ORIGINAL ARTICLE

Adolescent Reproductive Health Education: Insights from a Mixed-Methods Evaluation of an Intervention Program

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ABSTRACT

Introduction: Adolescence is a critical stage of mental, emotional, and psychological growth, offering a key opportunity to promote lifelong health. However, adolescents often lack services that address their distinct needs **Objectives**: 1. To assess knowledge of the students and teachers regarding reproductive health prior to and post the intervention.2. To assess the utility and acceptability of reproductive health intervention module among adolescents and teachers. **Methodology**: The study had a mixed model design. An interventional study was done to assess change in knowledge regarding reproductive health among students and teachers using a single comprehensive module. A qualitative study was done to acceptability and utility of the intervention module among teachers. **Results**: There was a significant difference in the mean score among boys and girls pre- and post-health education. 75.8% (376) of the girls had a good increase in the knowledge. The difficulty index for the girl's module was found to be 2.78 out of 10 and for the boys' module, it was found to be 2.77 out of 10. **Conclusion**: The study identified substantial gaps in adolescents' sexual and reproductive health knowledge, stressing the urgent need for inclusive and structured education. The LEAP module–based intervention demonstrated encouraging outcomes, indicating its potential for wider implementation.

KEYWORDS

Adolescent Health, Intervention, Reproductive health, mixed method, Utility assessment

INTRODUCTION

The adolescence is defined as the second decade of life, between the ages of 10 and 19 years according to World Health Organization (WHO). (1) India is home to over 253 million adolescents, comprising nearly 20% of the country's total population. (2)

The strategic approach of Government of India for raising reproductive health awareness for adolescents shows low utilization rates for various reasons. (3) Adolescence provides a unique window of opportunity to build the foundation for health and productivity in adulthood. For adolescent girls, correct knowledge about sexual and reproductive health is not only key to leading healthy, responsible, and fulfilling lives but also to

protecting themselves from reproductive health problems. (4)

Only 15% of young men and women (15-24 y) reported that they received family life or sex education. Eventually, due to inadequate knowledge, they are at greater risk of exposure to unprotected sex, unethical sexual practices, and STIs. (5)

The importance of educating adolescent girls about reproductive health has gained momentum in India; however, a similar focus on adolescent boys remains limited. The Life skills Education and Health Promotion (LEAP) module prepared by IAPSM – REECH group was pilot tested in schools to assess changes in adolescents' reproductive health knowledge, with the long-term aim of fostering positive attitudes and practices through a structured, school-based intervention.

Objectives

- To assess knowledge of the students and teachers regarding reproductive health before and after the intervention.
- To assess the utility and acceptability of reproductive health intervention module among students and teachers

Material & Methods

The study had a mixed model design conducted at schools in Dakshina Kannada district over a period of one year. An interventional study was done to assess the baseline knowledge and post-intervention knowledge regarding reproductive health among students and teachers. The utility and acceptability of the module among students was assessed quantitatively while a qualitative study was done to explore the acceptability and utility of the intervention module among teachers. The mixed method study design helped in knowing the impact of the intervention and to explore the possibility of implementation of these modules in the future.

The sample size was estimated using the cluster sample formula. For keeping power of study at 80% and the number of clusters being 10, with considering intracluster correlation coefficient at 0.034, and expecting a base knowledge to be 50% the final sample size of 900 and 90 in each cluster. The sampling method employed was cluster sampling 10 schools were selected. The students were the active part of intervention and teachers were considered passively. The unit for analysis was both students and teachers. Institutional ethics Committee clearance was obtained before the start of the study.

Ten English-medium schools were selected through convenient sampling technique, and it was ensured that the selection was not based on anticipated outcomes. The necessary permissions were obtained, and the purpose of reproductive health awareness was explained to the school authorities. The LEAP module was delivered over two months; teaching hours were scheduled in consultation with teachers. Sessions were conducted by department interns, who were trained for this purpose.

