

Effectiveness of a Train-the-Trainer Programme on Sexual and Reproductive Health Knowledge Among Adolescent Girls

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ABSTRACT

Background: Adolescence is a critical period when girls often have gaps in sexual and reproductive health knowledge, making school-based peer education important for improving awareness and informed decision-making.

Methods: A true-experimental pre-test/post-test design was used among 20 adolescent girls from a selected arts and science college, with 10 participants in the experimental group and 10 in the control group, to evaluate a train-the-trainer programme using a 50-item questionnaire across pretest and follow-up assessments.

Results: The experimental group showed a clear rise in knowledge, with adequate knowledge increasing from 20% at pretest to 40% at post-test 1 and 70% at post-test 2, while mean scores improved from 29.00 to 36.00 and 41.70, respectively; paired t-test and ANOVA results showed highly significant improvement, whereas the control group showed only minimal change over time.

Conclusion: The train-the-trainer programme was effective in improving adolescent girls' knowledge regarding sexual and reproductive health, and peer-led educational strategies may be useful for college-based health promotion.

Keywords: adolescent girls; sexual and reproductive health; train-the-trainer programme; peer education; knowledge; college students

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INTRODUCTION

Adolescence is a critical developmental stage marked by rapid physical, psychological, and social changes that shape long-term health behaviors and outcomes. During this period, girls are particularly vulnerable to gaps in sexual and reproductive health (SRH) knowledge, which may contribute to poor menstrual hygiene practices, unmet contraceptive needs, sexually transmitted infections, and unintended pregnancy. Studies among educated adolescent girls have shown that, although general awareness of menstrual hygiene may be relatively better, knowledge of sexual health and contraception remains limited, indicating a clear need for structured educational interventions in school and college settings [1].

The importance of adolescent SRH education is also linked to broader public health and social goals. Adolescents constitute a substantial proportion of the population, and their health-related decisions influence not only individual well-being but also educational attainment, gender equity, and future

reproductive outcomes. In school settings, SRH education can create an accessible platform for reaching adolescents before misconceptions and risky behaviors become established. Evidence from a systematic review of peer education programs in India showed that peer-based and school-linked interventions can improve knowledge, attitudes, and

sometimes behaviors, although the magnitude of effects varies depending on program design, content, and implementation context [2].

Peer-led and train-the-trainer approaches are especially relevant for adolescent populations because information delivered by peers is often perceived as more acceptable, relatable, and less intimidating than adult-led instruction. Adolescents may feel more comfortable discussing menstruation, puberty, sexuality, and contraception with trained peers who understand their language and social realities. A recent study on peer education in sexual and reproductive health and rights found that peer education contributes to increased knowledge and preventive behaviors among adolescents, and that

school-based settings provide a strong platform for sustaining such gains. Similarly, a systematic review noted that peer education can be a useful component of broader SRH promotion efforts, particularly when it is embedded in organized programs with supportive structures.

Despite these benefits, the level of SRH knowledge among adolescent girls remains insufficient in many settings. Research has repeatedly shown that girls may know about menstruation but lack accurate information about puberty-related changes, reproductive anatomy, sexually transmitted diseases, and contraception. This imbalance is important because incomplete knowledge can delay help-seeking, reduce self-confidence, and limit informed decision-making. In addition, open communication about SRH is often constrained by cultural discomfort, peer misinformation, and limited opportunities for confidential discussion, especially in early adolescence [3–5].

Train-the-trainer programs address these gaps by preparing selected students to disseminate accurate health information to their peers in a structured and supervised manner. This model combines formal health education with peer influence, allowing a small trained group to act as multipliers within the larger student population. The approach is consistent with evidence showing that adolescent peer educators can function as agents of change when they receive adequate support, relevant materials, and repeated reinforcement. In school and college environments, such interventions may be particularly effective because they integrate naturally into the social context where adolescents interact daily [6–8].

