

# The Effectiveness of Mobile Application as an Alternative of Health Education Media for Adolescents in the Middle School

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## Abstract

Adolescent health problems are still becoming major issues in health issues such as smoking behavior, drugs, and free sex. Improving health school age and adolescent is prioritized in promotive and preventive efforts. One of them is done through the school health effort. The purpose of this study was to determine the effectiveness of mobile applications as a health education media for adolescents in secondary schools towards adolescent knowledge and attitudes about health, compared to printed media. This type of research is quasi experimental research with a two group comparison pretest-posttest design. There were significant mean differences in knowledge, attitudes and skills before and after getting an intervention using the mobile application media ( $p = 0.000$ ). There were significant mean differences in knowledge, attitudes and skills before and after getting an intervention using the My Health Report Card ( $p = 0.000$ ). There was a significant mean difference in knowledge, where the mean score of knowledge was higher in the group using the mobile application media compared to using the My Health Report Card ( $p = 0.000$ ). There are no differences in the attitudes and attitudes of groups who use the mobile application media and who use the My Health Report Card.

**Keywords:** mobile application, adolescent, health school

## Introduction

Based on the results of the 2015 School-Based Health Survey in Indonesia, it can be seen health risk factors for students aged 12-18 years (junior and senior high) nationally. As many as 41.8% of men and 4.1% of women claimed to have smoked, 32.82% of those who smoked for the first time at the age of  $\leq 13$  years. The same data also shows 14.4% of men and 5.6% of women have consumed alcohol, then also found 2.6% of men have ever consumed drugs. Another illustration of health risk factors is sexual behavior in which 8.26% of male students and 4.17% of female students aged 12-18 years have had sexual relations. Premarital sexual behavior certainly has a broad impact on adolescents, especially related to the transmission of infectious diseases and unwanted pregnancy and abortion. <sup>1</sup>

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Seeing the existing problems, improving school-age and adolescent health is prioritized on promotive and preventive efforts. One of them is done through the health school effort which aims to improve the ability to live healthy and student learning achievements so that healthy and quality human resources can be produced. One of the efforts to improve the health of students through the health school program, since 2013 my Health Report Card has been developed for students. In 2015 the book received support and approval from the Minister of Education and Culture to be implemented in schools. My Health Report Card consisted of 2 types of books namely Information Books and Health Record Books, Information Books containing health knowledge about clean and healthy living behavior, dental and oral health, balanced nutrition, eye health, ear health, prevention of infectious and non-communicable diseases, reproductive health, prevention of violence, mental health, accident prevention. Whereas the Health Record Book contains a sheet recording the results of health services: health screening and periodic examinations, giving blood-added tablets, administering

worm medicine, health checks at health facilities.<sup>2</sup>

The results of a preliminary study conducted in the City of Palangka Raya, obtained information that not all junior high schools and senior high schools received the books, although there were those who received but the number was very small and did not reach all students. Data collected from health school program in several Palangka Raya Community Health Centers states that the number of books received from the Palangka Raya City Health Office is very limited, so that only a few books are distributed to each school and it is recommended to increase their respective schools. The existence of different schools certainly led to different decision-making processes, only a few schools were willing to reproduce the book, and the rest said they could not because of the limited availability of funds.

Currently advances in information technology play a very effective role in helping the health system and allows removing time and place barriers to providing high quality services.<sup>3</sup> In the last few years significant growth has been observed in cell phone use. This portable device provides the impact of fast access to information and easy communication between individuals.

Based on the above, researchers intend to make alternative media other than printed books to expand the reach of the utilization of Information Books and Health Records through a mobile application that can be accessed by students, teachers and parents, so that they can support government programs in improving adolescent health. To find out the effectiveness of mobile applications as a medium for health education for adolescents in secondary schools towards adolescent knowledge and attitudes about health, compared to printed text media.

## Materials and Method

This type of research is a quasi-experimental research, with a two-group comparison pretest-posttest design, the approach used is quantitative. The study was conducted at senior high schools in the Menteng Sub-District, namely ISIE Vocational School and Karsa Mulya Vocational School.

The population in this study are all high school or equivalent students in the Langkai Village and Panarung Village which are the work areas of the Panarung Community Health Center. The sample in this study were students who met the inclusion criteria, namely Grade X High School students or equivalent, for intervention groups using mobile application students had an android mobile phone, got permission from their parents or guardians, were willing to attend an explanation meeting using printed books and mobile application. Exclusion criteria are students do not follow the meeting and explanation of the use of a printed book mobile application, students are exposed to the information book/book notes into health and not follow the post-test.

The method of taking samples in this study is by consecutive sampling. The independent variable, which is the variable that influences or is the cause of change, is the Mobile application media and the Health Information Book for high school students. Dependent variable, is a variable that is affected or that is due to the presence of independent variables, namely knowledge, attitudes and skills of high school students about health (clean and health behavior, oral health, balanced nutrition, eye health, ear health, prevention of infectious diseases, reproductive health, prevention of violence, mental health and accident prevention).