A validated, pre-tested questionnaire assessing adolescents' knowledge of reproductive health was completed before the intervention, together with a general item about perceived need and interest in health awareness. The reproductive health module was conducted in the presence of teachers, who were also provided with a copy of the written material for future use. After two months, the same knowledge questionnaire was repeated. Validated, pre-tested questionnaires to assess utility and acceptability of the module were separately administered to students and teachers. The latter also measured teacher willingness to independently conduct the module and perceived challenges. Focus Group Discussions (FGD) were conducted among teachers at schools to gather further perceptiveness. Purposive sampling technique was used to select the schools. 2 Schools were selected, one with state syllabus and other with CBSE Syllabus. FGD guide was used for the conduct of discussions.

Statistical analysis: The data were entered in Microsoft Excel. To check the difference of scores within the group Paired t-test was used. Frequency and percentage were calculated. To test for the association of utility with change in knowledge chi-square analysis was used. The difference in knowledge < 6 was considered as average and > 7 was considered as good for boy's and girl's modules. The difficulty index of the module was also assessed. Scoring from 1-10 was given as an option, with 1 being module is easy to understand and 10 was considered as difficult to understand. Thematic analysis was done for the focus group discussion. All the authors

Results

A total of 981 students participated in the study from 10 English medium schools in the district. 5 of the schools had a state syllabus while the other 5 had a CBSE syllabus. Among the participants 485 (49.4%) students were boys, and 496(50.5%) students were girls.

On assessing the basic awareness regarding the importance of health among the students it was observed that 84.5% of the students agreed that understanding of reproductive health is good for them. 63.5% of the students agreed that they are unaware of the health hazards during adolescence.

77.5% of students agreed that knowing about the health aspects will their family and their community. 69.7% of students strongly agreed that teachers need to know more about health-related issues. On the assessment of awareness regarding the importance of health among teachers, it was observed that 100% of the teachers strongly agreed that understanding reproductive health is good for everyone. 90% of the teachers agreed that they as a teacher need to know more about health-related issues.

Table 1: showing the change in knowledge regarding reproductive health among boys (N=485)

Knowledge	Pre-Test (Mean)	95% CI	Post-Test (Mean)	95% CI	P Value
Reproductive health	9.07	8.85-9.27	14.09	13.93-14.24	<0.001*
Problem of Adolescent	3.8	3.70-3.93	4.9	4.82-5.0	<0.001*
Total (25)	12.8	12.6-13.15	19.0	18.83-19.19	<0.001*

There was a significant difference in the mean score among boys pre and post-health education. The knowledge was also assessed in different sections like reproductive health and problems of adolescents which also showed significant differences pre- and post-intervention. (Table 1)

Table 2: showing the change in knowledge regarding reproductive health among girls (N=496)

Knowledge	Pre-Test (Mean)	95% CI	Post-Test (Mean)	95% CI	P Value
Reproductive health and sexual violence	4.3	4.22-4.54	8.43	8.35-8.52	<0.001*
Problems of adolescence	1.84	1.76-1.91	3.7	3.69-3.84	<0.001*
Menstrual cycle and hygiene	1.1	1.05-1.18	2.9	2.91-3.04	<0.001*
Total (20)	7.34	7.14-7.55	15.18	15.05-15.31	<0.001*

There was a significant difference in the mean score among girls as well in pre and post-health education. The knowledge was also assessed in different sections like reproductive health and sexual violence, problems of adolescents, and menstrual hygiene which also showed significant differences pre- and post-intervention. (Table 2)

The baseline knowledge of girls regarding the different types of touch was found to be low at 14.7%. Post health education 83.8% of the girls were able to identify good touch and bad touch. The knowledge on menstrual hygiene, i.e. regarding products that can be used during the menstrual cycle was found to be low (6%), there was an increase of this knowledge to 64% post-intervention

The baseline knowledge of the boys regarding reproductive health was found to be low at 8.8% which improved to 82.4% post health education. Most of the boys i.e. 57.5% were aware of good and bad touch, their knowledge further improved to 97.9% being able to identify good touch and bad touch.

