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USING THE SMARTPHONE APPLICATION FOR PREGNANCY CARE: A LITERATURE REVIEW

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ABSTRACT

Background: Smartphones are new media that provide greater benefits than conventional health education. It provides ease and quick access information for users and they may repeat any time. This study aims to analyze the use of various applications related to assessment care, including pregnancy.

Methodology: The literatures was collected from e-databases such as Science direct, PubMed, and Google Scholar. Journal criteria used by using RCT (Randomized Controlled Trials (RCTs) techniques and English-language journals. 5 international journal articles were found by using the keywords "smartphone applications" and "pregnancy care". The journal had to be conducted in 2014-2019.

Results: The smartphone application was a medium that used to get information easier, faster and efficient. Those 5 journal articles were conducted in Indonesia (1 journal), Australia (3 journals), and USA (1 journal). It has been proven in 5 research articles to show effectiveness results in information acquisition, management of anxiety, weight management, management of antenatal care visits and management of childbirth preparations, thus helping pregnant women to optimally care for pregnancy. Overall, all of the applications were effective as the health promotor media.

Conclusion: The future recommendations are needed to improve the materials and the information in term of pregnancy. The usage of application as health education media should be develop for low middle-income household.

Keywords: Smartphone, Pregnancy, Application

INTRODUCTION

Significant perinatal morbidity and mortality is a global health problem in women's health and well-being. Some risk factors that affect perinatal health, such as obesity, smoking, drug use, hypertension, diabetes, malnutrition [1-3]. Pregnancy is a condition with the conception of the start until the birth of the fetus for 280 days (40 weeks or 9 months 7 days). In maintaining the health of pregnant women often seek information about pregnancy because they do not want to know or want to share experiences with others, then they seek consultation with experts through instant networks [4].

The existence of health information based on smartphone applications can make it easy to understand, discuss, connect, motivate, and empower individuals to overcome health problems [5]. The application becomes new to provide information easily via buttons, at no cost, accessible anywhere and anytime [6,7,8]. A smartphone application is a computer program designed to run devices on cellphones. General features of pregnancy assessment applications: information about pregnancy, recording such as schedules, results of antenatal care and calculation of pregnancy such as estimated births of babies [9]. The free application available is more than 100,000 applications that are used by general users and health

workers [10,11]. Currently the health application application is rapidly increasing which is available in the app store through the Google Play and iTunes application store [12].

The application is an important source of information, thus increasing the importance of the quality of the application. [13,14,15]. Most descriptive research, only a few studies published in the application of protection in health assessments, also explain where applications are proven in facilitating changes in pregnancy. The purpose of this review literature review is the use of smartphone applications on pregnancy care.

METHODS

The preparation of the review literature comes from online searches of journal databases through Science Direct, Google Scholar and other related websites. Literature collected based on topics raised in publications in 2014 until 2018 resulted in 100 articles. Initially, the keywords used were "smartphone applications" and "midwifery" but the results obtained were 7 articles, but articles that corresponded to articles about smartphone-related smartphone application features using the keyword "smartphone application" and "pregnancy care" were found in 5 articles. Journal criteria used by using RCT techniques and English-language journals.

Table 1 literature review with the uses of smartphone application pregnancy care (Keywords: "application, smartphone, pregnancy care")

No	Article Content	
1	Title	: Android Application Model of "Suami Siaga Plus" as an Innovation in Birth Preparedness and Complication Readiness (BP/CR) Intervention.
	Author	: Hanna Yuanita Dana Santoso MSc, Dr. Supriyana, Bahiyatun MPH, Dr. Melyana Nurul Widyawati, Dr. Diah Fatmasari, Sudiyono MPH, Dyah Anantalia Widyastari MPH, Doni Marisi Sinaga M.Sc [21]
	Publication	: <i>Journal of Family and Reproductive Health</i> Vol. 11, No. 1, March 2017
	Study design	: a randomized controlled trial with a pretest-posttest design.
	Sample	: A total of 38 husbands and pregnant women from three health centers in three sub-districts in Semarang were selected with a systematic proportional random sampling technique and evenly distributed into the control and intervention groups.
	Treatment	: Counseling and installing the Alert Husband Plus application
	Assessment procedure	: Measure birth readiness and readiness complications before the application is installed and after the application is installed
	Findings	: Counseling only increases the husband's score from 61.5 to 62.6 (2%), while the combination of counseling and application increases 20% of husband's score from 60.4 to 72.9 (p-value 0.000)
2	Title	: Optimizing Gestational Weight Gain With the Eating4Two Smartphone App: Protocol for a Randomized Controlled Trial
	Author	: Deborah Davis Ph.D., Rachel Davey Ph.D., Lauren T Williams Ph.D., et al [19]
	Publication	: JMIR Research Protocols (2018)
	Study design	: a randomized controlled trial with posttest design
	Sample	: 1330 were grouped into the intervention group (n = 578) and the control group (n = 578)
	Treatment	: Nutrition counseling and illustration of changes in body weight with graphics and installing applications

