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The Role of Counseling Application towards the Rise of Breastfeeding Knowledge among Pregnant Women in the Third Trimester

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ABSTRACT

Breastmilk is considered the most impeccable and primary food for infants. Breastfeeding counseling can be such an effective way to increase exclusive breastfeeding coverage. This study aims to determine the effect of providing counseling applications towards the rising knowledge on third-trimester expectant mothers related to breastfeeding.

This research applies a combined method, namely Research and Development (R&D) and one-group quasi-experimental design, that involves pre-test and post-test. Furthermore, this study was conducted at the Public Health Centre (Puskesmas) of Pangkajene from January to February 2021. The sample in this study consists of 49 expectant mothers in the third trimester of pregnancy. The technique of data collection adapts purposive sampling. Application assessment is carried out using the Technology Acceptance Model (TAM) questionnaire. TAM is useful for assessing the acceptance of the model from the counseling application. Moreover, Wilcoxon Signed Rank Test is applicable for data analysis in this study.

The experts from two different backgrounds confirmed the validation test results, i.e., media expert assessment (87%) and material expert assessment (89%), show that the counseling application is applicative. However, the assessment for accepting the model sourced from counseling application on small-scale field tests and large-scale field tests through TAM questionnaire investigates that the application is very well accepted by the expectant. Assessment of the level of knowledge obtained an average pre-test score of 71.02% in which was categorized as sufficient knowledge category. Additionally, the post-test score is found out to be increased at 86.83% in the category of good knowledge level after receiving such counseling application intervention. In other words, the result of pre-test and post-test proves positive trends due to Android-based counseling application intervention. Furthermore, the significance test attempted to determine the discrepancy of increasing average value on pre-test and post-test through Wilcoxon Sign Rank Test. The result has been tested to be significant ($\rho = 0.000$).

The counseling application is feasible and acceptable by the expectant mothers as the sample of this study. It also significantly affects pregnant women's knowledge in the third trimester regarding breastfeeding education.

Keywords: Counseling application, knowledge, pregnant women in the third trimester, breastfeeding

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INTRODUCTION

In Global Strategy for Infant and Young Child Feeding, WHO and UNICEF have set applicable feeding patterns for newborns up to two years. Based on WHO (2020), there are several steps to improve the health quality of infants and children, i.e., early breastfeeding for the newborns after one hour of birth, regular supply of breastmilk or exclusive breastmilk from the newborns until six months, provide nutritious and safe weaning food from the age of six months up to 24 months, and the step is continuable by giving breastfeeding until two years or more. However, in many cases, infants and children are not receiving optimal nourishment. Between 2007-2014, an estimated 34% of infants aged 0 to 6 months were exclusively breastfed across the globe. Moreover, approximately 40% of the same age obtain exclusive breastfeeding.[1]

Cited from Indonesian Health Profile 2016, the percentage of babies still exclusively breastfed from 0 to 5 months was 54.0%. The rest of approximately 29.5% received the same handling up to the age of six months (Ministry of Health, 2017). Meanwhile, according to Indonesian Health Profile 2017, the number of infants who had acquired exclusive breastmilk was 61.33% (Ministry of Health, 2018). In the South Sulawesi case (2013-2016), the data of exclusive breastmilk receiver is as follows: exclusive breastfeeding coverage in 2013 was 62.70% which led to a downward trend in 2014 (56.31%), yet the percentage had increased in 2015 and 2016, respectively 59.14 % and 63.24% (South Sulawesi Provincial Health Department, 2017). At the more regional level, e.g., Pangkep Regency, exclusive breastmilk infants from 0 to 6 months amounted to 67.38% in 2019 and 71.85% in 2020 (Pangkep Health Department, 2021). Meanwhile, Pangkajene City Public Health Center had a different experience, whereas the infants in the age of 0 to 6 months who had achieved exclusive breastmilk were 48.39% in 2019 and 43.84% in 2021 (Pangkajene City Public Health Center, 2021).[2,3,4,5,6]

Breastmilk is considered the most impeccable and primary food for infants. Breastmilk provides a nutritional composition that immensely helps infants' optimal growth and development needs.[7] Exclusive breastfeeding also offers the mothers benefits, including taking the role as natural contraception, reducing the breast cancer risk, and developing emotional closeness with the children. Also, exclusive breastmilk availability truly helps the family in the economic aspect since it is costless. In other words, there are no expenses to purchase any expensive formula milk.[8]