Given the continued need for effective and sustainable adolescent SRH education, the present study evaluates the effectiveness of a train-the-trainer programme in improving knowledge among adolescent girls. The findings are expected to contribute evidence on a low-cost, peer-mediated strategy that may strengthen reproductive health awareness and support healthier decision-making among college-going adolescents.

2. Methodology

Research approach: Quantitative Approach

Research design: True-Experimental Pre-test post-test design

Research variables:

Independent Variables: Train the trainer programme intervention

Dependent Variable: awareness (knowledge)

Setting: Selected Arts and Science College.

Population: First year and second year students

Sample: Adolescent girls who are studying at Arts and Science colleges and fulfill the inclusion criteria.

Sample Size: 10% of main study, (10 Sample from experimental and 10 sample from control group).

Sampling Technique: Stratified random Sampling Technique.

Description of the tools

The instrument consists of two sections

Tool 1: Section A: Demographic Variables

It includes the age of the adolescent girl, religion, educational status of parents, occupation of parents, area of residence, undergone any training regarding sexual and reproductive health, Age of menarche, Type of school, get along with friends.

Tool 2: Section B: Questionnaire on adolescent sexual and reproductive health

It consists of 50 closed-ended self-prepared questions which consist of 5 domains to assess the adolescent girls' knowledge on Adolescent health, menstrual health & hygiene, anatomy of physiology of the reproductive system, and Sexually Transmitted Diseases and Contraception.

The pilot study aids the investigator in determining the method of statistical analysis and the time requirement for data collection, and the intervention procedure.

Pretest conducted for 50 adolescent girls; five adolescent girls had scored more than 20, and the Interventional program was taken by the researcher in five sessions, planned for 1 hour per day for Adolescent girls who had scored more than 20.

Post-test for the adolescent girls was conducted after 6 weeks (April 2nd week). Adolescent girls who scored more than 35 were selected as adolescent trainers (2 Adolescent girls). One adolescent trainer was willing to be the trainer. 10 adolescent girls were selected by the lottery method. The train-the-trainer intervention program was done by the Adolescent trainer in the presence of the researcher. The 1st post –test conducted after 2 months (August 1st week), and the 2nd post-test was conducted after 4 months (December, 2nd week).

Plan for data analysis

- Descriptive statistics were used to analyze the mean and standard deviation

- Both formulas for the reliability of the tool were identified: paired t-test, ANOVA, P-value, and unpaired t – the knowledge about adolescent sexual and reproductive health among adolescent girls.

- Paired t-test to assess the effectiveness of adolescent “train the trainer programme “

3. Results

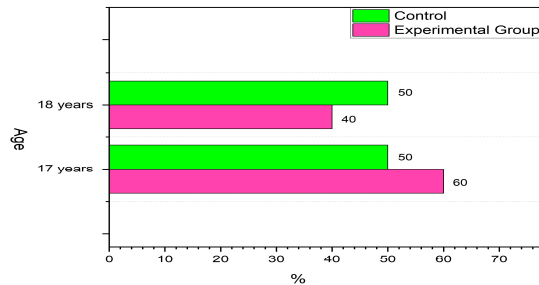


Fig. 1 Frequency and percentage-wise distribution of samples based on their demographic variables: Age of participants

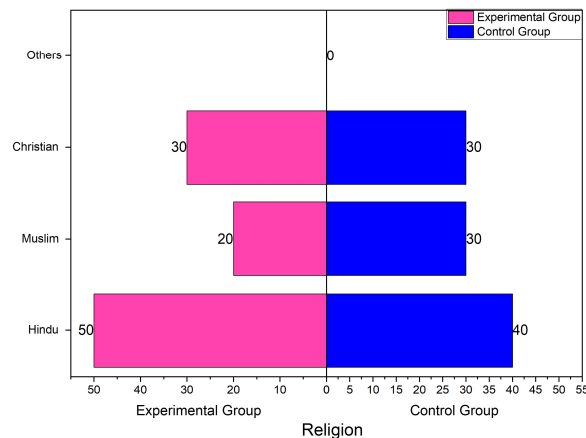


Fig. 2 Religion of participants in experimental and control group

The experimental and control groups were broadly comparable at baseline across all demographic and selected personal variables, with no statistically significant differences observed, as all chi-square values were associated with nonsignificant p-values greater than 0.05. This indicates that the two groups were homogenous before the intervention, which strengthens the validity of subsequent comparisons in the study.