No	Article Content	
	Assessment procedure	: Measure pregnancy care about gaining weight
	Findings	: Demonstrating the use of eating4two is an intervention that has proven effective in measuring body weight, in the conclusion of the study mentioned the existence of obstacles regarding the research process and costs
3	Title	: Pregnant women's interest in a website or mobile application for healthy gestational weight gain
	Author	: Molly E. Waring Ph.D., Tiffany A. Moore Simas, MD MPH ME, Rui S. Xiao, MPH, Lisa M. Lombardini BS, et al [8]
	Publication	: NIH Public Acces (2014)
	Study design	: a randomized controlled trial with posttest design
	Sample	: 64 pregnant women
	Treatment	: Nutrition counseling and illustration of changes in body weight with graphics and installing applications
	Assessment procedure	: Measure pregnancy care about gaining weight
	Findings	: Showing the use of the application proved effective in measuring body weight
4	Title	: Reaching Perinatal Women Online: The Healthy You, Healthy Baby Website App
	Author	: Lydia Hearn, Margaret Miller, Leanne Lester [17].
	Publication	: Hindawi Publishing Corporation Journal of Obstetry (2014)
	Study design	: In the study explained the research with interview techniques and randomized controlled trial with posttest design
	Sample	: Interviews with a population of 53 pregnant women and 12 focus groups for pregnant women
	Treatment	: Counseling for antenatal examinations and seeking information on the use of lifestyle applications during pregnancy
	Assessment procedure	: Conducted interviews with focus groups then transcribed the word through audio recordings by giving questions about the application used whether it has a level of need for the use of lifestyle during pregnancy
	Findings	: In the study it was shown that the results of interviews with the needs of the majority of pregnant women often sought information about pregnancy online, the reason being that they could find factual answers quickly, time efficient and facilitate knowledge without having to visit a doctor for non-medical reasons
5	Title	: The Health e-Babies App for Antenatal Education: Feasibility For Socially Disadvantaged Women
	Author	: Julia A Dalton, Dianne Rodger, Michael Wilmore, et al [18]
	Publication	: Journal PLOS ONE (2014)
	Study design	: a randomized controlled trial with posttest design.
	Sample	: Samples aged 18 years or older, gestational age between 10 and 14 weeks. The intervention group consisted of 30 pregnant women who used the application Control group: 94 pregnant women who did not use the application
	Treatment	: Counseling for antenatal examinations and downloading applications and assessed using the STAI (State-Trait Anxiety Intervention) questionnaire to assess anxiety levels in pregnant women

No	Article Content
Assessment procedure	: After conducting antenatal examination counseling the respondent is given verbal and nonverbal information about how to download the application and evaluate the use of the application with the STAI (State-Trait Anxiety Intervention) questionnaire to assess the level of anxiety in pregnant women
Findings	: In this study, the results of the T-test ($P = 0.001$) using the STAI questionnaire (State-Trait Anxiety Intervention) showed a significant difference that there was a higher level of anxiety in users who did not use the application.

RESULTS

Utilization of Smartphone Applications in Pregnancy

Research on the utilization of cellular health-based smartphone applications as a media for health care information during pregnancy. The information obtained by pregnant women is more efficient and faster, agreeing with the research conducted by Lydia Hearn et al. (2014) to develop the Healthy You application, Healthy Baby App (HYHB App), the subject of the study was 12 pregnant women by knowing the level of need for use. lifestyle during pregnancy In research shows that the results of interviews with the needs of the majority of pregnant women often seek information about pregnancy online, the reason being can find factual answers quickly, time efficient and provide ease of knowledge without having to visit a doctor for non-medical reasons.