Figure 1: Showing change in reproductive health knowledge among girls (N= 496)

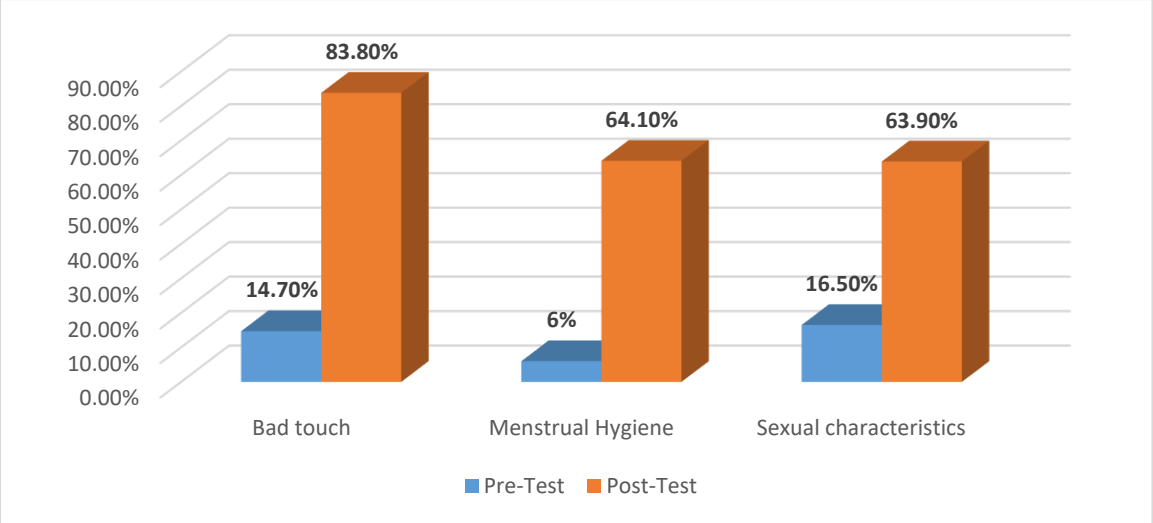
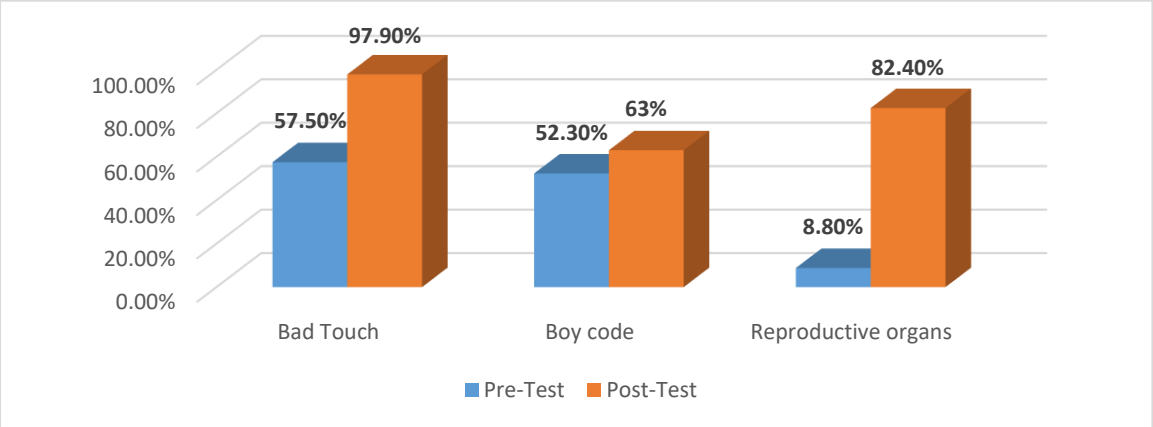


Figure 2: Showing change in reproductive health knowledge among Boys (N= 485)



Acceptability and utility of the module were assessed for association with the change in knowledge showed that there was no significant association between change in knowledge and acceptability and utility of the module. Although all the students agreed/strongly agreed that the module was good for understanding reproductive health and their awareness of reproductive health and health hazards improved post health education. The difficulty index for the girl's module was found to be 2.78 out of 10 and for the boys' module, it was found to be 2.77 out of 10.

Acceptability and utility among teachers were also assessed 70% of the teachers agreed that the module was useful in understanding reproductive health. Regarding carrying out the module by oneself 77% of them confidently agreed that they can do it with the training. A total of 86% of teachers strongly agreed that in the present scenario we can introduce this module to the students. 90% of the teachers agreed that they are aware of the health hazards after education.

