IMPROVING SELF-CARE BEHAVIORS OF PREGNANT WOMEN USING M-HEALTH

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ABSTRAK: PENINGKATAN PERILAKU *SELF-CARE* IBU HAMIL MENGGUNAKAN M-HEALTH

Latar Belakang: Perilaku *self-care* dalam kehamilan berhubungan dengan pengetahuan tentang *self-care* dan efikasi diri. Pengetahuan dan perilaku *self-care* yang kurang baik selama kehamilan dapat membahayakan ibu maupun janin, dan ini menjadi penyebab paling umum kesakitan dan kematian ibu. Salah satu upaya untuk meningkatkan pengetahuan, efikasi diri, dan perilaku *self-care* ibu hamil adalah dengan pemanfaatan m-Health dalam bentuk Aplikasi Sahabat Ibu Hamil (ASIH) berbasis android.

Tujuan: untuk menganalisis pengaruh penggunaan Aplikasi Sahabat Ibu Hamil (ASIH) terhadap peningkatan pengetahuan tentang *self-care*, efikasi diri dan perilaku *self-care* ibu hamil.

Metode: Metode penelitian secara quasi eksperimen dengan *pretest-posttest with control group design.* Subyek penelitian adalah ibu hamil trimester III pada wilayah kerja Puskemas Garuda Kota Bandung sebanyak 60 orang, yang dibagi kedalam kelompok perlakuan yang menggunakan aplikasi Aplikasi Sahabat Ibu Hamil (ASIH) sebagai panduan *self-care* dalam kehamilan dan kelompok control menggunakan Buku KIA. Pengambilan sampel berdasarkan teknik Simple Random Sampling. Instrument yang digunakan adalah lembar kuesioner.

Hasil: Penggunaan aplikasi ASIH berpengaruh meningkatkan pengetahuan ibu hamil dibandingkan dengan yang menggunakan Buku KIA dengan nilai p<0,05, nilai RR 2,62(1,39-4,97), dan nilai NTT (*Number Needed to Treat*) 2,30; meningkatkan efikasi diri ibu hamil dibandingkan dengan yang menggunakan Buku KIA dengan nilai p<0,05, nilai RR 2,00 (1,14-3,52), dan nilai NTT 3; dan meningkatkan perilaku *self-care* ibu hamil dibandingkan yang menggunakan Buku KIA dengan nilai p<0,05, nilai RR 2,75 (1,46-5,17), dan nilai NTT 2,14 yang berarti dibutuhkan 2 orang bu hamil menggunakan aplikasi ASIH untuk meningkatkan perilaku *self-care* 1 orang ibu hamil.

Kesimpulan: Penggunaan Aplikasi Sahabat Ibu Hamil (ASIH) berpengaruh meningkatkan pengetahuan, efikasi diri, dan perilaku *self-care* ibu hamil.

Saran: Tenaga kesehatan perlu melakukan berbagai inovasi untuk mengembangkan teknologi digital guna meningkatkan derajat kesehatan masyarakat.

Kata Kunci: Aplikasi Sahabat Ibu Hamil (ASIH), efikasi diri dalam *self-care*, pengetahuan tentang *self-care*, dan perilaku *self-care* ibu hamil.

ABSTRACT

Background: Self-care behaviour in pregnancy is related to knowledge about self-care and self-efficacy. Poor self-care knowledge and behaviour during pregnancy can harm both mother and fetus, and this is the most common cause of maternal morbidity and mortality. One effort to increase the knowledge, self-efficacy and self-care behaviour of pregnant women is by using m-Health inform of the form of the Android-based Aplikasi Sahabat Ibu Hamil (ASIH) application.

Purpose: to analyse the effect of using the ASIH application on increasing knowledge about self-care, self-efficacy and self-care behaviour of pregnant women.