Several factors influence the low level of exclusive breastmilk transfers. The determinants among populations create such distinct treatment related to providing breastmilk to the infants. Therefore knowledge is fundamentally important to promote exclusive.[10] Previous studies have revealed factors that cause failure in exclusive breastfeedings, such as the lack of expectants' knowledge regarding the benefits of breastfeeding, breastfeeding techniques, and the disadvantages of breastmilk exclusion, as well as the less confident manner that the breastmilk itself can meet the needs of the baby.[11]

The government has designed policies to increase the coverage of exclusive breastfeeding in Indonesia. Breastfeeding counseling can be one of the effective ways for exclusive breastfeeding trends escalation. The availability of breastfeeding counselors in health care

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facilities serves the information about the benefits of breastfeeding and how to breastfeed properly.[11] Furthermore, intensive lactation counseling shall expectedly contribute to upgrading exclusive breastfeeding practice for up to three months in the infants' age. Intensive lactation counseling should be carried out by the counselors four times during prenatal and five times postnatal. These practices are predictable to present the effect on improving knowledge, changing attitudes, and increasing the number of mothers who give exclusive breastfeeding for up to three months of baby age.[12]

The use of media in lactation counseling activities affects the absorption of the information conveyed. Various media can be used in counseling activities, including deliverable pamphlets to expectant mothers, flipcharts, lactation props, and film or video screenings as visual materials. The principle is following health education that consists of five senses. Thus, the concept states that the more senses are used in receiving information, the clearer knowledge can be obtained.[10] In connection with education to gain the knowledge amongst breastfeeding mothers. Media plays an essential role as a tool to facilitate learning and skill for midwives. Several studies have concluded that media and assistive devices such as leaflets, flipcharts, and posters enable advanced breastfeeding success. However, those mentioned media seem likely applicable at the public health center. Meanwhile, it is limited for field counselors.[14,15,16]

Qualifiable communication media can provide information that can be easily accepted and obtained by the expectant. This positive result may encourage a better understanding of the mothers as the object of this study. The development of educational media also allows for technological advancement that eventually facilitates the community to access the internet and social media in a wider range. The utilization of recent Android use is considered the bridge to delivering health education information to the users. Relevant studies showed mobile phone and internet application-based technology's effectiveness in increasing the knowledge and nutrition-conscious behavior across the community.[17] Another study found that mobile phone and internet technology significantly impact early breastfeeding initiation, knowledge, and exclusive breastfeeding practice on four weeks and six months of the baby age.[18] The cell phone intervention for lactation counseling is very useful in serving frequent and continuous support for pregnant and lactating women. Hence, the patients exclude making an appointment for face-to-face counseling to the hospital.[19]

According to the study's background, the researchers are willing to design and develop an Android-based counseling application to increase third-trimester expectant mothers' knowledge.

METHODOLOGY

Location of the study and research design

This research was conducted in the Public Health Centre of Pangkajene, Pangkep Regency, South Sulawesi. The duration of data collection started from January until February 2021.

The research approach used a combined method, which consisted of Research and Development (R&D) and quasi-experimental one group with pre-test and post-test design. According to H.R. Borg and M.D. Gall (1983), research that includes the R&D method is a process that can develop and validate educational products.[20]

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Population and sample

This study's population was pregnant women in the third trimester at Pangkajene City Public Health Centre from September to October 2020. The total population amounted to 56 expectant. However, the research took 49 samples of pregnant women in the third trimester using the purposive sampling technique. The sample characteristics consisted of 1) inclusion criteria including pregnant women in the third trimester at Pangkajene Public Health Centre, pregnant women in the third trimester who had Android smartphone and were willing to be respondents; 2) exclusion criteria including pregnant women who were not present during data collection, pregnant women who had not participated during this study.

Data collection method

There are several processes of a data collection method in this study. The instruments applied were respondent consent form, respondent information form, counseling application, validation questionnaire from the experts (media experts and material experts), TAM questionnaire to assess the acceptance of the model used in the counseling application, and questionnaire related to breastfeeding knowledge.

The researchers took many steps to respond to the counseling application's effect on breastfeeding knowledge before and after utilizing the counseling application. The first step conducted was to allow the participants to answer the pre-test concerning breastfeeding knowledge and counseling application intervention. In the next step, after the one-week duration of that such intervention, the participants submitted the post-test regarding breastfeeding knowledge.

