

RESEARCH ARTICLE

Effects of Android-Based *Sayang ke Buah Hati* (SEHATI) Application towards Mothers' Knowledge and Children's Skill on Hand Washing with Soap

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Abstract

Hand washing with soap is the most straightforward skill that elementary school-aged children should have to avoid infectious disease transmission. Rapid development of today's technology has led to efforts to develop android-based applications for smartphones to improve health-related knowledge. *Sayang ke Buah Hati* (SEHATI) application is an android-based application for improving mother's knowledge on health-related issues. The objective of this study was to analyze the effects of SEHATI application in improving mothers' knowledge regarding hand washing and the relationship between mothers' knowledge and children's skills improvement in hand washing with soap. This was a quasi-experimental study with pretest-posttest one group design conducted in the period of February to March 2017 on 33 mothers and students of grades 1 and 2 of Uchuwwatul Islam Elementary School in Bandung city who met the inclusion criteria, not met exclusion criteria, and are willing to participate as respondents. Knowledge data were analyzed using paired t test while skill data were analyzed using Spearman rho. Results showed that SEHATI application improved mothers' knowledge on hand washing with soap ($p < 0.001$). A relationship was observed between mothers' knowledge and improved children's skill in hand washing with soap ($p < 0.001$). It is concluded that SEHATI application can be used as a guide for parents to find health-related information, which improves mother's knowledge on hand washing with soap and indirectly improves children's skill in hand washing with soap..

Key words: Knowledge, SEHATI application, skill, washing hands

Pengaruh Aplikasi *Sayang ke Buah Hati* (SEHATI) Berbasis Android terhadap Pengetahuan Ibu dan Keterampilan Anak tentang Cuci Tangan Pakai Sabun

Abstrak

Mencuci tangan menggunakan sabun merupakan keterampilan paling sederhana yang harus dimiliki anak usia sekolah dasar untuk mencegah penyakit menular. Perkembangan teknologi yang berkembang pesat saat ini merupakan salah satu upaya meningkatkan pengetahuan ibu, yaitu dengan memanfaatkan aplikasi *Sayang ke Buah Hati* (SEHATI) yang tersimpan dalam *smartphone* android. Tujuan penelitian menganalisis pengaruh penerapan aplikasi SEHATI berbasis android pada ibu terhadap peningkatan pengetahuan tentang cuci tangan pakai sabun dan hubungan antara pengetahuan ibu dan keterampilan anak tentang cuci tangan pakai sabun. Penelitian menggunakan metode *quasi-experiment* dengan *pretest-posttest one group design*. Subjek penelitian adalah 33 ibu dan anak kelas 1 dan 2 SD Uchuwwatul Islam di Kota Bandung yang telah memenuhi kriteria inklusi dan tidak termasuk kriteria eksklusi serta bersedia menjadi responden. Penelitian ini dilakukan pada bulan Februari sampai Maret 2017. Analisis data pengetahuan menggunakan uji t berpasangan, sedangkan analisis data keterampilan menggunakan Spearman ro. Hasil penelitian menunjukkan bahwa aplikasi SEHATI meningkatkan pengetahuan ibu tentang cuci tangan pakai sabun ($p < 0,001$). Terdapat hubungan antara pengetahuan ibu dan keterampilan anak tentang cuci tangan pakai sabun ($p < 0,001$). Simpulan, aplikasi SEHATI dapat digunakan sebagai panduan orangtua dalam mencari informasi kesehatan yang mampu meningkatkan pengetahuan ibu serta berdampak pada keterampilan anak tentang cuci tangan pakai sabun.

Kata kunci: Aplikasi SEHATI, cuci tangan, keterampilan, pengetahuan

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Introduction

Hand washing with soap is the most straightforward skill the elementary school-age children must have to prevent infectious diseases such as diarrhea, pneumonia, respiratory infections, intestinal worms, measles, etc.^{1,2} Infectious diseases are considered to be a significant contributor to global morbidity and mortality in children. School-age children (5–14 years) in Indonesia contribute 1.9% of deaths caused by infectious diseases.³ The 2013 Basic Health Research reported that the prevalence of infectious diseases such as intestinal worms, measles, and typhoid among elementary school children is still quite high.⁴

Elementary school is the most appropriate period to teach hand washing with soap skill. Perceptions and habits obtained at this stage can lay the foundation for lifelong health practices that determine the children's quality of life in the future.^{5,6} Hand washing with soap skill of elementary school-age children is still problematic. A study in Indonesia show that 71.8% of elementary school children do not wash their hands properly.⁷ This result is supported by the 2013 Basic Health Research (BHR) report that shows correct hand washing behavior as the third lowest indicator out of the ten indicators of clean and healthy living behavior with the proportion of 47.0% nationally and 45.7% in West Java Province for children aged ≥ 10 years.⁴