Method: The research method is quasi-experimental with pretest-posttest with control group design. The research subject were 60 pregnant women in the 3rd trimester in the working area of the Garuda Community Health Center at Bandung, who were divide into a treatment group that used ASIH application as a self-care guide in pregnancy and a control group that used the KIA Book. Sampling was based on the Simple Random Sampling technique. The instrument used is a questionnaire sheet.

Results: The use of ASIH application has the effect of increasing the knowledge of pregnant women compared to those who use KIA Book with a p<0,05, an RR value of 2.62 (1.39-4.97), and an NTT (Number Needed to Treat) value of 2.30; increase the self-efficacy of pregnant women compared to control group with a p value <0.05, an RR value of 2.00 (1.14-3.52), and an NTT value of 3; and increase the self-care behaviour of pregnant

 DOI 10.33024, http://ejurnalmalahayati.ac.id/index.php/kebidanan

women compared to those who use the KIA Book with a p value <0.05, an RR value of 2.75 (1.46-5.17), and an NTT value of 2.14 which means that 2 pregnant women are needed to use ASIH application to improve the self-care behaviour of 1 pregnant women.

Conclution: Using of ASIH application has the effect of increasing the knowledge, self-efficacy and self-care behaviour of pregnant women.

Suggestions: Innovation is needed in health workers to develop digital technology to improve health status.

Keywords: Aplikasi Sahabat Ibu Hamil (ASIH) application, self-efficacy in self- care, knowledge about self-care, and self-care behaviour of pregnant women.

INTRODUCTION

Pregnancy is a normal reproductive process but still requires special self-care so that the mother and fetus are healthy. Ignorance of self-care during pregnancy can harm both the mother and fetus. World Health Organization (WHO) states that health problems during pregnancy and childbirth can be prevented with good self-care behaviour (Zhianian et al., 2015).

Various study results have shown that self-care behaviour in pregnancy can reduce mortality and morbidity, improve quality of life, and reduce care costs during pregnancy, as well as maintain health during pregnancy (Zhianian et al., 2015). Based on data from the 2015 Inter-Census Population Survey (SUPAS), the Maternal Mortality rate (MMR) was 305/100,000 of live birth (KH), and data from the 2017 Indonesian Demographic Health Survey (SDKI), the Infant Mortality rate (IMR) was 24/1000 KH. The target of The Sustainable Development Goals (SDGs) in 2030 is to decrease MMR reaches 70/100,000 KH, while IMR is 12/1000 KH. At 2019 48,9% of pregnant women were suffered from anemia, supported by the low percentage of pregnant women who consume 90 iron tablets during pregnancy, only 33.3%. Anemia in pregnant women is associated with increased premature births, stunting, maternal and neonatal death, and infections. 24.4% of pregnant women got Chronic Energy Deficiency (CED) which at risk of giving birth to low birth weight babies. These risks and complications can be avoided if pregnant women carry out proper self-care during pregnancy (Firmansyah, 2019).

According to Dorothe Orem Theory, self-care behaviour is an active cognitive process that initiates a person to carry out self-care to maintain health or overcoming disease. Actions as self-care efforts are universal, developmental, and health deviation (Muhlisini, 2010). When related to pregnancy care, universal self-care includes meeting the needs of pregnant women in a structures and integrated manner during pregnancy, such as maintaining adequate fluids, rest, activity, travelling, breast care, preparation for lactation, preparation for childbirth, and family planning; self-care for health deviations includes efforts to manage and treat uncomfortable during pregnancy; and self-care aspects of development include efforts to maintain health and prevent complications due to the development of pregnancy, through early detection of danger signs of pregnancy (Panthumas et al., 2012).

Previous study results explain that factors related to self-care behaviour in pregnancy include knowledge about self-care and self-care efficacy of pregnant women. Panthumas and Puspita's study shows that pregnant women's self-care behaviour was lacking, associates with low knowledge about self-care (Panthumas et al., 2012). The results of the preliminary study showed that 37% of pregnant women said that the information provide by midwives was always the same at every ANC visit, so that 15,2% of pregnant women felt dissatisfied with the information provided by midwives and encouraged the majority of pregnant women (63,2%) to look for better information needed from the internet.

