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Exclusive Breast Milk Education with Android-Based Application Program Towards Breastfeeding Patterns

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ABSTRACT
During the Covid-19 pandemic, education, which so far has been carried out directly, has switched to education through various online media, but the effectiveness of education through these applications needs to be evaluated. The aim of the study was to increase pregnant women's knowledge about exclusive breastfeeding and to find out the effect of android-based application programs on breastfeeding patterns. The research design was quasi-experimental with a pre and post-test control group design, subjects were grouped into intervention groups and control groups, selected by purposive sampling with a total of 30 people in each group. This research was conducted in 2022 in the Sindang Barang and Cipaku Health Centers, Bogor City. The independent variable is the Android-based ASI application program with the dependent variable being the pattern of breastfeeding. The statistical test uses the Wilcoxon and Mann Whitney tests. The results of the study showed that there was a significant increase in the average knowledge and attitude after exclusive breastfeeding education was carried out with Android-based application program, as well as a significant change in the pattern of breastfeeding after participating in the breastfeeding education program. The conclusion of the study is that there is a significant relationship between breastfeeding education and Android-based application program on increasing knowledge, attitudes of mothers and patterns of breastfeeding.
Keywords*: Education; Android-Based Applications; Patterns of Breastfeeding*

ABSTRAK
Selama pandemi Covid-19 edukasi yang selama ini banyak dilakukan secara langsung beralih ke edukasi melalui berbagai media daring, tetapi keefektifan edukasi melalui aplikasi tersebut perlu dievaluasi. Tujuan penelitian untuk meningkatkan pengetahuan ibu hamil tentang ASI eksklusif dan mengetahui pengaruh program aplikasi berbasis Android terhadap pola

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pemberian ASI. Desain penelitian adalah quasi eksperimen dengan *pre and post-test control group design*, subyek dikelompokkan menjadi kelompok intervensi dan kelompok kontrol, dipilih secara *purposive sampling* dengan jumlah 30 orang pada masing-masing kelompok. Penelitian ini dilakukan pada tahun 2022 di wilayah Puskesmas Sindang Barang dan Cipaku Kota Bogor. Variabel independen adalah program aplikasi ASI berbasis Android dengan variabel dependennya adalah pola pemberian ASI. Uji statistik menggunakan uji Wilcoxon dan Mann Whitney. Hasil penelitian menunjukkan terjadi peningkatan signifikan pada rata-rata pengetahuan dan sikap setelah dilakukan edukasi ASI ekslusif dengan program aplikasi berbasis Android, serta perubahan signifikan pada pola pemberian ASI setelah mengikuti program edukasi ASI. Simpulan penelitian bahwa terjadi hubungan yang signifikan antara edukasi ASI dengan program aplikasi berbasis Android terhadap peningkatan pengetahuan, sikap ibu dan pola pemberian ASI.
Kata kunci: Edukasi; Aplikasi Berbasis Android; Pola Pemberian ASI

INTRODUCTION

The condition of the Covid-19 pandemic is testing the resilience of the health care system throughout the world, including Indonesia. Some time ago, the Government of Indonesia issued Government Regulation Number 21 of 2020 concerning Large-Scale Social Restrictions (PSBB), limiting people's daily activities outside the home to prevent the spread of Covid-19 (Kementerian Hukum and HAM, 2019). Social Restrictions during the Covid-19 pandemic caused education which has been carried out directly to education through various online media in line with the era of globalization, using communication technology media such as smartphones that plays a fairly important role in human life. Many smartphone providers make breakthroughs in the design of health education media applications. The literature study shows that gadgets commonly used daily can be maximized as tools to provide information both in the form of text messages and information through applications (Sudiarto *et al.*, 2019).

The era of the industrial revolution 4.0 also had an impact on the growth or creation of very rapid information and communication technology which was used to achieve maximum efficiency, so that the resulting information and communication technology could innovate to create new digital-based models. The rapid development of technology and communication at this time has encouraged the world of education to adapt and create new technology-based learning media models (Riyan, 2021).

Android smartphones as a form of technological and communication advances are now the right choice and are widely used by the people of Indonesia. It is user friendly, has affordable price and the various types are easy to get, making Android one of the most sought-after operating systems. According to the Digital Marketing Research Institute, it is

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estimated that by 2018 the number of active smartphone users in Indonesia will be more than 100 million people (Putra, D.W., Nugroho, A.P., Puspitarini, 2016). The increase in smartphone users is referred to as new media because they can access information quickly through internet facilities, one of which is smartphone-based media, namely the Android system (Sulistiani, Rahayu and Yuniastuti, 2021).