Figure 3: Showing distribution of various components of acceptability and utility among Boys (N=475)

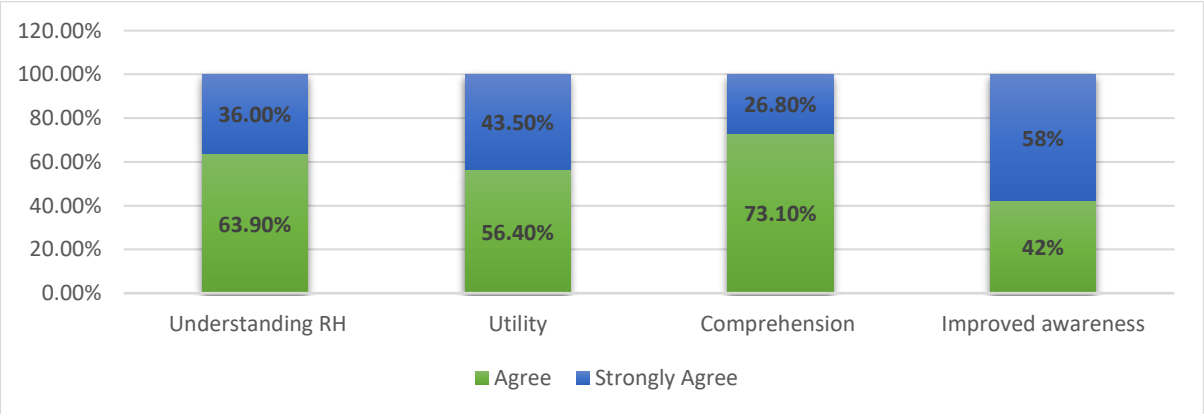


Figure 4: Showing distribution of various components of acceptability and utility among girls (N=496)

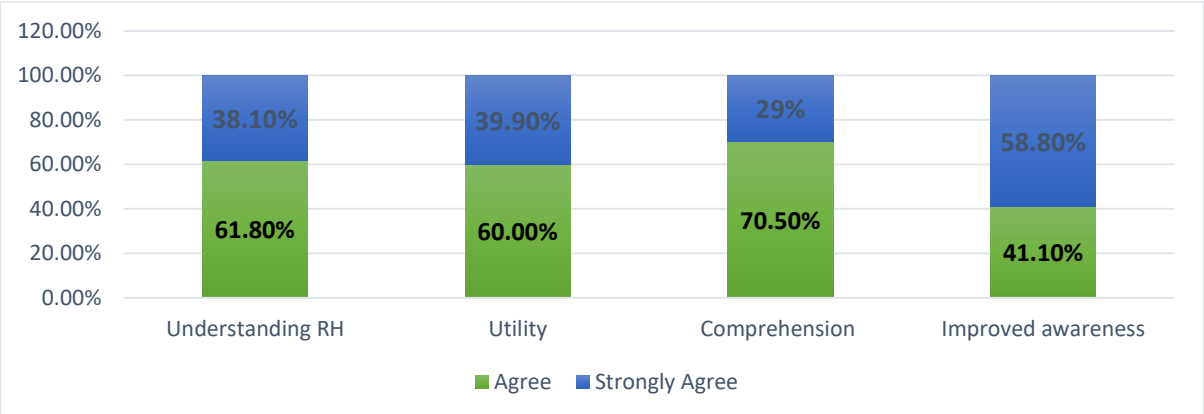


Table 3 showing the association between acceptability and utility of module with the change in knowledge post health education among Boys (N=475). #Chi Square Test

		Difference in knowledge			P
		Good	**Average**	**Total**	**value**
Understanding of reproductive health is good	Agree	195(62.5%)	107 (65.6%)	302	0.499
	Strongly Agree	117 (37.5%)	56 (34.3%)	173	
Utility of teaching methods - good	Agree	173(55.4%)	96 (58.8%)	269	0.472
	Strongly Agree	139 (44.5%)	67 (41.1%)	206	
Module was easy to comprehend	Agree	231 (74%)	116 (71.1%)	347	0.503
	Strongly Agree	81(25.9%)	47 (28.8%)	128	
Post education awareness improved	Agree	129 (41.3%)	75 (46%)	204	0.329
	Strongly Agree	183 (58.6%)	88 (53.9%)	271	

75.8% (376) of the girls had a good increase in the knowledge with more than six points increase in the score. The rest of them were i.e. 24.1% (120) had an average increase in knowledge.