Based on social cognitive theory by Albert Bandura, self-efficacy is a link between knowledge and behaviour, and is a person's belief regarding their ability to behave in a way that influences events that influence their life. Self-efficacy determines how people feel, think, motivate themselves, and behave (Bandura, 1998). Self-efficacy is highly correlated with health behaviour (Zhianian et al., 2015). When someone has high self-efficacy, they will be more enthusiastic in implementing healthy behaviour (Puspita et al., 2015). Preliminary study results show that 50.4% of pregnant women have low self-efficacy for their ability to overcome discomfort during pregnancy, and 34,8% of pregnant women have low self-efficacy for recognizing the danger sign of pregnancy. Therefore, special attention is needed to increase knowledge about self-care and self-efficacy of pregnant women, so that they can carry out good self-care during pregnancy.

One of the government's efforts to encourage the empowerment of women and society is through increasing knowledge behaviour is by implementing

the Maternal and Child Health Book (KIA) program, which has information, education and communication functions to improve maternal and child health. The KIA book is implemented based on KEPMENKES No. 148/MENKES/SK/2004 (Kurniasari, 2017). Utilization of KIA books has not been maximized, based on the 2018 Riskesdas, the coverage of KIA book ownership was decrease from 80.8% to 75.2%, below the coverage of the at the first ANC visit, and recording service results in the KIA Books was also not optimal, only 10.5% of the KIA Book is completely filled out (Kementerian Kesehatan RI, 2020).

Smartphones are currently a very effective communication tool in health services. Indonesia was the 6th largest number of users smartphone in the world, with the average length of time using android was 5 hours a day. Various application are available and can be operated on a smartphone. This in opportunity to develop mHealth to improve the health of pregnant women (Nurazizah et al., 2023).

Developing mHealth with special components has the opportunity to increase self-efficacy and help change behaviour, as well as provide information that allows a person to determine his or her ability to achieve goal. The use of mHealth as information technology has the opportunity to change healthy behaviour because the device is small, easy to carry, easy to access, makes it possible to manage their own health behaviour, and can be used as often as possible to monitor their involvement in health efforts. Bandura in Maxwell explains that interactive technology is a way creativity that makes it possible to increase one's self-efficacy (Maxwell, 2015).

This study developed mHealth for pregnant women's health services in the form of the Aplikasi Sahabat Ibu Hamil (ASIH) Application. The ASIH applications was designed in an integrated manner for midwives and pregnant women to function as a medium of information, education and communication as a guide for pregnant women in caring for their pregnancy. This application was designed by applying of self-efficacy approach to Bandura's theory, in vicarious experience aspects, verbal persuasion, and physiological feedback. This application contains information about self-care to fulfil mother's need during pregnancy, guides mothers in managing discomfort independently, facilitated to detect signs of danger in pregnancy, and was equipped with a chat feature that pacilitated for interaction between pregnant women with a midwife. This study was conducted to analyse the effect of using the ASIH application on increasing knowledge, self-efficacy and self-care behaviour of pregnant women.

RESEARCH METHODS

This study used a quasi-experimental design with a pretest-posttest with control group design. The study subjects were 60 pregnant women in the third trimester in working area of Garuda public health center in Bandung. All participants were devided into 2 groups, the treatment group that used the ASIH application and the control group that used KIA Book as a self-care guidance in pregnancy. A simple random sampling technique was carried out by midwives who provided antenatal services to separate the participants.The inclusion criteria were the first to third pregnancy, in the third trimester, gestation age 28-32 weeks, aged between 30-34 years, with a minimum of secondary education, own and be able to uses an Android-based smartphone, who had ANC visit in Garuda public health center or Posyandu around Garuda public health center. Exclusion criteria include pregnant women with complications, with a health education background or active participation in health services.