Data analysis

Data analysis technique proposed Wilcoxon Signed Rank Test to compare the knowledge on pre-test and post-test. Finally, the data was processed through SPSS For Windows 25.

RESULT OF THE RESEARCH

The display of Android-based Counseling Application

Fig 1. Android-based counseling application enables to improve breastfeeding knowledge among third-trimester expectant mothers

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Validation from the experts aims to assess the feasibility of the application. Experts from two different study backgrounds finalized this mechanism, respectively, two media specialists and two material specialists. The result of validation is compiled from validation questionary instruments. Hence, the output is presented in Chart.

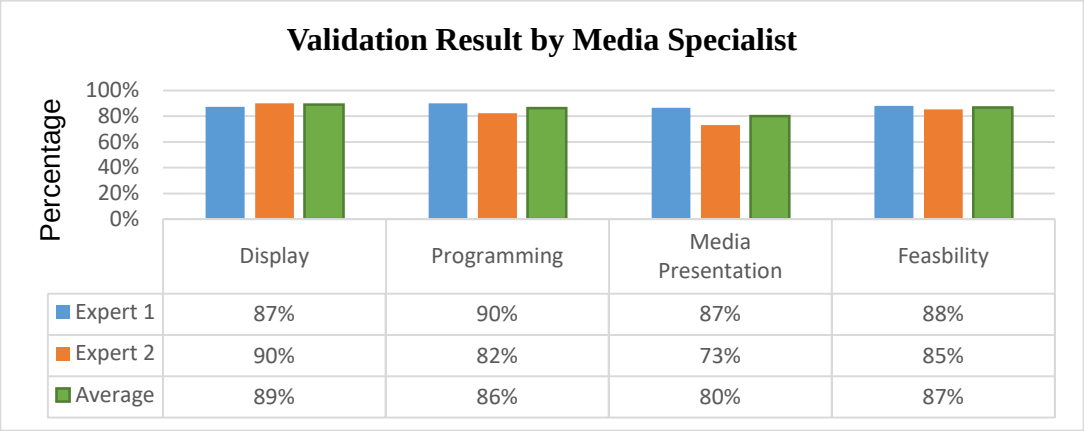

Chart 1. Validation Result by Media Specialist on Android-based Counseling Application

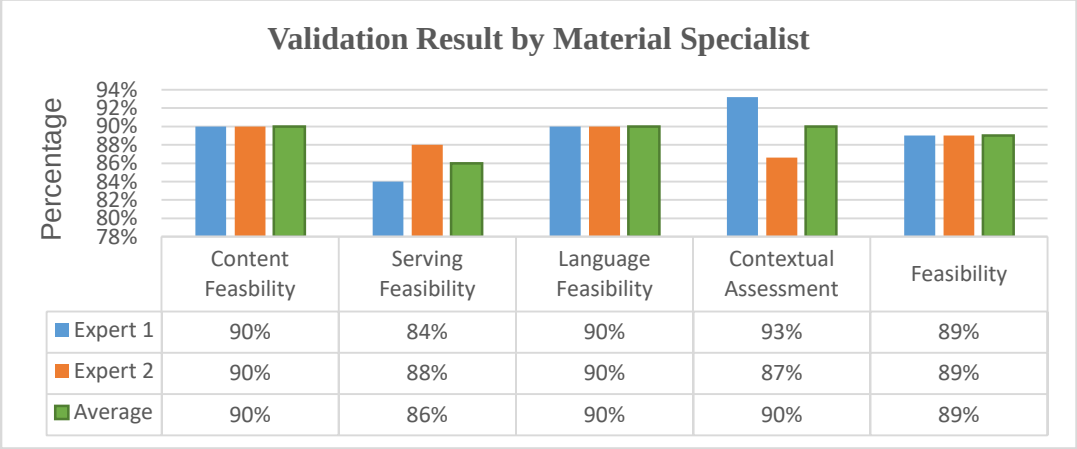

Chart 2. Validation Result by Material Specialist on Android-based Counseling Application

Based on the media expert validation assessment results, feasibility reached the average percentage at 87%, while material experts contribute the feasibility value of 89%. This indicates that the counseling application is considered feasible to use.