64.3% (312) of the boys had a good increase in the knowledge with more than six points increase in the score. The remaining 35.6% (173) had an average increase in knowledge.

Table 4 showing the association between acceptability and utility of module with the change in knowledge post health education among girls (N=496). #Chi Square Test

		Difference in knowledge			P value#
		Good	Average	Total	
Understanding of reproductive health is good	Agree	235 (62.5%)	78 (65%)	313	0.621
	Strongly Agree	141 (37.5%)	42 (35%)	183	
Utility of teaching methods - good	Agree	220 (58.5%)	77 (64.1%)	297	0.271
	Strongly Agree	156 (41.4%)	43 (35.8%)	199	
Module was easy to comprehend	Agree	271 (72%)	87 (72.5%)	358	0.928
	Strongly Agree	105 (27.9%)	33 (27.5%)	138	
Post education awareness improved	Agree	155 (41.2%)	49 (40.8%)	204	0.940
	Strongly Agree	221 (58.7%)	71 (59.1%)	292	

Focus group discussion was conducted for the teachers of two schools to understand the acceptability and utility of the module. One of the schools had a state syllabus while the other had a CBSE syllabus.

Need: The need for health education especially for reproductive health was perceived by all the teachers. The majority of them agreed that it should be part of the syllabus. The topics are usually less spoken. The parents or teachers are not able to communicate on these topics to the students appropriately. The students often depend on their peers for information.

"There is a sense of curiosity among students in the adolescents"

"The topics are seldom discussed with parents. This often makes them rely on untrustworthy sources for the information and end up having distorted views"

School-Based: Most of the teachers agreed it is good to have school-based health education for adolescents. This provides easy accessibility for the educators to get all the adolescents in a place. However, some of the teachers opined it may be burdening the hours due to the stress of completion of the syllabus. They opined that if it was part of the syllabus, it would be better and completion of it will be assured.

"There are increased holidays for the students in the year due to heavy rains and elections. It makes

the completion of the syllabus difficult and extra hours are required to complete the given portions"
"It has to be part of the syllabus. When it is not these extra-curricular activities will be taken lightly.

Professional educator: Majority of the teachers opined that the health education if given by the professional like doctors or nurses it will be perceived better by the students. The topic of reproductive health is quite sensitive and students are not able to discuss it with the teachers or the parents regarding it. The students will also get an opportunity to clarify their doubts and discuss their problems if the health educator is a medical professional was what they said.

"It is better if reproductive health education is given by the doctors. The hesitation of the students will be reduced"

Teacher as a health educator: Majority of the teachers although opined education by doctors or nurses is better, they also felt that if there was proper training of the teachers on the topic, they can be an effective educator as well. The topic of reproduction is taught in 10th std in State syllabus and students are often feeling shy during this class was the opinion of the teachers. They opined if there was a reliable standard protocol for taking class regularly this will bring seriousness to the topic.

"We often teach it as a part of science syllabus in the 10th std. No extra classes are taken"

DISCUSSION

Reproductive and sexual health is a crucial aspect of adolescent well-being, yet it remains inadequately addressed, particularly among boys. In the present study, only 57.5% of male students were aware of the concept of good touch and bad touch prior to the intervention. This is consistent with findings from Sharma et al., who reported that less than half of adolescent boys had a clear understanding of personal safety concepts before targeted health education sessions were conducted (6). Following our intervention, awareness improved significantly to 97.9%, indicating a high level of receptiveness and rapid uptake of information among adolescents. Similar outcomes were noted in a study by Meena et al., where structured school-based health education led to a statistically significant increase in knowledge related to child sexual abuse and safety behaviours (7).