Before the study begun, the ASIH application trial was carried out on users (midwives and pregnant women) and experts. To assess aspects of usability, convenience and satisfaction from the users, and to assess the suitability and feasibility of the application content, trials were carried out by experts from the Indonesian Midwives Association (IBI), obstetrics and gynecology experts and media experts.

The treatment group using the ASIH application as a guide for pregnancy care for 4 weeks. The control group used the KIA book as a pregnancy care guide. Pre-test was carried out to know on knowledge about self-care, self-efficacy and self-care behaviour of pregnant women before using the application and a final assessment (post-test) was carried out after 4 weeks uses of application and KIA book. The study instrument was a questionnaire developed by researchers based on the literature studies. The knowledge questionnaire consists of 36 statements, using the Gutman scale of positive and negative statements with answer choices: 1=true, 0=false. The self-efficacy questionnaire consists of 36 statements using a Likert scale with 4 answer choices: very confident, confident, somewhat confident, and not confident. Self-care behaviour questionnaire with 36 statement using Likert and Gutman scales.

Data processing and analysis used the Chi-Square test with the significance of the test results determined based on a *p* value <0.05

 DOI 10.33024, http://ejurnalmalahayati.ac.id/index.php/kebidanan

Finding

Tabel 1
Characteristics of Respondents in Both Groups

Characteristics	Groups		*p* value
	ASIH (n=30)	Non ASIH (n=30)	
Age (year)			
20-24	9 (30%)	9 (30%)	
25-29	8 (26.7%)	10 (33.3%)	0.823
30-34	13 (43.3%)	11 (36.7%)	
Education			
Midle	24 (80%)	25 (83.3%)	0.500
High	6 (20%)	5 (166.7%)	
Pregnancy			
1st	10 (33.3%)	9 (30%)	
2nd	13 (43.3%)	11 (36.7%)	0.688
3rd	7 (23.3%)	10 (33.3%)	

Based on data table 1, it can be seen that the respondents in the ASIH group were mostly aged between 30-34 years, with secondary education, and in their second pregnancy. It can be seen that the characteristics of respondents in the two group did not show any significant differences. Based on the results of statistical tests using the Chi-Square test, the *p* value was greater than 0.05. It can be concluded that the two groups have homogeneous characteristics so they were worthy of comparison.

Tabel 2
Comparison of Knowledge Improvement Categories Between the Two Groups After Using ASIH

Groups	Increased Knowledge		*p* value	RR (CI 95%)
	Tetap	Increased		
Non ASIH	21 (70%)	9 (30%)	0,001	2,62 (1,39-4,97)
ASIH	8 (26,7%)	22 (73,3%)		

Based on table 2, it can be seen that the increase in the knowledge category has become good in both groups. The results of the Chi-Square test showed that the increase in the knowledge category occurred significantly ($p<0.05$), the RR value (CI 95%) increased of 2.62, and the NTT value is 2.30. This shows that it takes 2 pregnant women using the ASIH application for 4 weeks to increase knowledge about self-care for 1 pregnant women.

Tabel 3
Comparison of Self-Effication Improvement Categories Between the Two Groups After Using ASIH

Groups	Increased Sef-Effication		*p* value	RR (CI 95%)
	Tetap	Increased		
Non ASIH	20 (66.7%)	10 (33.3%)	0,010	2.00 (1.14-3.52)
ASIH	10 (33.3%)	20 (66.7%)		

Based on table 4, using the Chi-Square test, it can be seen that the increase in self-efficacy category between two groups is significantly different ($p<0.05$), the RR value (95% CI) is 2.00, and the NTT value is 3.00. it was show that it takes 3 pregnant women using the ASIH application for 4 weeks to increase the self-efficacy of 1 pregnant women.