In the age distribution, both groups were almost equally represented by 17-year-old and 18-year-old participants, while religion, area of residence, family income, parental education, parental occupation, and

type of family were also similarly distributed between the groups. Prior exposure to adolescent sexual and reproductive health intervention programmes was reported by all participants in both groups, and the common sources of information included television, social media, workshop, newspaper, and conference, again without meaningful group differences. Menarcheal age, peer relationship pattern, menstrual regularity, and whether the menstrual cycle disturbed daily routine were likewise comparable in the two groups, confirming that the sample characteristics were balanced at the outset.

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Table 1: Frequency and percentage-wise distribution of participants in the Experimental group N=10

Level of knowledge	pretest		Posttet-1		Post test 2	
	F	%	F	%	F	%
Adequate	2	20	04	40	07	70
Moderate	5	50	06	60	03	30
Inadéquate	3	30	-	-	-	-
Total	10	100	10	100	10	100

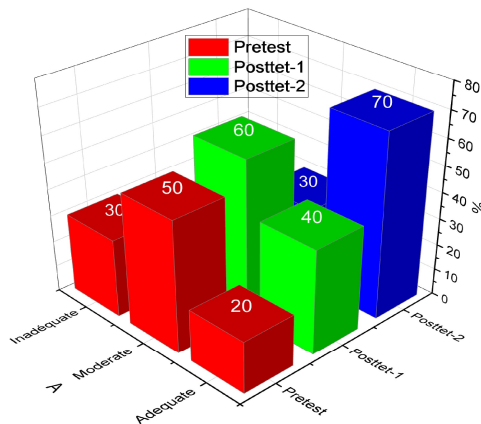


Fig. 3 Frequency and percentage-wise distribution of participants in the Experimental group N=10: Level of knowledge

Table 1 shows a clear improvement in the level of knowledge among participants in the experimental group across the three assessments. In the pretest, only 2 participants (20%) had adequate knowledge, while 5 (50%) had moderate knowledge and 3 (30%) had inadequate knowledge; however, in Post-test 1, the proportion with adequate knowledge increased to 4 (40%), moderate knowledge to 6 (60%), and no

participant remained in the inadequate category. This positive trend became more evident in Post-test 2, where 7 participants (70%) achieved adequate knowledge and the remaining 3 (30%) were in the moderate category, with none in the inadequate level, indicating that the intervention was effective in improving participants' knowledge over time.

Table 2. Mean, SD among participants during pretest, posttest-1 and post test-2 in Experimental group

Groups	N	Max score	Mean	Std. Dev.	Std. Error
Pretest	10	50	29.00	5.9255	1.8738
Posttest-1	10	50	36.00	6.3770	2.0166
Post test 2	10	50	41.70	3.5292	1.1160

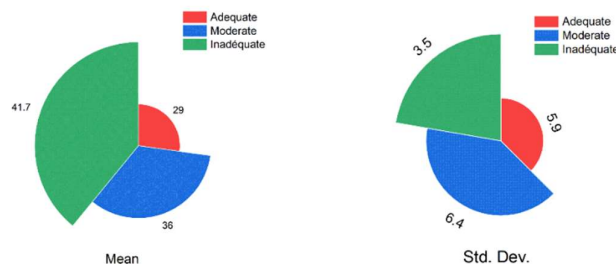


Fig. 4 Standard deviation and mean among Experimental group

Table 2 shows a progressive improvement in the experimental group across the three assessments,

indicating a positive effect over time. The mean score increased from 29.00 in the pretest to 36.00 in