One of the things that contribute to the low level of exclusive breastfeeding globally is the poor knowledge about breastfeeding where the factors includes caregivers, societal beliefs supporting mixed feeding (i.e. believe that babies need additional fluids or solids before 6 months because breastmilk alone is not enough) as well as a lack of knowledge about the dangers of not exclusive breastfeeding and proper breastfeeding techniques among women, their partners, families, health care providers and policy makers (Sayekti *et al.*, 2020).

Breastfeeding has many benefits for both mother and child. Breastfeeding stimulates cognitive development and protects babies against diarrheal infections and pneumonia. It can reduce the risk of obesity and chronic diseases such as type II diabetes, as well as serves as protection against ovarian cancer and breast cancer among nursing mothers. Breastfeeding results in lower health care costs. Increasing breastfeeding can prevent 823,000 annual deaths in children under five and 20,000 annual deaths from breast cancer. The level of breastfeeding practice until 2019 is 43% of babies breastfeeding within one hour of birth from the target of 70% in 2030. As many as 41% of babies under 6 months exclusively breastfed from the target of 70% in 2030 (WHO and UNICEF, 2017).

Malnutrition in toddlers based on the height-for-age index (TB/U) includes very short and short categories. The 2018 Basic Health Research (Riskesdas) stated that the percentage of very short children aged 0-23 months (baduta) in Indonesia was 12.8%, while the percentage of short was 17.1%. In toddlers aged 0-59 months, the percentage of very short is 11.5%, while the percentage of short is 19.3%, West Java's figure is 5.4 % (UNICEF & WHO, 2019). The achievement of exclusive breastfeeding in West Java province is 55.4%. This figure is still below the national exclusive breastfeeding coverage rate of 61.33% (Kementrian Kesehatan Republik indonesia, 2014).

Education for mothers during pregnancy is generally provided through the media of Maternal and Child Health Books (KIA), and posters. Technological developments and cellphone ownership have increasingly encouraged the use of

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Android-based educational media in health services. Health education supported by technology provides the flexibility to obtain complete information, such as Android-based applications which provide information quickly, easily and can be used anywhere as well as being accessed at any time (Kementrian Kesehatan Republik Indonesia, 2014). Based on this background, the research aims to evaluate the effectiveness of Android-based applications in increasing pregnant women's knowledge about exclusive breastfeeding and to determine the effect of Android-based application programs on breastfeeding patterns.

METHOD

The research design used was the *pre-posttest control group design*, where the research subjects grouped into two, namely the intervention group and the control group, which were selected by *purposive sampling*. The criteria for selecting research subjects for both the intervention and control groups were pregnant women in the third trimester until delivery until the breastfeeding period was 28 days and had a history of non-exclusive breastfeeding for previous children, owned and actively used an Android-based smartphone, and was willing to be a respondent.

In the intervention group, education was carried out using Android-based application "Sukses ASI Eksklusif/ SAE" which contained material on exclusive breastfeeding, planning successful breastfeeding, success of exclusive breastfeeding, breastfeeding in the era of Covid-19, and testimonials from mothers who exclusively breastfeed.

The intervention was given to the mother accessing the Android application "SAE" from the time she was willing to become a respondent and managed to install the application on her smartphone until the mother gave birth 28 days (28 days post-partum). Applications can be accessed anytime and anywhere but are required to be accessed sequentially. Every week, mothers are asked to access one menu. After all menus have been accessed, mothers can randomly access the application menu according to the knowledge needs that mothers want. Meanwhile, the control group was not given education on the exclusive breastfeeding through the Android application and instead use the KIA book in accordance with the government programs.

The variables in this research are the Android-based application and pattern of breastfeeding, which are the independent and dependent variable respectively. Both variables were measured using a questionnaire that had been implemented in the previous studies and had been tested

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where r > 0.3 in the validity test (Rank Spearman correlation), and alpha values > 0.05 in the reliability test (Cronbach's Alpha). As the data is not normal, the non-parametric test with Wilcoxon test is used. Prior to conducting the research, it was deemed ethically clear with the approval number 46/KEPK/EC/IV/2022.