Tabel 4
Comparison of Self-Care Improvement Categories Between the Two Groups After Using ASIH

Groups	Increased of self-care		*p* value	RR (CI 95%)
	Tetap	Increased		
Non ASIH	22 (73.3%)	8 (26.7%)	<0,001	2,75 (1,46-5,17)
ASIH	8 (26.7%)	22 (73,3%)		

Based on table 5 using the Chi-Square test, the self-care behaviour of pregnant women increased in both groups with significant difference, indicated by a p value greater than 0.05 (p<0.001). The RR (CI 95%) was 2.75, and NNT value was 2.14, this shows that it takes 2 pregnant women using the ASIH application for 4 weeks to improve the self-care behavior of 1 pregnant women.

Tabel 5
Relationship between respondent Characteristics and Knowledge, Self-Efficacy, and Self-Care Behavior

Characteristics	Percentage increase in knowledge, self-efficacy, dan self-care behavior								
	Knowledge			Self-Efficacy			Self-C*are* Behaviour		
	ASIH	Non ASIH	*p* value	ASIH	Non ASIH	*p* value	ASIH	Non ASIH	*p* value
Age (year)									
20-24									
Mean	32,9	8,7	0,008	15,9	5,4	0,136	12,2	7,1	0,605
Median	24,9	3,4		18,2	2,4		7,6	7,5	
25-29									
Mean	28,6	15,8	0,360	30,5	13,6	0,21	14,1	6,0	0,16
Median	14,7	8,9		25,5	7,0		12,4	5,0	
30-34									
Mean	23,5	10,9	0,360	17,4	11,4	0,361	18,3	-0,3	0,002
Median	16,6	7,4		14,9	3,4		16,9	-2,1	
Education									
Midle			0,003			0,007			0,004
Mean	30,4	11,6		19,6	9,7		13,7	3,6	
Median	20,3	7,1		20,9	3,8		14,1	3,4	
High			0,662			0,429			0,52
Mean	16,7	13,5		23,9	3,6		22,0	5,9	
Median	16,3	3,5		27,2	3,4		19,8	1,8	
Pregnancy									
Ke-1									
Mean	29,9	11,4	0,79	25,9	15,5	0,79	10,8	5,1	0,447
Median	22,1	6,9		26,9	10,3		7,1	4,9	
Ke-2									
Mean	30,8	6,3	0,002	20,5	2,6	0,007	18,2	5,1	0,006
Median	16,7	3,3		19,7	1		16,8	2,8	
Ke-3									
Mean	18,6	18,5	0,669	12,8	14,1	1,000	16,6	1,8	0,19
Median	16,7	13,4		18,8	10,9		16,9	1,8	

Based on table 5, using the Mann-Whitney test, it found that for the characteristics aged 20-24 years, using ASIH application increased knowledge significantly (p<0.05), while a significant increase in self-care behaviour occurred in pregnant women aged 30-34 years. In the caracteristics of secondary education, the use of ASIH application increased knowledge, self-efficacy, and self-care behaviour of pregnant women significantly (p<0.05). From the characteristics of the second pregnancy, the use of the ASIH application increases knowledge, self-efficacy and self-care behaviour in all groups of

 DOI 10.33024, http://ejurnalmalahayati.ac.id/index.php/kebidanan

pregnant women. A significant increase in knowledge, self-efficacy and self-care behaviour was found in mothers with their second pregnancy ($p<0.05$).