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posttest-1 and further to 41.70 in post test-2 out of a maximum score of 50, suggesting sustained gain in the measured outcome. At the same time, the

standard deviation decreased by post test-2 to 3.5292 from 5.9255 in the pretest and 6.3770 in posttest-1,

Table 3. Effectiveness of TOT in Experimental group

Group	Paired t test value	Significance
Pre-test vs. Post-test 1	5.38	0.004 HS
Pre-test vs. Post-test 1	9.76	0.00 HS
Posttest 1 Vs Posttest -2	5.01	0.00 HS

which indicates that the scores became more consistent among participants in the later assessment. The standard error also declined to 1.1160 in post test-2, reflecting greater precision in the mean estimate at the final measurement

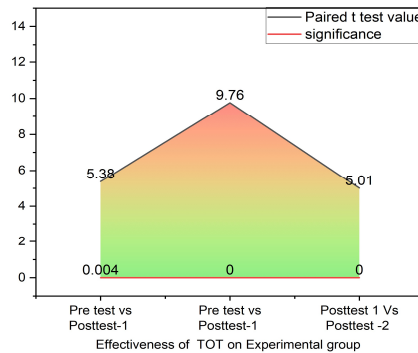


Fig. 5 Effectiveness of TOT in Experimental group Paired t test value and significance

The table (Table 3) shows that the TOT intervention was highly effective in the experimental group, as all the paired t-test comparisons revealed statistically significant differences with positive t values and p values below 0.05. Specifically, the comparison between the pre-test and post-test 1 scores was significant at $t = 5.38$, $p = 0.004$, indicating a meaningful improvement after the intervention. The difference between the pre-test and post-test 2 scores

was even more pronounced, with $t = 9.76$ and $p = 0.00$, while the comparison between post-test 1 and post-test 2 also remained highly significant at $t = 5.01$, $p = 0.00$. Overall, these findings suggest that the TOT programme produced a sustained and progressive effect in improving the measured outcome across the post-test assessments.

Table 4. Effectiveness of TOT based on the ANOVA in the experimental group

Source	Degrees of Freedom	Sum of Squares	Mean Square	F-Stat	P-value
Between Groups	2	809.27	404.63	13.7578	0.0001 HS
Within Groups	27	794.10	29.41		
Total	29	1603.37			

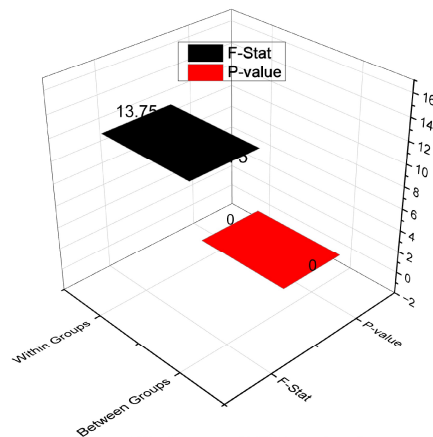


Fig. 6 Effectiveness of TOT based on the ANOVA in the experimental group: F-stat and p-value

The ANOVA results in the experimental group indicate a statistically significant difference among the compared groups after the TOT intervention, as shown by the F-statistic value of 13.7578 with a p-value of 0.0001, which is highly significant. The between-group sum of squares (809.27) was notably higher than the within-group sum of squares

(794.10), suggesting that a substantial proportion of the total variation (1603.37) was explained by the intervention effect rather than random error. This means that TOT was effective in producing measurable changes in the outcome variable, and the null hypothesis can be rejected at the 0.05 level.