Utilization of smartphone applications in addition to adding information more quickly and easily, developed in reducing anxiety during pregnancy easily through the Smartphone application. Research conducted by Julia, et al (2018) on the smartphone application The Health-e Babies App for antenatal education with application users by pregnant women ($n = 30$) and pregnant women without application users ($n = 94$). The results of the study stated that using the STAI questionnaire (State Trait Anxiety Interventory) showed a significant difference that there was a higher level of anxiety in users who did not use the application.

Research conducted by Deborah (2018) about the application of Optimizing Gestational Weight Gain With the Eating4Two Smartphone App developed to be able to control weight during pregnancy. In his study there were 578 groups intervened and 578 groups controlled. The controlled group received treatment for antenatal care and weight measurements were written in booklets published by the government, while the intervention group received care for antenatal care, examination of weight measurements and were given Eating4Two application access via the respondent's smartphone. The results in this study indicate the use of eating4two is an intervention that has proven effective in measuring and managing body weight during pregnancy.

Applications developed not only for pregnancy health care, but reminders for the schedule of appropriate antenatal care visits, in connection with research conducted by Stine Lund (2014) with the results of comprehensive antenatal care in the form of applications showing increased ANC examination visits and improving health quality during pregnancy.

Research related to labor preparation information conducted by Santoso (2017) regarding the android application "Husband Alert Plus". This research is information provided to pregnant women and husbands who show that the combination of counseling methods and cellular health utilization in the form of "Alert Alert Plus" shows a significant increase in knowledge of danger signs in pregnancy compared to couples who only obtain knowledge through counseling or not using application. This application can help couples to prevent three things "late" that lead to an increase in Maternal Mortality Rate (MMR).

From table 1 we can see that of the 5 articles related to the theme of the use of smartphone applications for pregnancy care, most of them use posttest design. The five articles stated that they have different application content features related to pregnancy care. Content features of the smartphone application have different benefits.

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DISCUSSION

Cellular health use is one of the effective solutions recommended by WHO in health care during pregnancy. The health care process includes adding information during pregnancy, reducing anxiety, controlling body weight to maintain / ideal during pregnancy, reminding schedule of ANC examination visits as well as adding information about labor preparation.

Pregnancy is an important period to change her lifestyle to overcome pregnancy health problems and maintain healthy babies, one of them is by adding information. Information that women want today is fast and practical information. Quick and practical information available on mobile / online sites, so

women can download pregnancy-based applications. The Healthy Baby Health (HYHB app) application is a design created for fast and practical / easy information [17]. In particular the design of HYHB is designed to obtain information regarding pregnancy and the lifestyle of pregnant women regarding the preparation of roles to become parents [17]. The credibility of resources, web addresses and HYBY applications are promoted through networks and maternal and child health bulletins [17].

Health in pregnant women some people experience changes. In three-part pregnant women, some people experience anxiety about labor. Research conducted by Julia (2018) designed the application by providing audio meditation and tape relaxation meditation to reduce anxiety without remote access [18]. The use of large cellular applications focuses on how applications affect behavior, lifestyle and effectiveness in disease prevention management [22].

Physical changes in women during pregnancy include changes in body weight. about 50% of pregnant women experience excessive weight changes. In order to obtain optimal weight in addition to maintaining food nutrition in a balanced manner, there are other innovations in the form of supporting tools for managing body weight in the form of Eating4Two researchers' application conducted by Deborah Davis (2018) using smartphone applications that are effective in helping manage body weight [19].

Inspection visits during pregnancy are important interventions to be able to identify complications during pregnancy and improve health during pregnancy for the mother and baby. Antenatal care and increased maternal and infant survival are influenced by motivation to conduct examination visits during pregnancy [23]. Efforts made to provide quality antenatal services to routines during visits to antenatal care need to involve technology and healthcare providers. The effectiveness of using cell phone text message reminders between health care providers and pregnant women has the effect of producing positive health behaviors [24]. In connection with the research conducted by Stine Lund (2014) that the use of this application can show an increase in ANC examination visits, so that the quality of health during pregnancy increases [20].