Table 1. Research design

Group	Pre-test	Intervention	Post-test
Experiment	X_1	√	X_2
Control	O_1	-	O_2

X_1 is the result of the pre-test in the intervention group regarding knowledge, attitudes and history of the past breastfeeding pattern. √ is the treatment given, namely exclusive breastfeeding education using the Android-based SAE application. The treatment was given for approximately 3 months, starting with the respondent installing an application on a smartphone that was actively used. Then the respondents were made a WhatsApp's group to monitor and evaluate their activity in using the application which was carried out every week.

X_2 is the post-test result on the knowledge, attitudes and patterns of breastfeeding for newborns after intervention. 0_1 is the pre-test result regarding knowledge, attitudes and history of breastfeeding patterns in the past in the control group. Meanwhile, 0_2 is the result of the post-test in the control group regarding knowledge, attitudes and patterns of breastfeeding in newborns.

The subjects in this study were pregnant women in the Bogor City area. An affordable population in areas with low breastfeeding outcomes and a history of the Covid-19 red zone. The implementation of exclusive breastfeeding education with the Android-based application program was carried out for 30 respondents in each group who met the inclusion and exclusion criteria. The total of 30 samples is calculated based on the sample size of the other quasi-experimental design where the variance of the difference between 2 pairs averages 7.3, the average score before intervention is 53.1, the average score after intervention is 56, 8 thus a sample size of 30 respondents is obtained.

The stages in this study were: 1) Implementation of the Android-based educational programs on breastfeeding patterns. Research subjects were collected offline where the purpose of this study was explained and asked to sign the informed consent after being given PSP (consent after explanation). 2) After the respondent agreed to the informed consent, a measurement (pre-test) was carried out regarding the knowledge, attitude and

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history of the previous patterns of breastfeeding to children. 3) Respondents were asked to install the Android-based application, namely the SAE (Exclusive Breastfeeding Success) on their smartphone. 4) Respondents were given an explanation on how to use the installed application using the module 'How to use the application'. 5) Respondents are periodically reminded to access information about exclusive breastfeeding through the SAE application that has been installed on the respondent's smartphone. Each menu in the application must be accessed for one week, afterward it can move to the next menu until all menus can be accessed. Then all menus can be accessed according to the knowledge needs that the mother wants to know. This access monitoring is carried out every week through the WhatsApp group. 6) After the respondent gave birth (after 28 days of delivery), the respondent was asked to fill out a post-test questionnaire regarding knowledge, attitudes and patterns of breastfeeding for newborns.

RESULTS AND DISCUSSION

1. Application overview "Sukses ASI Eksklusif"

The Android-based media application "Successful Exclusive Breastfeeding" consists of 5 parts, namely knowing about exclusive breastfeeding, planning successful breastfeeding, success of exclusive breastfeeding, breastfeeding in the era of Covid-19, and testimonials from mothers who exclusively breastfeed.