Tabel 6
Comparison of Knowledge, Self-Efficacy and Self-Care Behavior Scores before and after intervention in the two groups

Variable	Groups		p value
	ASIH	Non ASIH	
Knowledge			
Pre-test			
Mean	76,48	76,85	0,666
Median	77,78	77,78	
Range	41,67 - 88,89	44,44 - 91,67	
Post-test			0,001
Mean	93,98	84,91	
Median	94,44	86,11	
Range	86,11 – 100	66,67 - 91,67	
Comparison *pre-test* and *post-test*	p<0,001	p <0,001	0,002
Increasing (%)	18,0%	7%	
Self-Efficacy			
Pretest			0,684
Mean	70,8	70,22	
Median	68,98	68,06	
Range	52,78 - 94,44	48,15 - 96,3	
Posttest			<0,001
Rata-rata	93,98	84,91	
Median	94,44	86,11	
Range	86,11 – 100	66,67 - 91,67	
Comparison *pre-test* dan *post-test*	p<0,001	p<0,001	0,007
Increasing (%)	20,9%	3,7%	
Self-care behaviour			
Pre-test			0,415
Mean	73,71	72,35	
Median	72,78	72,14	
Range	63,02 - 87,14	59,52 - 94,29	
Post-test			<0,001
Mean	84,53	74,89	
Median	84,76	75,08	
Range	75,87 - 96,83	63,49 - 88,57	
Comparison *pre-test* dan *post-test*	p<0,001	p=0,036	<0,001
Increasing (%)	15,4	4,0	

Based on table 6, the results of the Mann-Whitney test, Wilcoxon test, T test, and paired T test showed an increase in the mean, median, and range of scores for knowledge, self-efficacy, and self-care behaviour after treatment in both groups. The different in improvement between the treatment group and the control group occurred significantly ($p<0.05$).

DISCUSSION

The effect of using the ASIH application on increasing knowledge about self-care for pregnant women

Using ASIH application in this study has a significant role in increasing knowledge about self-care for pregnant women. Based on the statistical test results in Table 6, the pre-test knowledge scores of respondents in the two groups did not show significant differences, it was mean that the initial condition of knowledge about self-care in pregnancy in both groups was the same. In contrast to the post-

test results, after treatment there was a significant increase in the average, median and range of knowledge scores for the treatment and control groups with p<0.05. the increase in knowledge between the group that used the ASIH application and the non-ASIH group showed a significant difference (p = 0.002).

This study results were supported by study of Zhianian (2015) which found that providing health education programs by applying self-efficacy theory was effective in increasing pregnant women's knowledge about self-care behaviour. The use of media helps clarify the information conveyed, is more interesting, more interactive, can overcome the limitations of space and time. The use of the Android-based ASIH application functions as an educational medium about self-care in pregnancy which makes it easy to obtain information about self-care thereby increasing pregnant women's knowledge (Zhianian et al., 2015).

The use of KIA Books as print media has limitations, including taking a long time, being tedious, and can be lost and damaged. Sistiarani's study found that the use of MCH Books does not necessarily increase mother's knowledge, around 40% of mothers have never read or read only a small potion, among mothers who had read, 22.4% said they found it difficult to understand the MCH Book (Sistiarani, 2014). Supported by Kusindijah's study, there was no relationship between ownership of the KIA book and pregnant women's knowledge about self-care (Kusindijah, 2012).

The effect of using the ASIH application on increasing the self-efficacy of pregnant women

The ASIH application used as a guide for pregnant women in carrying out self-care during pregnancy in this study has a significant role in increasing the self-efficacy of pregnant women. In this study, the self-efficacy of pregnant women who used the ASIH application got a significant increase compared to pregnant women who did not use the ASIH application.

The results of this study were in accordance with study by Zianian (2015) which shows that providing health education programs by applying efficacy theory significantly increases the self-efficacy of the participants (Zhianian et al., 2015). Supported by the results of meta-analysis studies which show the potential for using m-Health to strengthen and increase self-efficacy and influence behaviour change, increasing healthy living behaviour in preventing or managing disease.

Based on social cognitive theory which developed by Albert bandura, it was explained that self-efficacy is a link between knowledge and behaviour. Self-efficacy determines how a person feels, thinks, motivates himself, and behaves. Self-efficacy theory promoted the empowerment of pregnant mothers and improve their performance in self-care behaviour during pregnancy (Bandura, 2005).

