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The Effectiveness of Menarche Education Via The *Simencar* Application: A Study of Knowledge and Anxiety in Prepubertal Children

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Abstract

This study aimed at determining the effect of reproductive health education using the SIMENCAR application. It discusses the effect on knowledge and anxiety of prepubertal children. The method chosen was quasi-experimental using a two-group, pre-test/post-test design. The study sample comprised 68 prepubertal pupils at *Bekasi* elementary school, Indonesia. They were chosen through purposive sampling and divided into intervention and control groups. The intervention was provided through the Android-based SIMENCAR application installed on smartphones for the intervention group and via PowerPoint presentation for the control group. Data analysis used *t*-test statistical testing. The results showed that the level of knowledge in the intervention and control groups had increased (*p*-value = 0.003) while the level of anxiety in the intervention group and the control group experienced a significant decrease (*p*-value = 0.000). In the independent *t*-test in the intervention group and the control group, there was no difference in the knowledge score, both pre-test (*p*-value = 0.893) and post-test (*p*-value = 0.203). There was no difference in the pre-test anxiety score (*p*-value = 0.537) but post-test, there was a significant difference between the two groups (*p*-value = 0.013). It was, therefore, concluded that the SIMENCAR application was effective in increasing knowledge and reducing anxiety levels. It is suggested that the SIMENCAR application be used as a medium for reproductive health education regarding menarche.

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1. Introduction

Adolescence is a transitional phase from childhood to adulthood. According to the WHO, adolescents are individuals aged 12 to 24 years who are unmarried and are still dependent on their parents. Adolescents are defined as the growth, transition and development of the child physically, mentally and emotionally starting from the average age of 12-20 years (Ismainar, 2016). The onset of adolescence is marked by significant physical, hormonal, psychological and social changes associated with reaching sexual maturity. One of the processes of sexual maturity is the arrival of menarche, defined as the first menstrual cycle, or first menstrual bleeding (Santrock, 2017).

Menarche is a menstrual or decaying lining of the uterine wall containing blood vessels and was first experienced by teenage girls at puberty (Baharudin, 2019). Menarche can have a unique physiological and psychological effect on adolescent girls, influencing their perceptions of the realities of life both in adolescence and adulthood. Menarche usually occurs between the ages of 12 and 14 years (Jahja, 2015). Adolescents in the face of menarche will give different responses, both negative and positive responses. The negative response shown by the child with menarche is anxiety, confusion, uncertainty, discomfort so that it will affect the child in the face of his first menstruation (Gaikwad, 2018). Ignorance and lack of information about menarche are also one of the causes of anxiety in adolescents in the face of her first menstruation (Winarti et al., 2016).

In developing countries, some people still consider information about menarche as taboo, and there is remains a culture of silence and negative beliefs or perceptions passed on from generation to generation (Aburshaid, 2017). Therefore, providing information and education is necessary for creating readiness to face menarche so that girls can go through their first and subsequent menstrual cycles smoothly.

The general objective of this study is to identify the effect of education using the SIMENCAR (Ready for Smooth Menarche) application on knowledge and anxiety in prepubertal children approaching menarche. The specific objectives of this study are (1) to identify the characteristics of respondents (age) at Indonesia; (2) to identify the effect of reproductive health education on knowledge and anxiety about menarche before and after being educated with the SIMENCAR application, and (3) to compare these results with the same factors before and after education using presentations, in terms of the effectiveness of providing reproductive health education in these two ways on knowledge and anxiety in prepubertal children.

2. Material and Method

The research used in this study was quasi-experimental with a two-group pre-test/post-test design. The intervention group received reproductive health education using the SIMENCAR application (Ready for Smooth Menarche) delivered on Android devices, while the control group was similarly educated through PowerPoint presentations. The variables measured were the levels of knowledge and anxiety in prepubertal children, before and after the intervention, together with peer influence and information exposure. The study population were prepubertal children who attended SDIT Jati Asih Bekasi aged from 10 to 12 years who had not experienced their first menstruation. The sample size used a research formula to test the hypothesis for the difference between two population means (Lemeshow, 1997) as follows:

$$n = \frac{2\sigma^2[Z_{1-\alpha/2} + Z_{1-\beta}]^2}{(\mu_1 - \mu_2)^2}$$

The results of calculations based on this formula obtained minimum sample results in each group. Data collection was by pre-test and post-test questionnaires. The questionnaires, which contained questions addressing demographic data, information exposure, peer influence, knowledge and anxiety, was integrated into the SIMENCAR application for the intervention group and was delivered using a Google format for the control group. Data analysis used was univariate and bivariate using *t*-testing (dependent and independent).

3. Results and Discussion

On this section, the researchers present research results, and then, discussed them based on the research problems. The research results are presented in the tables as follows.

