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Research Article

Creating Awareness about Adolescent Reproductive Health among Upper Primary School Students in Haryana through the Use of Interactive e-Modules

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A B S T R A C T

Adolescents are the prospective citizens of any nation; therefore, investment in terms of the well-being of adolescents is considered quite rewarding. Adolescents are now attaining biological maturity earlier than the previous generation, as witnessed by the gradual decline in average age of puberty and menarche; hence, it becomes imperative to address this cohort of the population. Integration of technology in the field of education has been an area of research for a long. The present study attempts to use digital technology in the form of e-modules created through H5P in creating awareness about adolescent reproductive health on upper primary school students. A sample of 309 students from randomly selected ten unaided private schools of Sonipat district of Haryana was taken. Interactive e-modules were developed for addressing adolescent reproductive health. After the pre-test administration, the experimental group was taught through e-modules and the control group was taught through the conventional method. The data was collected through validated tools over a period of three months. A post-test was conducted afterward to assess the awareness level. After ascertaining comparability of the two groups, data was analyzed using percentage and t-statistics. The data analysis showed that the difference in the mean and standard deviation of the post-test scores of the experimental group 20.50 ± 3.40 and the control group 15.72 ± 4.03 were statistically significant at 0.001 level (t value = 11.26, d.f. = 297). Thus, the study concludes that the interactive e-modules effectively create awareness about adolescent reproductive health at the upper primary school stage.

Keywords: Adolescent Reproductive Health, Awareness, Intervention, e-modules, H5P, Digital Technology, Upper Primary School Stage

Introduction

Technology has crept and blended into our lives to a great extent. We have glided past the era of alarm clocks, telephone directories, calculators, dictionaries, and many more articles which were once proudly owned and used by each one of us. How could then modern-day teaching-learning be left untouched by technological advancements? The present generation, often addressed as 'digital natives'[1], tend to be much at ease using digital devices compared to the children and adults.[2] Digital media and internet technologies offer an enormous possibility for reaching out to adolescents.[3]

The integration of technology as an effective tool for classroom teaching-learning for elementary classes has been well researched with positive outcomes of technology use in pedagogy.[4-7] A review of studies to assess the KAP of adolescents across India has pointed out the gaps among adolescents regarding reproductive health.[8-11] A review on "knowledge and understanding of menarche, menstrual hygiene, and menstrual health among adolescent girls in Low and Middle-Income Countries (LMIC)" reported that girls were unprepared for menarche as they are not equipped with adequate and timely information. The review further states that in India, older adolescents had better possession of knowledge than young adolescents.[12] This lack of knowledge among adolescents regarding reproductive health is neither addressed by the school nor parents. Taking advantage of their ignorance, adolescents are often sexually abused[13,14] and do not even know how to resist or report. Adolescents are now attaining biological maturity earlier than the previous generation, as witnessed by a gradual decline in the average age of puberty and menarche.[15] Hence, it becomes imperative to educate very young adolescents in the age bracket of 10-14 years regarding reproductive health. Reports state that the very young adolescents (10-14 years old) are mostly neglected as policymakers focus on older adolescents.[16] Also, there is a paucity of data regarding them as none of the surveys seeks information from this cohort of adolescent population therefore; there is very little understanding of their needs.[17]