In our study, awareness of the "boy code"—a cultural norm discouraging emotional expression among boys—was low, with only 52% of students recognizing it prior to intervention. This increased slightly to 63% post-intervention, indicating the need for ongoing efforts to challenge gender stereotypes. Similar findings have been reported in studies highlighting how emotional suppression is often seen as a marker of masculinity among adolescents (8). None of the participants were initially familiar with the term ejaculation or nightfall. However, once these concepts were explained, many students expressed curiosity but also hesitation, reflecting the stigma and lack of safe spaces to discuss such topics, as noted in prior research (9).

A majority (84.5%) felt that health education sessions were necessary and valuable. Students also expressed a desire for their teachers to be better informed about reproductive health, a finding consistent with earlier studies emphasizing the importance of equipping educators to handle sensitive topics effectively (10)

In our study, it was found that the majority of the girls, 83% did not know secondary sexual characteristics. The study by Shankar P et al showed that 80% of the adolescents were unaware of the secondary sexual characteristics. (11) The results of study by Shivani Bhaduria et al showed that only 56% of the adolescent girls were aware of menstruation at the time of menarche. These findings indicate that these topics less often discussed and with the current trend of early menarche it becomes very essential to start the reproductive health education early with a standard module. (12) A study done by Baliram WV et al showed that 90% of the teachers agreed that there is a need for imparting sex education which is similar to our study where 100% of the teachers said that reproductive and sexual health education is important. (13) A study by Ghongdemath JS et al showed there was a significant increase in the knowledge regarding menstruation and menstrual hygiene after the health education. (14) Similar findings were also found in our study.

Similar to previous qualitative research, teachers felt that there was a significant need for structured reproductive health education, citing teenage curiosity and inadequate parent-child communication.

(15,16) Although integration into the curriculum was emphasised to guarantee priority, school-based delivery was deemed acceptable. Teachers acknowledged that trained teachers, backed by standardised protocols, could effectively deliver sustainable reproductive health education, but they preferred medical professionals for delicate subjects, in line with earlier research. (16)

CONCLUSION

The study reveals significant gaps in sexual and reproductive health knowledge among adolescents, highlighting the urgent need for

inclusive education. Boys often lacked awareness of emotional expression and puberty-related changes, while girls showed limited understanding of secondary sexual characteristics and menstrual hygiene. Encouragingly, the LEAP module intervention improved knowledge across these areas for both groups.

Recommendation

To guarantee consistent and ongoing delivery, sexual and reproductive health education should be incorporated into the school curriculum. Both boys and girls must receive early, age-appropriate, and gender-sensitive education. With assistance from medical experts, teachers should receive training using standardised modules like LEAP. To maintain knowledge and encourage positive attitudes, periodic reinforcement sessions are advised.

Limitation of the Study

The post-intervention assessment was conducted shortly after the health education session, which restricted the ability to assess long-term retention of knowledge and the sustainability of observed improvements. Additionally, the study did not evaluate whether the increase in knowledge translated into sustained behavioural change or healthy practices over time. Longitudinal follow-up assessments would be required to determine the enduring impact of the intervention on adolescent attitudes and behaviours.

Relevance of the Study

The study identifies significant gaps in teenage girls' and boys' understanding of sexual and reproductive health. It offers proof of the LEAP module's acceptability and efficacy as a planned, classroom-based intervention. The results provide useful information for improving school health and adolescent health programs and support early, gender-inclusive reproductive health education and teacher preparation.

Authors Contribution

HHN – Conception and design, Acquisition of data, analysis and interpretation of data, drafting of article, final approval of version to be published. AR- Conception and design, analysis and interpretation of data, revision of the article, final approval of version to be published. RK- Conception and design, Acquisition of data, analysis and interpretation of data, drafting of article, final approval of version to be published. DR- Conception and design, analysis and interpretation of data, drafting of article, final approval of version to be published. SP- Conception and design, analysis and interpretation of data, drafting of article, final approval of version to be published. SD- Conception and design, analysis and interpretation of data, drafting of article, final approval of version to be published. P- Conception and design, analysis and interpretation of data, drafting of article, final approval of version to be published

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Conflict of Interest

Nil

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Declaration of Generative AI and AI Assisted Technologies in the Writing Process

The authors haven't used any generative AI/AI assisted technologies in the writing process.

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