Table 1.
Distribution of respondent characteristics, homogeneity test, and information exposure in the Intervention and Control group

Variable	Intervention (n=34)		Control (n=34)		*P-value*
	N	%	n	%	
Information exposure	16	47,1	24	70,6	0,014
- Never been exposed	18	52,9	10	29,4	
- Had been exposed	15	44,1	18	52,9	0,650
Peer	19	55,9	16	47,1	
- Positive					
- Negative					

As seen on the above table, in the intervention group, just over half (52.9%) had been exposed to information, while in the control group 70.6% stated that they had never been exposed to information, again meaning that the two groups were not equal (*p*-value = 0.014). Meanwhile, the influence of peers in the intervention group was more frequently negative in effect (55.9%), while the control group had more positive effects (52.9%), indicating that the two groups were equal (*p*-value = 0.650).

Table 2. Distribution of respondent characteristics and homogeneity test by age, knowledge and anxiety: in the Intervention and Control group

Variable	n	Mean	SD	Minimal -Maximal	95% CI	*P-value*
Age						
Intervention	34	10,74	0,751	10 – 12	10.47-11,00	0,971
Control	34	10,85	0,784	10 – 12	10,58-11,13	
Knowledge						
Intervention	34	15,26	2,988	8-20	14,22-16,31	0,170
Control	34	15,18	2,355	10-20	14,35-16,00	

Anxiety						
Intervention	34	12,29	6,073	3-24	10,18-14,41	0,114
Control	34	13,12	4,804	6-28	11,44-14,79	

Distribution of respondent characteristics and homogeneity test by age, knowledge, and anxiety: The mean age of the respondents in the intervention group was 10.74 years while in the control group was 10.85. Thus the mean age of the respondents between the intervention and control groups was similar, with *p*-value = 0.971, meaning the two groups were equal. Table. 2 also illustrates that there was no difference in knowledge characteristics between the intervention group and the control group before the intervention, with a value of $p = 0.170$, indicating the two groups are equal. Meanwhile, the level of anxiety between the intervention and control groups also showed no difference with *p*-value = 0.114, meaning that the two groups were equal.

Table 3. Mean knowledge of prepubertal children before and after intervention in the Intervention and Control group

Knowledge	Intervention group (n=34)		Control group (n=34)		*P-value*
	Mean	SD	Mean	SD	
Before Intervention	15,26	2,988	15,18	2,355	0,003
After Intervention	16,97	2,222	16,32	1,918	
Score for the difference	-1.706	3,148	-1,147	2,047	

Mean knowledge of prepubertal children before and after intervention: The average knowledge in the intervention and control groups increased after the intervention. The results of statistical tests showed that there were significant differences before and after the intervention was given to the intervention group and the control group with p-value = 0.003. Based on that finding, it is concluded that there was an effect in terms of knowledge from intervention with the SIMENCAR application in the intervention group and PowerPoint presentation in the control group.

Table 4. Mean anxiety of prepubertal children before and after the intervention in the Intervention and Control group

Anxiety	Intervention group (n=34)		Control group (n=34)		*P-value*
	Mean	SD	Mean	SD	
Before Intervention	12,29	6,073	13,12	4,804	0,000
After Intervention	7,68	4,450	10,29	3,958	

Score for the difference	4,61	5,257	2,28	4,210

Mean anxiety of prepubertal children before and after intervention: The average level of anxiety in the intervention and control groups decreased after being given the interventions. Table 1 also shows that there is a difference in the mean value of respondents' anxiety levels between the intervention and control groups with the score for the difference in anxiety in the intervention group being 4.61 higher than in the control group at 2.28. The results of statistical tests showed that there were significant differences before and after intervention in the intervention group and control group with *p*-value = 0.000; it can therefore be concluded that there was an effect on anxiety from intervention with the SIMENCAR application in the intervention group and PowerPoint presentations in the control group.

Table 5. Differences in knowledge and anxiety of respondents by intervention group and control group

Variable	Mean	SD	SE	*P*-value
Pre-test knowledge				
Intervention group	15.26	2.988	0.512	0.893
Control group	15.18	2.355	0.404	
Post-test knowledge	16.97	2.222	0.381	0.203
Intervention group	16.32	1.918	0.329	
Control group				
Pre-test anxiety	12.29	6.073	1.042	0.537
Intervention group	13.12	4.804	0.824	
Control group				
Post-test anxiety	7.68	4.450	0.763	0.013
Intervention group	10.29	3.958	0.679	
Control group				

From Table 1 it can be seen that there was no difference in the level of knowledge in the intervention group and the control group before the intervention (*p*-value = 0.893) and after the intervention (*p*-value = 0.203). In the measurement of anxiety, however, before the intervention, there was no difference between the intervention group and the control group (*p*-value = 0.537). However, after the intervention, there was a difference in the level of anxiety between the intervention group and the control group (*p*-value = 0.013).

Based on these results, it is evident that the SIMENCAR application can reduce anxiety levels by 4.61, while PowerPoint presentations only reduce anxiety levels by 2.83. These results indicate that reproductive health education using the SIMENCAR application is more effective at reducing anxiety levels than PowerPoint presentation.