Elementary school-aged children need guidance and support in applying daily hand washing skills. At this age stage, children are still unable to wash their hand regularly and voluntarily without reminders from family or parents. Parents are the closest people to children and they, especially the mother, are the most appropriate persons to teach children to wash their hands using soap.⁶ The ability of mothers to teach children to wash their hands using soap is greatly influenced by the level of knowledge they own.⁸ This has been stated in a study in Nigeria which explains that mothers who have good knowledge have a stronger ability to motivate children to practice hand washing when compared to mothers with less knowledge who tend to believe that hand washing cannot prevent disease transmission so as not to motivate children to practice it.⁹

Health education is one of the efforts to increase one's knowledge. The media used in health education activities will influence the process of one's understanding of gaining

knowledge.^{10,11} Audiovisual media offers a more exciting and non-monotonous method by displaying motion, images, and sound.¹² Smartphones are currently widely used as a medium for health education in health services because they are portable, easy to carry, available in wide range, and can present information personally. The most widely used operating system for smartphones to date is the Android operating system.¹³ Various types of applications are provided by android smartphones including applications on health.^{14,15} The use of mobile health (mHealth) and smartphone applications has been proven to be effective as an information media for health education which may lead to changes in a person's knowledge and skills.¹⁶

The authors, supported by the study team, has developed a prototype of a health education expert system for smartphones in the form of an android-based application under the name of Love Your Children or *Sayang ke Buah Hati* (SEHATI). This is an audiovisual media with moving images or animations, attractive colors, and a time/reminder system that provide health information on hygienic and healthy living behavior, including fruits and vegetables consumption, physical activities, hand washing with soap, and proper toothbrushing for elementary school children. The purpose of this study was to analyze the effect of the android-based SEHATI application on mothers' knowledge on hand washing with soap and the relationship between mother's knowledge and child's skill in hand washing with soap..

Methods

This was a quasi-experimental analytical study with pretest-posttest one group design on 33 mothers and children in grade 1 and 2 of Uchuwatul Islam Elementary School in Bandung city who met the inclusion and exclusion criteria and were willing to participate in the study which was evident by the signing of the consent form. Sampling was performed using purposive sampling. The independent variables of this study were media (SEHATI application) and mother's knowledge on hand washing with soap after using SEHATI application, while the dependent variables were mothers' knowledge and children's skill on hand washing with soap after the mother used SEHATI application. Assessment of mothers' knowledge on handwashing with soap was assessed using a questionnaire and the scoring was performed using a scale of 100 while children's skill was

assessed using a checklist on hand washing with soap. Children were categorized as skilled if the value was ≥ 75 and unskilled if the value was < 75 . Statistical testing was performed to examine the effect of the use of SEHATI application on increasing maternal knowledge and the relationship between mother's knowledge and child's skill using the paired t test and Spearman rho, respectively. This study was conducted from February to March 2017.

This research has received approval from the Health Research Ethics Committee, Faculty of Medicine, Universitas Padjadjaran, Bandung with the letter of ethics approval number: 70/UN6.C10/PN/2017.

Results

Thirty-three subjects met the inclusion criteria and exclusion criteria. During the study, four mothers did not open the SEHATI application every day for 20 minutes as required by the study that they were considered as dropping out from the study; hence, the number of respondents became 29 respondents. Mothers and children who dropped out were included in the post-test. Details on these respondents are listed in Table 1.

Based on Table 1, the majorities of respondents were 30–39 years old and did not work. The most respondents graduated from senior high school and were multiparous. Most of the children were eight years old and there were more girls than boys.

Based on Table 2, the average knowledge score before the use of SEHATI application intervention was significantly different from the average knowledge score after the use of SEHATI application ($p < 0.001$). An increase of 58.4% in knowledge was observed after the use of SEHATI application.

Table 3 shows a relationship between maternal knowledge and children's skill ($p < 0.001$) of 0.63, showing a positive strong correlation.

Discussion

Providing health-related information through health education is one way to increase one's knowledge. This study shows that SEHATI application affects mother's knowledge by increasing the knowledge ($p < 0.001$). This result supports the result of Xuan and Hoat¹⁷ in Vietnam which concluded that knowledge increases after a health education intervention. The same findings

Table 1 Subject Characteristics

Characteristics	n=29
Mother	
Age (years)	
<30	6
30–39	17
≥ 40	6
Occupation	
Working	9
Not working	20
Education	
Basic (elementary, junior high school)	9
Senior high school	15
College (diploma, university)	5
Parity	
Primipara	7
Multipara	22
Child	
Age (years)	
6	3
7	11
8	15
Gender	
Male	13
Female	16

are also presented by Song et al.⁶ and Maher et al.¹¹ who stated that the provision of information through health education on hand washing can improve maternal knowledge. The knowledge gained will make it easier to make decisions or actions related to the importance of washing hands.