Table 5: Frequency and percentage-wise distribution of participants in the control group N=10

Level of knowledge	Pretest		Posttet-1		Post test 2	
	F	%	F	%	F	%
Adequate	3	30	03	30	04	40
Moderate	4	40	05	50	05	50
Inadéquate	3	30	02	10	01	10
Total	10	100	10	100	10	100

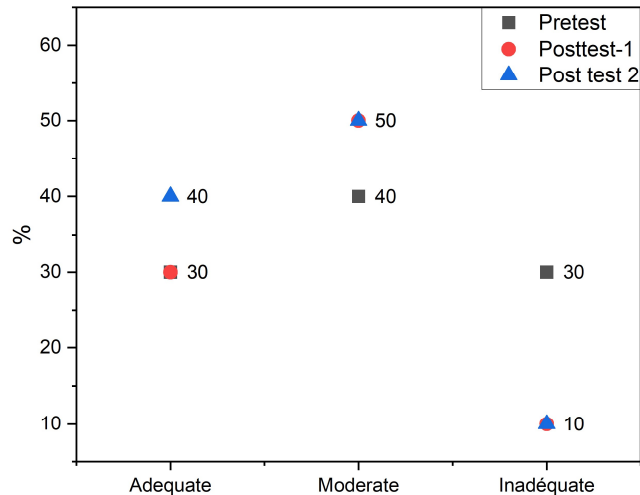


Fig. 7 Frequency and percentage-wise distribution of participants in the control group

The table presents the frequency and percentage distribution of knowledge levels among the 10 participants in the control group across pretest, posttest-1, and posttest-2 assessments. At the pretest stage, the sample was evenly distributed between moderate and inadequate knowledge levels, with 4 participants each (40% and 30%, respectively), while 3 participants (30%) demonstrated adequate knowledge. In posttest-1, a slight shift was observed, with moderate knowledge increasing to 5 participants (50%), adequate knowledge remaining

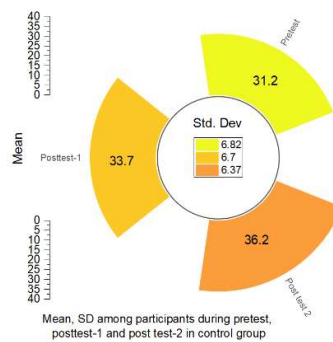
unchanged at 3 participants (30%), and inadequate knowledge decreasing to 2 participants (10%). By posttest-2, the proportion of participants with adequate knowledge increased marginally to 4 (40%), moderate knowledge remained constant at 5 (50%), and inadequate knowledge further declined to 1 (10%), indicating only a minimal improvement in knowledge distribution within the control group over time.

Table 6. Mean, SD among participants during pretest, posttest-1 and posttest-2 in control group

Groups	N	Max score	Mean	Std. Dev.	Std. Error
Pretest	10	50	31.20	6.82	2.15
Posttest-1	10	50	33.70	6.70	2.11
Posttest 2	10	50	36.20	6.37	2.01

In the control group, the mean score showed a gradual increase from the pretest to posttest-1 and posttest-2, rising from 31.20 with a standard deviation of 6.82 to 33.70 with a standard deviation of 6.70, and finally to 36.20 with a standard deviation of 6.37, out of a maximum score of 50.

This pattern indicates a modest improvement over time, while the relatively stable standard deviation and decreasing standard error from 2.15 to 2.01 suggest that the scores remained fairly consistent across the three assessments.

**Fig. 8 Mean, SD among participants during pretest, posttest-1 and posttest-2 in control group****Table 7. Effectiveness of TOT in Experimental group N=10**

GROUP	Paired t test value	Significance
Pre test vs Posttest-1	11.18	0.01 S
Pre test vs Posttest-1	7.90	0.00 S
Posttest 1 Vs Posttest -2	4.79	0.00 S

Table 7 indicates that the Total Outcome of TOT in the experimental group was statistically significant across all comparisons, demonstrating a clear improvement over time. The paired t-test value for pre-test versus posttest-1 was 11.18 with significance at 0.01, while the second comparison

also showed significance with a t-value of 7.90 and $p = 0.00$; likewise, posttest-1 versus posttest-2 remained significant with a t-value of 4.79 and $p = 0.00$, suggesting that the intervention produced a sustained positive effect in the experimental group.