The study conducted by Santoso (2017) states that the use of the 'Alert Husband Plus' application has a difference in the average birth readiness score or complication readiness using applications higher than those who only receive counseling, so this study contributes positively to increasing birth readiness and complications [21]. Smartphones are new media that provide greater benefits than conventional health education, the information provided by the application allows users to repeat the information they need at any time. Information from stored media will change their attitudes and behavior [25].

Health use is one of the effective solutions recommended by WHO in health care during an assessment. Care information during pregnancy, anxiety checks, weight control to be safe/ideal during pregnancy, reminders of ANC examination visit schedules and information on labor preparation.

Pregnancy is an important period for changing your own lifestyle to deal with health problems and maintaining a baby's health is always wrong by adding information. The information that women want now is fast and practical information. Fast and practical information is available on mobile/online sites, so women can download pregnancy-based applications. Your Health Application for Healthy Babies (HYHB application) is designed for fast and practical/easy information [17]. In particular, the design of HYHB is designed to obtain relevant information and lifestyle for pregnant women regarding the preparation of roles to become parents [17]. The credibility of resources, web addresses, and HYBY applications are promoted through networks and maternal and child health bulletins [17].

Health for pregnant women More than three pregnant women who experience difficulty in labor. Anxiety is a psychiatric condition that is full of what might happen [26]. Negative effects can occur on the physical and psychological. Physical effects regarding body shivering, excessive sweating, palpitations, headaches, while negative effects on pregnancy increase the risk of low birth weight and cause babies to understand in special care rooms, showing lower development [26]. The research

conducted by Julia (2018) designs applications by providing media to help complement with help. Media designed using application content to facilitate relaxation made by audio and tape to replace freedom without remote access [18]. The use of cellular applications is as large as how to implement applications, lifestyle and risk management planning [22].

Adequacy of nutritional needs for pregnant women is an important thing to note. Adequacy of nutritional needs during pregnancy completes a balanced food intake, where a balanced diet consists of various food intake in the appropriate amount and proportion to meet one's nutritional needs. Unbalanced food intake will cause an imbalance of nutrients that enter the body and can cause malnutrition or otherwise an unbalanced intake will also be able to overcome certain excess nutrients [27]. Excessive nutrition will affect changes in the body which occur in about 50% of pregnant women. Can receive the optimal weight the need for supporting media such as the Eating4Two smartphone application that is effective in helping manage body weight [19].

Examination visits during pregnancy are important interventions for complications during the assessment and improvement of health during pregnancy for the mother and baby. Antenatal care and increased maternal and infant survival are approved by the motivation to carry out examination visits during pregnancy [23]. Efforts made to provide quality antenatal services to routines during inspection visits need technical assistance and health service operators. The effectiveness of using cell phone text message reminders between healthcare providers and pregnant women results in positive health protection [24]. In connection with the research conducted by Stine Lund (2014) that the use of this application can show an increase in ANC examination visits so that the quality of health during pregnancy increases [20].

The study conducted by Santoso (2017) discusses the use of 'Alert Husband Plus' applications that have a higher average birth readiness score or complication readiness using applications than those who only receive counseling, so this study contributes positively to increasing birth readiness and complications [21]. Smartphones are new media that provide more than conventional health education, the information provided by the application allows users to repeat the information they need at any time. Information from the transferred media will change their attitudes and behavior [25].

CONCLUSION

Smartphone media is an effective tool in providing health education to the community in an easy and convenient way. Information provided through the application allows to be able to repeat the information they need. Changes that pregnant women make possible to manage changes during pregnancy. one of them is looking for information quickly and easily. The role of pregnancy applications affects some of the needs and problems they face during pregnancy. Some articles about identifying application content features, applications used in pregnancy care include the application of the level of information needs to media applications, applications to anxiety management, application to weight management, applications to management of antenatal care visits and applications to management of labor preparations. Application smartphone is an effective tool in providing health education to the community in an easy and convenient way. Information provided through the application allows being able to repeat the information they need. Changes that pregnant women make possible to manage changes during pregnancy. one of them is looking for information quickly and easily. The role of pregnancy applications affects some of the needs and problems they face during pregnancy. Some articles about identifying application content features, applications used in pregnancy care include the application of the level of information needs to media applications, applications to anxiety management, application to weight management, applications to management of antenatal care visits and applications to management of labor preparations. Future recommendations regarding application features by integrating the needs needed for pregnancy care based on operational standard procedures that have been determined or agreed according to government program policies

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