Table 1.
Results of Acceptance of the Counseling Application Model in Small-Scale Field Trials

Descriptive Statistic				
	N	**Min**	**Max**	**Mean**
PE1	10	4	5	4.70
PE2	10	4	5	4.50
PE3	10	4	5	4.40

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PE4	10	3	5	4.50
PE5	10	4	5	4.30
PE6	10	3	5	4.30
Average				4.45
Median				4.41
PU1	10	3	5	4.40
PU2	10	4	5	4.70
PU3	10	3	5	4.20
PU4	10	4	5	4.50
PU5	10	4	5	4.50
Average				4.46
Median				4.5
AT1	10	4	5	4.50
AT2	10	3	5	4.20
Average				4.35
Median				4.25
BI1	10	4	5	4.50
BI2	10	4	5	4.60
BI3	10	4	5	4.60
BI4	10	3	5	4.50
BI5	10	4	5	4.20
Average				4.48
Median				4.7
AU1	10	4	5	4.50
AU2	10	4	5	4.30
AU3	10	4	5	4.50
Average				4.43
Median				4.33

Table 2.
Results of Acceptance of the Counseling Application Model in Large-Scale Field Trials

	Descriptive Statistic			
	N	**Min**	**Max**	**Mean**
PE1	49	3	5	4.22
PE2	49	3	5	4.14
PE3	49	4	5	4.31
PE4	49	3	5	4.16
PE5	49	3	5	4.24
PE6	49	3	5	4.22
Average				4.21
Median				4
PU1	49	3	5	4.39
PU2	49	3	5	4.33
PU3	49	3	5	4.39
PU4	49	3	5	4.35
PU5	49	3	5	4.37

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Average				4.36
Median				4
AT1	49	3	5	4.35
AT2	49	3	5	4.39
Average				4.37
Median				4
BI1	49	3	5	4.18
BI2	49	3	5	4.33
BI3	49	3	5	4.16
BI4	49	3	5	4.02
BI5	49	4	5	4.45
Average				4.22
Median				4
AU1	49	3	5	4.29
AU2	49	3	5	4.57
AU3	49	3	5	4.24
Average				4.36
Median				4.33

The acceptance of the model from the counseling application intervention small and large scale field trials with TAM questionnaire involvement proves that five aspects of analysis assessment were found out to be reasonable. The five aspects consist of perceived ease of use(PE), perceived usefulness(PU), attitude toward(AT), behavioral intention(BI), and actual usage(AU). In other words, the outcome can be concluded the Android-based counseling application was acceptable by pregnant women as the samples of this study.

Table 3.
Cross Tabulation of Respondents Characteristics and Level of Knowledge

Characteristic	**Level of Knowledge**															
	Pre-test								**Post-test**							
	Good		**Moderate**		**Poor**		**Total**		**Good**		**Moderate**		**Poor**		**Total**	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Age																
≤ 20 years	0	0	1	2,0	1	2,0	2	4,1	1	2,0	1	2,0	0	0	2	4,1
20 – 35 years	14	28,6	26	53,1	2	4,1	42	85,7	35	71,4	7	14,3	0	0	42	85,7
≥ 35 years	2	4,1	3	6,1	0	0	5	10,2	3	6,1	2	4,1	0	0	5	10,2
Total	16	32,7	30	61,2	3	6,1	49	100	39	79,6	10	20,4	0	0	49	100
Formal Education																
Elementary/Junior High School	0	0	13	26,5	2	4,1	15	30,6	8	16,3	7	14,3	0	0	15	30,6
Senior High School	10	20,4	14	28,6	1	2,0	25	51,0	23	46,9	2	4,1	0	0	25	51,0
University	6	12,2	3	6,1	0	0	9	18,4	8	16,3	1	2,0	0	0	9	18,4
Total	16	32,7	30	61,2	3	6,1	49	100	39	79,6	10	20,4	0	0	49	100
Gravida																
Primigravida	5	10,2	15	30,6	3	6,1	23	46,9	19	38,8	4	8,2	0	0	23	46,9
Multigravida	11	22,4	13	26,5	0	0	24	49,0	19	38,8	5	10,2	0	0	24	49,0
Grande Multigravida	0	0	2	4,1	0	0	2	4,1	1	2,0	1	2,0	0	0	2	4,1
Total	16	32,7	30	61,2	3	6,1	49	100	39	79,6	10	20,4	0	0	49	100