Table 8. Effectiveness of TOT based on the ANOVA in Experimental group

Source	Degrees of Freedom	Sum of Squares	Mean Square	F-Stat	P-value
Between Groups	2	125	61.50	1.41	0.25 NS
Within Groups	27	1189	44.05		
Total	29	1314			

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ANOVA was performed to evaluate the effectiveness of TOT within the experimental group; the analysis included three levels (Between Groups, $df = 2$) and 27 degrees of freedom for the residual (Within Groups), totaling 29 observations. The Between-Groups sum of squares was 125 with a mean square of 61.50, while the Within-Groups sum of squares was 1189 with a mean square of 44.05, yielding an F statistic of 1.41. This F value corresponds to a p-value of 0.25, which exceeds the

conventional alpha of 0.05 and is therefore not statistically significant (NS), indicating that there is no evidence to reject the null hypothesis of equal group means for the outcome measured following TOT in the experimental group. In practical terms, the observed between-group variance is small relative to within-group variance, so differences among the three levels examined are likely due to sampling variability rather than a systematic effect of the intervention

Table 9. UNPIARED T TEST BETWVEN EXPERIMENTAL AND CONTROL GROUP

Experimental	Control	Unpaired t test value	Significance
Pre test	Pretest	0.76	P=0.22 NS
Post-test- 1	Post-test- 1	0.78	P=0.22 NS
Post test 2	Post test 2	2.38	0.01 S

ANOVA was performed to evaluate the effectiveness of TOT within the experimental group; the analysis included three levels (Between Groups, $df = 2$) and 27 degrees of freedom for the residual (Within Groups), totaling 29 observations. The Between-Groups sum of squares was 125 with a mean square of 61.50, while the Within-Groups sum of squares was 1189 with a mean square of 44.05, yielding an F statistic of 1.41. This F value corresponds to a p-value of 0.25, which exceeds the conventional alpha of 0.05 and is therefore not statistically significant (NS), indicating that there is no evidence to reject the null hypothesis of equal group means for the outcome measured following TOT in the experimental group. In practical terms, the observed between-group variance is small relative to within-group variance, so differences among the three levels examined are likely due to sampling variability rather than a systematic effect of the intervention.

4. Discussion

The improvement seen in the experimental group suggests that a peer-mediated model can be effective for conveying sensitive sexual and reproductive health information to adolescent girls. The gain in scores across repeated assessments indicates not only immediate learning but also some retention over time, which is important in adolescent health education. Similar findings have been reported in peer education studies where adolescents exposed to structured sessions showed better knowledge of contraception, STIs, HIV, and reproductive health issues [9].

The strong effect in the intervention group may be explained by the participatory nature of train-the-trainer programmes, which often make information more acceptable and relatable than conventional lecture-based teaching. Peer-led approaches may also reduce embarrassment and improve openness when discussing menstruation, puberty, sexuality, and contraception. A systematic review of Indian studies found that peer education frequently improved knowledge, although the effects on attitudes and behaviours were more variable than knowledge gains.

The relatively small change in the control group supports the view that routine exposure to information alone is less effective than a structured educational intervention. The significant between-group difference at the final assessment further reinforces the value of peer-based dissemination when adolescent health content is delivered through trained student leaders. This is also in line with evidence from peer education interventions in Nigeria, where knowledge improved significantly after exposure to peer-led sessions [2][1]. Overall, the findings support integrating train-the-trainer strategies into adolescent health programmes in colleges. Larger studies with longer follow-up and stronger behavioural outcomes would help confirm whether the observed knowledge gains translate into sustained practice change.

5. Conclusion

The present study concluded that the train-the-trainer programme was effective in enhancing the knowledge of adolescent girls regarding sexual and reproductive health. The experimental group showed a marked improvement in knowledge scores after the intervention, and the gains were sustained across follow-up assessments. In comparison, the control group demonstrated only minimal change over time. The study findings indicate that peer-led educational strategies can be successfully used to improve awareness and understanding of adolescent sexual and reproductive health among college students. Therefore, train-the-trainer programmes may be incorporated into adolescent health promotion initiatives to strengthen health education and encourage informed decision-making among girls.

Conflict of Interest: The authors certify that they have no involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this paper.

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