Good knowledge on hand washing with soap is influenced by the media selected with media that convey information in a readily accepted, digested, and absorbed manner as a better medium. Educational media have the function to mobilize senses to facilitate perceptions and to better understand information or materials that are considered complicated to be easier to understand.¹⁰ Media use plays a vital role in health interventions to change one's knowledge, awareness, attitudes, and behavior in maintaining hand hygiene.¹²

Audiovisual media offers a more exciting and non-monotonic method. The audiovisual media provides audio and visual stimulus that the optimum results can be obtained. These results are achieved because the sense that transmits the highest amount of knowledge is the visual sense (approximately 75–87%) followed by auditory

Table 2 Effect of Android-based SEHATI Application on Mother's Knowledge in Hand Washing with Soap

Mother's Knowledge Score	Measurement			Enhancement (%)
	Pretest	Posttest	p Value	
Mean (SD)	49.79 (7.83)	80 (11.56)	<0.001*	58.4 %
Median	48	76		
Range	36–64	60–100		

*t couples

Table 3 Relationship between Mother's Knowledge and Children's Skill in Hand Washing with Soap

Correlations	Measurement			
	Pretest		Posttest	
	sr*	p Value	sr*	p Value
Mother's knowledge and children's skills	0.22	0.91	0.63	<0.001

*Spearman rho

sense (13%) and other senses (12%).¹⁰ This media has the advantage of showing the skills related to movements such as demonstrating hand washing steps.^{12,18}

SEHATI application is a media that provides health information on hand washing with soap in an audiovisual form that includes images, sounds, and animations that should be accessed 20 minutes a day. Animated images in SEHATI application aim to attract mothers to learn the contents provided in the application and to make it more convenient for mothers to understand the contents presented, especially those regarding the steps in washing hands with soap. This application is proven to be effective in increasing mother's knowledge on hand washing with soap. This finding is supported by findings from several studies that compare the effectiveness of the use of audiovisual media to leaflet media suggesting that the use of audiovisual media is more effective than leaflets in conveying information to improve the hand washing knowledge, attitude, and behavior.^{10,12,18}

Electronic media has become a big part of human life and has shaped everyone's life. As many as 85% of internet users in Indonesia access the internet using cellular phones or cellphones.¹⁹ Smartphones are very suitable as the media for education in developing areas.¹⁶ Smartphones can be used to assist medical activities, as well as

in seeking health information, reference guides, personal health improvement, disease prevention, early detection, and determination of diagnosis and therapy.^{14,21,22} The use of smartphones provides satisfactory results in health education or health promotion.²² Messages delivered quickly and in real-time through a smartphone can stimulate one's understanding to be more comprehensive. A study by Herlina²³ explained that smartphones are useful media to convey information to increase maternal knowledge. Other studies also explain that the use of smartphone applications has the potential to be used as a medium in health education or health promotion that can improve one's knowledge and skills.²⁴

Knowledge is a very important domain for triggering one's actions. Knowledge can influence the mind and how information is understood. Mother's knowledge is one of the factors that can affect skills in children.⁸ Skill is defined as physical activities that involve psychomotor movement. The present study indicates that there is a relationship between mother's knowledge and children's skills in hand washing with soap, which is evident by a strong correlation between mother's knowledge and children's skills. A previous study by Asekun-Olarinmoye et al.⁹ suggested that mothers with good knowledge on hand washing with soap tend to give more

motivation to their children to wash their hands.

Mother has thoroughness in teaching children to wash their hands compared to their husbands. Mother is the first person children encounter in their lives. All behaviors, ways to educate children, and their habits can be used as examples for children so that children's dependence is usually more on mothers than on fathers.⁶ Vivas et al.²⁵ in their study have explained that mother is the primary caregiver who was in charge for teaching and creating personal hygiene habits including hand washing with soap.

Hand washing skill and habit in children are shown to be predominantly influenced by the parents. Children mostly learn how to wash their hands correctly from their parents (91.9%) followed by health workers (50.0%) and teachers (34.9%). Therefore, parental knowledge is essential in forming hand washing behavior.^{5,6} Parents who have a high level of knowledge will have a high level of awareness to teach their children to wash their hands. A study conducted by Song et al.⁶ was able to show that parents who have strong health interests and health beliefs tend to have positive behaviors in promoting health, leading to children's behavioral change towards a clean and healthy lifestyle, including washing hands with soap. Consequently, children's skill in hand washing will be very much dependent on the involvement and thoroughness of their parents in teaching them this behavior.

Conclusion

When it is used as a guide for parents to seek for health information, SEHATI has been shown to be able to improve mother's knowledge which will then improve children's skills in hand washing with soap.

Conflict of Interest

The authors declare no conflict of interest.

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