level of knowledge. Educational strategies need to be implemented in improving knowledge on transmission and prevention of HIV/AIDS.<sup>[22]</sup>

Another study was conducted on knowledge among senior secondary school pupils in Udupi district, Karnataka, India. In conformity to this study, the study found that many adolescents had misconceptions about transmission and prevention. About 16.9% of pupils possess very little knowledge of HIV/AIDS and 27.4% thought that there is a vaccine for preventing HIV infection.<sup>[5]</sup>

### Effectiveness of structured teaching programme on transmission and prevention of human immunodeficiency virus/acquired immune deficiency syndrome

The study found that there was a considerable improvement of knowledge after the structured teaching programme, and the enhancement in knowledge was statistically established as significant. The overall mean percentage knowledge score in the pretest was 67.67% and 88.83% in the posttest; with 21.16% mean percentage knowledge enhancement. This implies that the structured teaching programme led to a significant gain in knowledge; which may have an impact in preventing the spread of HIV/AIDS. A similar study was conducted in Mumbai, India, to assess the effectiveness of planned teaching programme regarding prevention of HIV infection on knowledge gain among school adolescents. In conformity to the findings of this study, the planned teaching programme was found to be effective in gaining knowledge on prevention of HIV infection among secondary school adolescents.<sup>[23]</sup>

A study conducted to assess the effectiveness of various Information, Education, and Communication in improving awareness and reducing stigma related to HIV/AIDS among school-going teenagers in Haryana, India, in which significant differences in the knowledge score was found between pretest (60%) and posttest (72%) after the education program.<sup>[19]</sup> This is on par with the present study where the gain in knowledge after the structured teaching programme was found to be statistically significant. Another study conducted on effects of rapid peer-based HIV/AIDS educational intervention on knowledge of high school students in Arab country, similarly reported that, the mean knowledge score of respondents was improved from 65% in pretest to 82% in posttest with an enhancement of 17%.<sup>[24]</sup>

### Association between sociodemographic variables and knowledge scores

In this study, age and type of family were found to have high significant association with knowledge score in the pretest; whereas, age, educational level, and friendship had high significant association with knowledge score in the posttest. There was no significant association found between religion, ordinal position in the family, and source of information about HIV/AIDS, in both pre- and post-test.

Results established that the higher the age of respondents, the higher the level of knowledge regarding transmission and prevention of HIV/AIDS and the association between age and knowledge level was found to be statistically significant in both pretest ( $\chi^2 = 12.8^*$ ,  $P < 0.05$ ) and posttest ( $\chi^2 = 13.09^*$ ,  $P < 0.05$ ).

Another study was conducted on adolescents to assess their knowledge about HIV/AIDS in Karachi, Pakistan. The study found adolescent girls with poor knowledge in the age group of 15–19 years (adjusted odds ratio [AOR] = 1.74; 1.22, 2.50) and low socioeconomic status of the family (AOR = 1.61; 1.09, 2.39), which shows that there was a significant association between age and knowledge score; and also between socioeconomic status of the family and knowledge score. This supports the present study, in which majority of the respondents (60%) belong to the age group of 15–18 years; and 53.3% of those in this age group had adequate knowledge in the posttest; which is higher compared to 40% of those in the younger age group had adequate knowledge in the posttest.<sup>[25]</sup>

Furthermore, a study was conducted to assess the knowledge and attitude of senior secondary school pupils toward HIV/AIDS in Udipi District of Karnataka, India. The study found a significant improvement in the knowledge, and change in attitude among 98.5% of pupils; after receiving a talk and hand out about HIV/AIDS ( $P < 0.01$ ). This shows that there is a significant association between the educational exposure and knowledge scores.<sup>[5]</sup> This supports the present study, in which a significant association was found between the educational level of respondents and their knowledge scores in posttest ( $\chi^2 = 10.78^*$ ,  $P < 0.05$ ).

A similar study was conducted to determine the knowledge regarding prevention of HIV infection, especially with reference to sociodemographic variables, among middle-class high school students in New Delhi, India. The study found

that increasing age, low socioeconomic status, and rural residence were important factors influencing the knowledge.<sup>[26]</sup> This study did not explore residential and socioeconomic variables, but age, educational level, and friendship were found to be significant factors in influencing the knowledge of adolescents on transmission and prevention of HIV/AIDS.

There was a significant change found between the pretest (67.67%) and posttest (88.83%) knowledge scores, regarding transmission and prevention of HIV/AIDS among adolescent girls, at 0.05 level of significance, with a paired “*t*”-test value of 51.20, ( $P < 0.05$ ). Hence, the stated research hypothesis was accepted, since there was a significant improvement (21.16%) in the knowledge scores of adolescent girls, after conducting the structured teaching programme.

A similar quasi-experimental study was conducted in Akwa Ibom State, Nigeria, to examine the effect of HIV/AIDS preventive health education on students toward HIV/AIDS prevention. Results of the study also indicated a significant effect of the intervention on students’ knowledge toward preventive measures ( $F = 234.27$   $P < 0.01^*$ ).<sup>[27]</sup>

Another study was conducted in Mumbai, India, to evaluate the impact of school-based HIV/AIDS education for adolescents. The pretest was administered to 2919 students. Only 50% of the students knew that HIV/AIDS is transmitted sexually. After the intervention, 95% of the students became aware that HIV/AIDS is transmitted sexually.<sup>[23]</sup> In consistency with the present study, there was a significant difference between pre-test and post-test knowledge score ( $P < 0.05$ ).

The present study is also supported by a study conducted on the impact of education in promoting the knowledge and attitude toward HIV/AIDS prevention among Iranian students. A self-assessment technique among University students, before and after the educational training program, revealed that the knowledge of students increased significantly ( $P < 0.05$ ) and there was also a significant improvement in their attitude.<sup>[28]</sup> Hence, the study concluded that continuous educational programs should be delivered to the younger generation.

### CONCLUSION AND RECOMMENDATION

Our findings suggest that the structured teaching programme enhanced the knowledge of the

adolescent girls on transmission and prevention of HIV/AIDS. Hence, we recommend that structured teaching programmes on transmission and prevention of HIV/AIDS should be encouraged among adolescents and youths to reduce the spread of HIV infection.

### Financial support and sponsorship

Financial support was not received for this study.

### Conflicts of interest

There are no conflicts of interest.

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