Eminent scholars from diverse fields like education, medicine, psychology, social work, and technology have reported different ways and means to address reproductive health. Also, the integration of digital technology to address the reproductive health of adolescents has been studied in varied contexts. Barak and Fischer studied the usage of two websites containing information on sexual and reproductive health for adolescents. Their study reported many users and multiple downloads within months of their launch and concluded the websites were helpful for adolescents to seek information.[18] Cousineau TM et al. reported that their interactive computer-based program on puberty, 'Body Morph,' could enhance knowledge and awareness about puberty among adolescents.[19] Roberto AJ et al. reported that the computer and internet-based interventions increased knowledge and delay sexual initiation among rural adolescents.[20] Bailey et al., in their systematic review of literature on the effectiveness of Interactive Computer-Based Interventions for sexual health promotion, reported these to be more effective than face-to-face interventions.[21] Sancheti PV et al. investigated the effect of an audiovisual intervention on improving knowledge about reproductive health among adolescents and reported a significant increase in knowledge post intervention.[22] Brayboy LM et al. studied the utility of a mobile app 'Girl Talk' and reported a substantial increase in knowledge of girls regarding many dimensions of reproductive and sexual health.[23] Calabrese investigated the effectiveness of mixed media methods for instructing six graders on sexual and reproductive health and reported increased knowledge retention of students.[24] The literature review indicates a paucity of research in interactive digital interventions, especially for addressing reproductive health to very young adolescents in the Indian context. In order to reach out to these 'digital natives' with age-appropriate knowledge about reproductive health, this paper explores the effectiveness of e-modules in creating awareness about Adolescent Reproductive Health among Upper Primary School students.

Materials and Methods

Phase I (Developmental Phase)

The first phase of the study comprised of analysis of the science text books of classes VI to VIII, from Central Board of Secondary Education in lieu of adolescence, reproductive health and other related issues. The existing electronic resources were then reviewed to check for the e-content available to address adolescent reproductive health for the age group of 10-14 years. The review concluded that content and quality of the electronic resources available did not match the requirement of the very young adolescents (10-14 years old), especially in the cultural context of Haryana. The e-modules were then designed and developed to address the topic of Adolescent Reproductive Health to students of Upper Primary classes.

The use of computers and internet technologies to facilitate learning is generally referred to as e-learning. There are two approaches to e-learning: Self-paced and Instructor-led or facilitated. Both the approaches use e-content which can be broadly classified as simple learning resources, interactive e-lessons, electronic simulations and job aids.[25] Each interactive e-lesson, henceforth called e-module, is basically an interactive presentation, developed for this study with the aid of H5P- an open source technology to create HTML5 content without much technical expertise. For designing and developing the e-modules, ASSURE

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model of instructional design was adopted. ASSURE is an acronym, as represented in Figure 1.

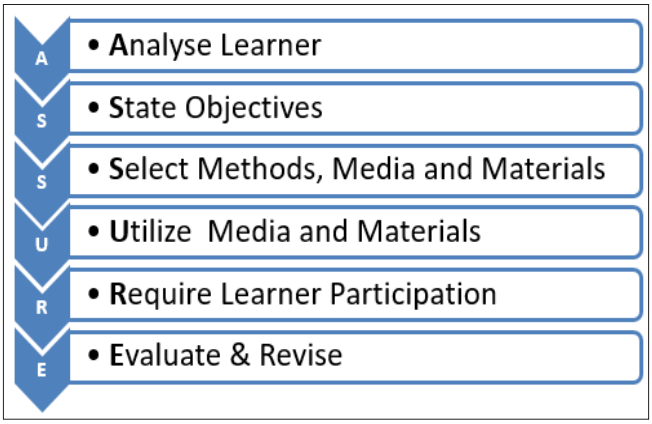

Figure 1.Representation of the steps mentioned for ASSURE model by Heinich R et al.[26]

Each e-module consists of a linear sequence of screens with text, graphics, animations, and interactivity in the form of true/false, multiple-choice, drag and dropbox, etc. The e-modules also contain reading links and links for audio-video and links for additional information on few selected topics. The images, graphics, and videos used in the content were taken from Open Educational Resources.

The e-modules were designed and developed under 4 subheadings: Adolescence and Puberty, Role of Hormones and Development of Secondary Sexual Characteristics, Human Reproductive system, and Reproductive Health. Each interactive e-module can be completed in around 30 minutes and consists of an introduction, learning objectives, content, interactive activities, and recapitulation or summary. On parallel lines, lesson plans were prepared with the same content as the e-modules. Both the e-modules as well as lesson plans were validated by experts. Content of the e-modules has been carefully picked up, keeping in mind the curriculum prescribed by the Central Board of Secondary Education and NCERT science text books for classes sixth, seventh and eighth.[27-29] After two individual tryouts and a group trial with 34 students, the final versions of e-modules were ready. Also, during this phase, the pre-test tool 'Questionnaire for Adolescents' and post-test tool- 'Post Intervention Questionnaire for Adolescents' were developed and validated through a pilot. Both the tools consist of 29 multiple choice items each. The reliability coefficient, KR-20 for pre-and post-test tool, was found to be 0.78 and 0.79 respectively.