Discussion

Most respondents were 10.74 years of age in the intervention group and 10.85 in the control group. This age range is in the prepubertal period, in which secondary sex characteristics have started to appear but the reproductive organs are not yet fully developed. At this age, feelings of interest and curiosity about new things are very high, especially regarding the changes that will happen in adolescence (Tatik, 2015), so that when explained the research process, pupils of this age are enthusiastic and listen to what the researcher explains.

In this study, on average more than 50% had not been exposed to information about menarche. There are several possibilities for this low level of information exposure in respondents, including because the educational information needed is less available, there is an assumption that discussing menstrual problems is taboo, and in general that parents, especially mothers, and teachers at school think that prepubertal children are not yet of an age to know this information in full. Education for adolescents requires an open discussion about sexual and reproductive health, while their parents cannot meet the expectations of teenagers. Therefore, some adolescents do not have people who act as trustworthy access to information about their sexual and reproductive health needs.

The positive characteristics of peer influence indicate that prepubertal children can socialise with peers and can share information about experiences, especially about menarche, and that this can have a good effect on children s readiness to face menarche. Children who are entering adolescence will tend to be experiencing social changes, including increasing numbers of friends and activities with peers, meaning teenagers may become closer to friends than to their parents. After the child enters, adolescence will experience social change by multiplying friends and activities with their peers (Mighwar, 2016). The forms of change that accompany puberty include cognitive, moral, emotional, social as a form of adolescent self-development. Each girl will experience a variety of different reactions in the face of her first period. The difference in reaction is influenced by the readiness of each young woman (Ramadhaniyati, 2014).

Some studies have shown peer influence on adolescent readiness in the face of menarche. Fatimah et al (2016) who researched grade V elementary school students on health education peer group methods about menstruation against the readiness to face menarche in grade V elementary school, before and after being given health education peer group method about menstruation shows a meaningful difference.

In general, there was an increase in knowledge scores after the intervention in both the intervention group and the control group. This is in line with research by Abusrshaid et al. (2017) conducted in Saudi Arabia which reported a significant increase in knowledge, personal hygiene care and quality of life in adolescents after being given a health education programme regarding menstruation. Knowledge is the result of human sensing or the result of knowing a person against an object through his or her senses (eyes, nose, ears, and so on). By itself, at the time of sensing until it produces such knowledge is heavily influenced by the intensity of attention and perception of objects. Most human knowledge is obtained through the eyes and ears (Notoatmodjo, 2012). Knowledge is an impression in the human mind as a result of the use of its five senses. Knowledge is the result of remembering things, including recalling events that have been experienced either intentionally or inadvertently and this happens after people make contact or experience of a particular object (Mubarak, 2011). The results of this study are in line with the results of several

studies that have been done before. Mawardika et al. (2019) researched reproductive health education with android-based app media "Lawan Roma" on knowledge and attitudes about reproductive health. Quasi-experiment research design with pre-posttest design with control group design. The results of the study showed an increase in knowledge (p-value = 0.012) and an increase in attitude (p-value = 0.001).

As with knowledge, the effect of education on anxiety through using the SIMENCAR application in the intervention group and PowerPoint presentations in the control group was significant. The use of both educational media in each respondent group is quite effective in reducing anxiety levels. Reproductive health education provided using android-based apps can be used easily. Respondents can access it anytime and anywhere, and they can read or use it; however, they like, helping to reduce the anxiety they feel about physical changes they experience. Anxiety that occurs when menarche is influenced by several factors including knowledge, understanding of information as well as changes that occur when teenagers face menarche (Proverawati & Misaroh, 2013).

This is also in line with the results of research conducted by Sarwinanti on grade 5 and 6 elementary school students which showed that in the intervention group there were significant differences in student anxiety in dealing with menarche after being given health education using audio-visuals, with a *p-value* of 0.002 (P < 0.05) while in the control group using the lecture method the *p-value* was 0.010 (p < 0.05). Teenagers who get support from family, especially mothers, make teenagers feel safe and comfortable at home. The teenager is closer to the mother, so will complain to her mother, including about menarche. The mother will explain to her son about the condition he will experience. Therefore, teenagers who get support from mothers can have better readiness in dealing with menarche than those who lack maternal support (Purba et al., 2017).

4. Conclusion

The results of this study show that the effectiveness of education with SIMENCAR education media and with PowerPoint presentations are similar. Both were able to increase the level of knowledge about menarche in each group of respondents. However, the SIMENCAR application is more effective in reducing anxiety levels in prepubertal adolescents in facing menarche than educational media in the form of PowerPoint presentations. The SIMENCAR application is designed audio-visually so that it is more attractive than the PowerPoint presentations, which can feel quite monotonous. Besides, the SIMENCAR application is also equipped with games that respondents enjoy and are entertained by. These findings can be used for further research, by developing knowledge around confounding factors that influence knowledge and anxiety in prepubertal children facing menarche.

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