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Occupation																
Unemployment/ Housewife	4	8,2	21	42,9	3	6,1	28	57,1	21	42,9	7	14,3	0	0	28	57,1
Private Sector	4	8,2	3	6,1	0	0	7	14,3	7	14,3	0	0	0	0	7	14,3
Government Employees/Civil Services	4	8,2	1	2,0	0	0	5	10,2	5	10,2	0	0	0	0	5	10,2
Others	4	8,2	5	10,2	0	0	9	18,4	6	12,2	3	6,1	0	0	9	18,4
Total	16	32,7	30	61,2	3	6,1	49	100	39	79,6	10	20,4	0	0	49	100

Source: Primary Data, 2021

Cross tabulation in Table 3 that represents respondent characteristic and the level of knowledge is explained as follows:

a. Pre-test

The characteristic of respondents' age is dominated by 20 – 35 years old (85.7%). This group can be categorized as knowing three levels, i.e., good (28.6%), moderate (53.1%), and poor (4.1%). Meanwhile, 51.0% of respondents accomplish high school as formal education. This characteristic has a good level of knowledge (20.4%), while the rest of 28.6% is moderate, and 2.0% has poor knowledge of breastfeeding education. Multigravida (49%) shows the domination in gravida characteristics amongst all respondents. This category has a good (22.4%) and moderate (26.5%) level of knowledge. Job characteristics of respondents, whereas those dominated by unemployment or housewives (57.1%), indicate good level knowledge at 41.9%, and the rest of 6.1% belongs to the low level.

b. Post-test

The respondents in the range age of 20 – 35 years old (85.7%) represent good (71.4%) and moderate (14.3%) levels of knowledge. The characteristic of educational background, which is dominated by high school graduates (51.0%), is considered well knowledgeable (46.9%); however, the percentage of 4.1% is moderate. Multigravida (49%) that takes control in gravida characteristic indicates having good level (38.8%) and moderate level (10.2%). The last characteristic, which is the occupation of respondents with the domination of unemployment/housewife (57.1%), results from the level of good knowledge (42.9%) and moderate level (14.3%).

Furthermore, Wilcoxon Sign Rank Test takes control to determine the influence of counseling application on the rising breastfeeding knowledge trend on third-trimester expectant women. The result is presented in Table 4.

Table 4.
The Effect Counselling Application on Improvement Knowledge on Third Trimester Expectant Women

Test	Average (%)	Minimum - Maximum	p-value
Pre-test	71,02	10 - 17	0,000
Post-test	86,83	17 - 20	

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Table 4 proves the average value of pre-test at 71.02% in a moderate level of knowledge. After the Android-based counseling application intervention, the respondent emerges from the increase of knowledge to 86.83%, categorized as good. Additionally, the significance of the p-value is 0.000 <0.05, indicating the impact of counseling application towards the rising breastfeeding knowledge amongst the respondents.

DISCUSSION

The expert validation test results for Android-based counseling applications on pregnant women in the third trimester related to breastfeeding education are shown in Chart 1 and Chart 2. Based on Chart 1, media experts' percentage of feasibility is at the amount of 87%. Chart 2 indicates the percentage of feasibility conducted by material experts (89%).From those results, it can be concluded that the counseling application is very feasible. Meanwhile, Table 1 and Table 2 present the applicable model's acceptance test results in small-scale and large-scale field trials. Five aspects of the TAM questionnaire, among other things, perceived ease of use (PE), perceived usefulness(PU), attitude toward(AT), behavioral intention(BI), and actual usage(AU), are likely very good. As a result, the respondents obtain a positive outcome from the existence of an Android-based counseling application. This is supported by Ferdira et al (2018)[21], which investigated that the convenience and benefits of information technology might affect a person's attitudes, interests, and satisfaction. The statement is also in line with the invention by Nurfiyah et al. (2019)[22], which explored perceived usefulness, perceived ease of use, attitude, and intention to use, which significantly affected user acceptance of Shopee application among students. Moreover, Thenu & Sitokdana (2019)[23] proved the acceptance of application usage among students at UKSW was determined by three variables that had positive effects, including positive influence between ease of use (Perceived Ease of Use) and user attitudes (Attitudes Towards) to iSalatiga application, positive influence between the user attitude (Attitude Toward) with the behavioral intention to use iSalatiga application, and positive influence between the behavioral intention to use iSalatiga application (Behavioral Intention) and the actual condition (Actual Use) in using iSalatiga in real terms.