Phase II (Experimental Phase)

For the second phase of the study, which required ascertaining the effectiveness of the e-modules developed in the previous stage, quasi-experimental research with non-equivalent control group design was adopted. The study was conducted in Sonipat district of Haryana, with a population of around 15 lakhs, a neighbouring town of Delhi which falls under NCR. The population for the present study comprised all the students enrolled and studying in Upper Primary Classes (six to eight) in Haryana. The sampling frame includes students of class eight from co-educational, English medium CBSE affiliated schools of Sonipat district. A list of CBSE-affiliated schools in Sonipat district was drawn and cross-checked. Out of 122 listed schools, 90 secondary and higher secondary schools were affiliated to CBSE and had the facility of computers as per UDISE data available for the previous session (2018-19).[30] From the list, randomly 22 schools were selected for the study. The researcher then sought permission from the schools. Ten schools met the necessary technological requirement and gave permission for the conduct of the study. The schools were coded and assigned into two groups, with five schools each. The treatment was randomly assigned to one group, the experimental group (N=155), in which subjects were taught through e-modules. Subjects in the control group (N= 154) were taught through the conventional method (lecture cum demonstration).

A pre-test was administered in both groups by the investigator. To avoid bias, both the groups were taught adolescent reproductive health by the investigator. The experimental group was taught through e-modules and the control group through the conventional method using charts and flashcards. Each session was of 40 minutes duration spread over six days. A post-test tool was administered to ascertain the enhancement in the awareness level post sessions in both groups. The study was executed and data collected over three months from Dec.19 to Feb.20. The data set obtained was cleaned and entered into MS Excel and IBM SPSS version 22 to draw a comparison between the experimental (n=155) comprising of 83 males and 72 females and control group (n=154) comprising of 79 males and 75 females. The average age of subjects was 12.97 years.

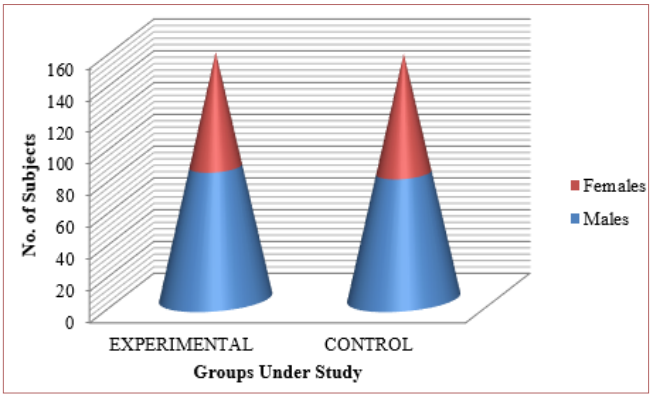

Figure 2.Gender wise representation in Experimental and Control Group

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Result

Before proceeding with the analysis, the equivalence of groups was established based on pre-test scores. F test results (F=0.916, d.f. = 154,153, p>0.01) revealed there is no significant difference between the variances of the two groups. Results of t-test for equal variance (t = -0.4613, d.f. = 307, p>0.01) reveal no significant difference between the mean of Pre-test scores (PTS) of both the Experimental Group and Control Group. Hence the two groups were comparable.

In order to ascertain the effectiveness of the intervention, the performance of subjects in both the groups was compared on the basis of their scores obtained in the post-test (PSTS) by applying a t-test for unequal variance. Result for the same is represented in Table 2.