Increased self-efficacy of pregnant women is supported by increased knowledge about self-care in pregnancy (Table 6), vicarious experience (imitation), and verbal persuasion (verbal reinforcement) that mothers got when interacting with fellow pregnant women or with midwives in carrying out self-care by using the android-based ASIH application. Different from the use of KIA book, it did not support the sources of self-efficacy from the aspects of vicarious experience, verbal persuasion and physiological information. When the women had questions or concern about the condition of teir pregnancy, these cannot be resolved immediately. Interaction with midwives and other pregnant women can only be done when the mother attends a antenatal class or during her next ANC visit to the community health center or posyandu.

The effect of using the ASIH application on increasing the self-care behaviour of pregnant women

The use of ASIH application contributed to increasing the self-care behaviour of pregnant women by 15,4% (Table 6) compared to 4% in the control group. Pregnant women who do not use the ASIH application as a self-care guide in pregnancy have a risk of self-care behaviour that is 2.75 times less when compared to pregnant women who use the ASIH application.

These results are supported by the study of Zhianian (2015), finding that providing health education programs by applying efficacy theory significantly increases the self-care behaviour or pregnant women. The increase in self-care behaviour of pregnant women in this study may be supported by increased knowledge and increased self-efficacy in self-care after using the ASIH application. Self-efficacy is a link between knowledge and behaviour. Self-efficacy influences human actions through cognitive process, motivation, affection and selection processes. Cognitive processes with increasing knowledge about an object underlie the formation between the use of health technology and change in healthy living behaviour. The use of health technology with certain content provides opportunities to increase knowledge and self-management in healthy behaviour which facilitates increasing the self-

 DOI 10.33024, http://ejurnalmalahayati.ac.id/index.php/kebidanan

efficacy of pregnant women to carry out self-care behaviour.

Based on Table 6, it can be seen that the control group's self-care behaviour increased by 4% compared to the treatment groups 15.4%. This finding was in line with the results study of Kusindijah, who found that ownership of the KIA book was not related prenatal care. It was found that only 15.8% of pregnant women who had MCH books carried out good pregnancy care. This finding shows that the information in the KIA book does not settle into memory and knowledge. It possible that a deep impression was not formed on the KIA book information so that they did not feel motivated to make it necessary part and implement.

Supported by the results of a systematic review by Jessica (2015) that interventions in the form of effective use of m-health have had a positive impact on changing the behaviour of patients and health workers. By providing short massages (SMS) as reminders and health education on mothers' mobile phone, it has been proven to significantly increase ANC visits in the treatment group ($p<0.002$), and increase timely immunization ($p<0.01$) (Fanning et al., 2012). The self-efficacy and increased attention to the important predictors of health behaviors adoption by pregnant women was appropriated (Zhianian et al., 2015). Several countries have developed self-care applications to make it easier for pregnant women to access various information related to their pregnancy while increasing the ability of others to maintain their health (Nurazizah et al., 2023). Review by Stephen noted that e-Health and m-Health are the only forms of self-monitoring that have been explore from the perspective of midwives in academic sphere (Vickery et al., 2020).

CONCLUSION

In this study, the use of m-Health by applying self-efficacy theory can significantly increase knowledge about self-care, self-efficacy in self- care and self-care behaviour of pregnant women. Innovation by developing m-Health with content of information about self-care in pregnancy, facititate pregnant women to interact and communicate with other pregnant women and midwives so that can carry out independent care at home to maintain and improve their health.

The strong points in this study were: Used of self-efficacy theory in promote to empowerment the pregnant women and improve their performance practice self-care behaviour during pregnancy; used smartphone as media that own by large number of people pregnant women, used large number of time that used a day.

It is recommended that health workers need to carry out various innovations to develop digital technology to improve the health status of pregnant women which is integrated with health workers who provide services so that they can monitor the mother's health condition at each antenatal care visit.

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