Cross-tabulation between respondents' characteristics and level of knowledge in Table 3 reflects the occurrence of rising knowledge in respondents in the range age of 20 – 35 years old, high school graduate, multigravida, and employment/housewife. The positive trends of knowledge enhancement are supported by respondents' characteristics, such as age, level of formal education, gravida, and occupation. Respondent age affects how they create decisionsin maintaining their health, and consider the maturity will obtain more experience, knowledge, and sources of information.[24] Fatimah (2017)[25] added the connection between age and knowledge of exclusive breastfeeding. However, maturity is not always considered the primary factor in absorbing better knowledge than the younger ones, since the age is not only an element for people to receive knowledge. Another factor that enables to contribute to input people's knowledge is the level of formal education. A higher educational level helps people achieve more information in theoretical explanation (Arikunto, 2010).[26] The finding is supported by

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Yulianti's (2014) analysis which discovered a significant relationship within the level of education and knowledge related to exclusive breastfeeding.[27]

Moreover, the characteristics of gravida resulting the changing and increasing of knowledge. Knowledge ultimately affects the attitudes and skills of pregnant women in transferring the breastmilk to their future babies. Self-development correlates with the experience that allows respondents to have betterment knowledge compared with fewer experience ones. Tendean (2019)[28] overviewed there is a significant correlation among knowledge related to exclusive breastmilk alongside the gravida factor's involvement. Occupation characteristic is one of the factors that assist knowledge improvement. Unemployment or housewife respondents have the same opportunity to raise knowledge with employed respondents. The unemployment or housewife shall spare time to seek information regarding the importance of exclusive breastfeeding.[29] Shaliha (2019) also issued a similar statement, which revealed a significant relationship between occupation factor and knowledge related to exclusive breastfeeding practices.[30]

The test results of the effect towards counseling application on rising knowledge within the expectant are presented in Table 4. It shows the average value of the pre-test is 71.02%. The percentage is categorized as sufficient knowledge. A higher percentage (86.83%) has been shown in the post-test, classified as sufficient knowledge. The pre-test and post-test data denote there is percentage escalation since the respondents accept Android-based counseling application intervention.

Furthermore, the significance test applied for the difference of the increased means values in pre-test and post-test scores.This process was carried out by using Wilcoxon Sign Rank Test.The result of significance is in the range of 0.000<0.05.The calculation means there is influence on counseling application towards the rising knowledge by the respondents.This study result is similar to prior research by Lestari et al (2019)[31] that found out the effectiveness of Sik-Asiek application intervention in improving breastfeeding knowledge.The result is also according to Hidayat et al. (2019)[32] that explored the significancy of knowledge raised on employed mothers after being given information discussing breastfeeding management.

Meanwhile, this study utilizes an Android-based application.This innovation allows employed respondents to have continuous access to the information without being disturbed by time factors.While the research results conducted by Widyawati et al (2020)[33], discovered animated media regarding exclusive breastfeeding plays a vital role in developing knowledge of pregnant and lactating mothers with a prior mean value of 9.9% to a final result of 12.2%. Bayati et al. (2018)[34] acquired a higher value of health education after education and health promotion interventions. The value before intervention was at 79.22% and significantly upgrading to 95.49% after the intervention.[35,36,37,38,39]

CONCLUSION AND RECOMMENDATION

Result of the validation test conducted by media and material specialists, an Android-based counseling application is considered feasible. Moreover, the outcome of acceptance test using Android-based counseling application in small-scale and large-scale field trials seem likely to be

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very workable along with the fact that such innovation is acceptable by the respondents. Based on the cross-tabulation between respondents' characteristics and the level of knowledge, the age groups that dominantly receive adequate knowledge are in the range of 20-35 years old. Other characteristics found out within the respondents who accomplish high school degree, multigravida factor, and unemployment/housewife groups. The post-test was higher than the pre-test, which means the intervention of counseling application truly matters. In other words, that Android-based application that helps respondents to obtain guidance through an online counselor contributes significant effect related to the increasing breastfeeding knowledge.

In response to this study's positive output, the researchers expect that Android-based counseling applications can be such future effective alternative media to assist pregnant women in collecting more knowledge about the importance of breastfeeding.

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