Table 1.Mean and variance comparison of PTS and PSTS of experimental (n=155) and control group (n=154)

	Pretest scores		Posttest scores	
	Mean	Variance	Mean	Variance
Experimental group	13.61	16.53	20.50	11.54
Control group	13.83	18.06	15.72	16.23

Table 2.Comparing the mean of PSTS of experimental (n=155) and control group (n=154)

Post Test Scores (PSTS)	Mean	S.D	t value	Effect Size
Experimental group	20.50	3.40	11.26	1.29
Control group	15.72	4.03		

d. f. 297, p<0.001.

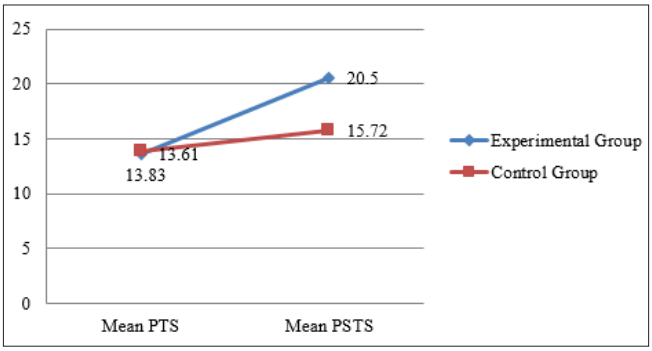

Figure 3.Comparison of means of the experimental and control group on PTS and PSTS

Table 2 indicates that the difference in the means (4.77) of Post Test Scores (PSTS) of the experimental group and the control group is statistically significant (t=11.26, d.f.297, p <0.001). The experimental group had a higher mean than the control group, which is attributed to the intervention used in the experimental group. The effect size (Cohen's d) calculated is 1.28, which is >.80, so it is inferred that the magnitude of intervention was large.

Discussion

The pre-test scores of both the groups were low, thus indicating a lack of awareness regarding reproductive health. However, post-intervention, gain in scores on post-test in the experimental group is attributed to the e-modules as indicated by data analysis. The little gain observed in the scores of the control group indicates inefficient discourse of reproductive health matters in the classroom. Therefore, even when the conventional method was used to address reproductive health in the control group, it led to better awareness among subjects as reflected by the scores on the post-test.

Studies have reported that integration of H5P technology has enhanced learning outcomes, improved learning efficiencies, and reduced the cost of practical sessions.[31,32] The e-modules developed to address Adolescent Reproductive Health have been found to be effective in creating awareness among students of upper primary classes in Haryana. The results are in conjunction with studies of Lavanya S,[33] Phulambrikar RM,[34] Calabrese S,[24] Roberto AJ et al.[20] and Singh S et al.,[35] who reported the effectiveness of digital interventions to address reproductive and sexual health in classrooms. However, the findings of the study are antagonistic to the studies by Calise TV et al.[36] and Gustina E & Wibowo M[37] who reported no change in knowledge regarding reproductive health post-intervention.

The limitation of this study is that the study was conducted on subjects from English medium CBSE schools of Sonipat district only. Also a few selected topics addressing adolescent reproductive health were taken for designing and development of the e-modules through H5P. Further research can be conducted on similar lines in other school settings, among varied population subset, using different software or authoring tool and on different subject matter.

Conclusion

The use of digital media in education has helped us evolve as facilitators. H5P is one such user friendly tool that helps us create digital content with our basic computer knowledge without much technical knowledge and expertise. Integrating technology to address sensitive issues like reproductive health in a culturally conservative society is a boon. Technology has given us a promising solution to solve the problem of lack of trained persons. Integration of technology in teaching learning context can be used to reach out and connect to the digital natives quickly and easily. E-content on sensitive topics can serve as a non-human intervention that helps reduce shyness among students and allow them to acquire age-appropriate and scientifically correct knowledge. In possession of accurate

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knowledge, the adolescents will be empowered to make mature decisions, maintain overall health, and remove shackles surrounding the taboo subject 'sex'.

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