## Findings and Discussion

**Table 1. The Mean Differences in Knowledge, Attitudes, and Skills of Paired Groups**

Knowledge Variable	Pre Test Mean (Elementary)	Post Mean Tests (Elementary)	Mean difference (95%) CI	p-value
- Application	45.60 (8.65)	74.72 (10,62)	29.12 (-34,62- (-23,61)	0.00
- book	54.88 (9.06)	67.84 (9.69)	12.96 (-16.30 - (- 9.61)	0.00
- Application	80.96 (5,88)	91.76 (4,38)	10,80 (-12,12 - (- 9,47)	0.00
- book	78.96 (3.43)	87.00 (4.67)	8.04 (-9.71 - (- 6.36)	0.00
- Application	76.08 (4.63)	84.76 (4.30)	8,68 (-9.63 - (- 7,72)	0.00
- book	72.72 (4,12)	78.60 (3,69)	5,88 (-7,56 - (- 4,19)	0.00

**Table 2 . The Mean Difference of Knowledge, Attitudes and Skills Impaired Groups**

Knowledge Variable	Post Mean Tests (Elementary)	Mean difference (95% CI)	p-value
- Application - book	29.12 (13.34) 12.96 (8,10)	16,16 (9.88-22.43)	0.00
- Application - book	10,80 (3,20) 8.04 (4.06)	2.76 (0.67-4.84)	0.01
- Application - book	8.68 (2.30) 5.88 (4.08)	2.80 (0.91-4.68)	0.00

**Differences in changes in the mean score of knowledge, attitudes and skills in each of the mobile application and My Health Report Card groups**

Based on the results of the analysis, it was found that there were significant mean differences in knowledge before and after getting health education in groups using the mobile application and My Health Report Card, with the difference in mean scores higher in the groups using the Health Application My Health Report Card. In conducting research, each group has obtained the same health information about adolescent health through different media.

My Health Report Card for junior high or high school students is equivalent to a book that contains health information about puberty, balanced nutrition, reproductive health, STI and HIV/AIDS, drugs, mental health and myths. This book has been developed since 2013. In 2015 received support from the Ministry of Education and Culture to be applied in schools. Students are asked to read the My Health Report Card, communicate with parents and as a media for health education to peers.<sup>2</sup>

Nowadays information technology is developing more rapidly, many people are helped by various facilities produced by the advancement of technology. One technology that is developing is an Android-based smartphone (smartphone), because it is considered to provide convenience and benefits for its users, many practitioners and academics who develop the application.<sup>5</sup> Technology development

may to help health workers role in the socialization of MCH Handbook, Pre Scrinning Child Development Questionnaire and monitoring the nutritional status of children.<sup>6</sup>

Most mobile phone users are teenagers, so it becomes an opportunity in the health sector to use mobile phones as a medium in them his health information and services. The development of technology is very possible to be used to help in the dissemination of information and socialization of several health programs.<sup>7</sup> In this study the application that was made and used as a health education media in the form of the My Health Report Card had an impact on meaningful knowledge enhancement for high school students.

The results of this study are in line with the results of Pratiwi and Restanty’s (2018) research on the application of android-based applications to mother’s knowledge in monitoring the nutritional status of children. The results showed that there were significant differences in the knowledge of mothers before and after applying an android-based application “nutritional status of children”.<sup>8</sup>

The attitudes and skills of adolescents in this study indicate that there is an equally increase in the average score of attitudes and skills in groups using the mobile application and My Health Report Card, with differences in mean scores higher in groups using the

mobile application compared to using the My Health Report Card.

Some research abroad related to improving attitudes and skills in health through application was shown by Denghani et.al. (2019) regarding the prevention of high-risk sexual behavior using a mobile application shows an increase in students' attitudes compared to previous risky sexual behavior, so the use of a mobile application plays a role in preventing high-risk sexual behavior and can increase sexual attitudes in students.<sup>9</sup> The results of this study are in line with the results of research conducted by Bull (2012) who conducted research on sexual health interventions through social media to send sexual health messages through the Facebook network to reduce STIs, the results show that social networks are effective for health interventions.<sup>10</sup>

#### **Differences in changes in the mean score of knowledge, attitudes and skills between the Mobile Application My Health Report Card and the My Health Report Card.**

The difference in knowledge scores in the pre-test and post-test results for the two groups showed a significant difference with the increase in knowledge in the mobile application group was higher than those using the My Health Report Card. From the results of this analysis it can be concluded that the mobile application is more effective towards increasing knowledge.

Research conducted by Novaeni et.al (2018) shows that 85% of adolescents said that very good about android-based adolescent health applications, can increase understanding of reproductive health, interesting, easy to remember and understand material, add motivation and in accordance with adolescent needs.<sup>11</sup>

The results of other studies that show the same results as this study are studies conducted by Novianto, Suryoputro and Widjanarko (2019) about the influence of the application of "Smart Mobile Teenagers" on the knowledge, attitudes and self-efficacy of adolescents about the prevention of prediabetes, showing a significant influence on the improvement knowledge, attitude and self-efficacy in the prevention of prediabetes. Clever Teen Mobile Application can be an alternative in the use of health promotion media as a means of communication of educational information in adolescents in the

prevention of prediabetes.<sup>12</sup>

### **Conclusion**

There are significant mean differences in knowledge, attitudes and skills before and after getting an intervention using the mobile application media. There are significant mean differences in knowledge, attitudes and skills before and after getting an intervention using the My Health Report Card. There is a significant mean difference in knowledge, where the average score of knowledge is higher in groups using the mobile application media than those using the My Health Report Card. There are no differences in the attitudes and attitudes of groups who use the mobile application media and who use the My Health Report Card.

**Ethical Clearance:** This research has gone ethical feasibility testing by the Ethical Research Commission of the Polytechnic of Health, Ministry of Health, Palangka Raya.

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**Conflict of Interest:** The authors declare that there are no conflicting interests.

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