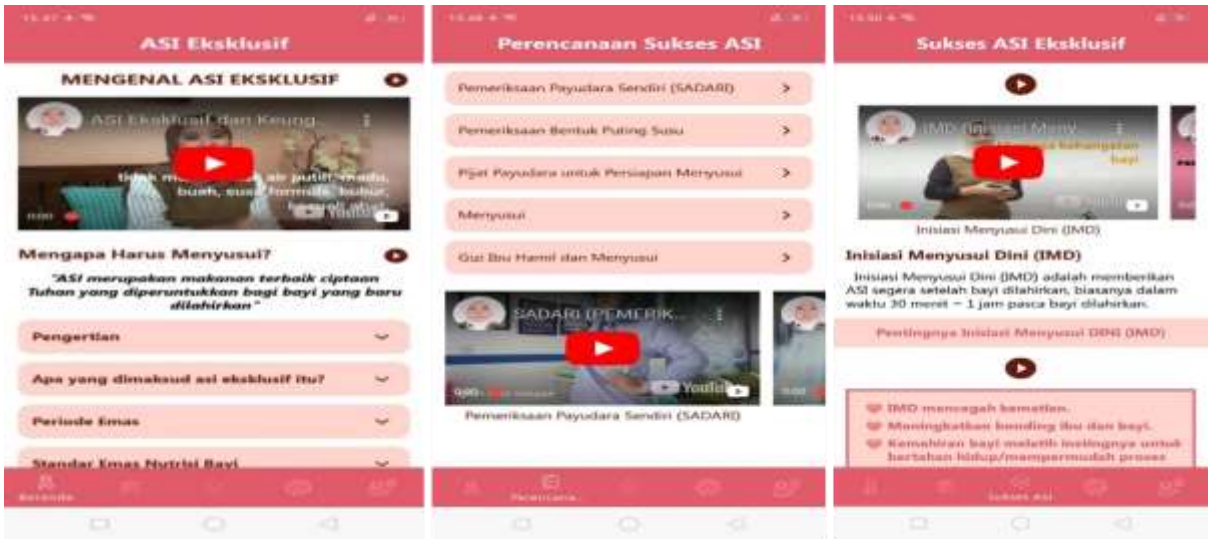

Figure 1. Application "Sukses ASI Eksklusif" part 1, 2 and 3

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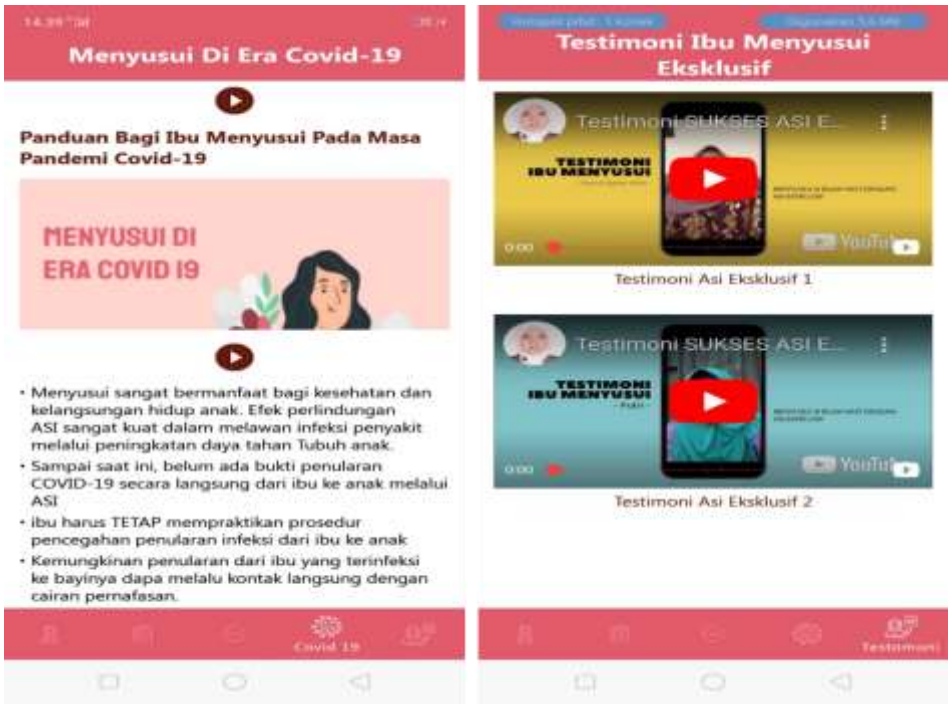

Figure 2. Application " Sukses ASI Eksklusif" part 4 dan 5

2. Overview of respondent

In general, the characteristics of the respondents in the exclusive breastfeeding education with Android-based application programs (intervention group) and the control group were relatively the same. The average age of pregnant women is 30 years in the exclusive breastfeeding education group with the "SAE" Android-based application program and 28 years in the control group. Previously, the average age of the children was 5 years in the exclusive breastfeeding education group with the "SAE" Android-based application program and 4 years in the control group. The average current delivery is the second pregnancy in both groups.

Most of the education status of pregnant women in either group is low (≤ Junior High School), with 60% in the exclusive breastfeeding education group with Android-based application program and 48% in the control group. Likewise, family income per month in the two groups is relatively the same, in the exclusive breastfeeding education group with Android-based application program 1.7 million and in the control group 1.6 million. In more detail, the description of the characteristics of the respondents can be seen in table 2 and 3.

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Table 2. Description of respondents' characteristics based on education and occupation of the intervention group and the control group

Characteristics	Intervention (Exclusive breastfeeding education with an Android-based application program) (%)	Control (%)
Education		
Primary School	10	11
Junior High School	50	47
Senior High School	40	42
Profession		
Housewife	96	86
Private	4	14

Table 3. Description of respondents' characteristics based on mother' age of the intervention group and the control group

Characteristic	Intervention (Exclusive breastfeeding education with an Android-based application program)	Control
Mother' age		
Average	31	28
Minimum	22	20
Maximum	39	40

2. Average differences in knowledge, attitudes before and after education with digital application in the exclusive breastfeeding education group with Android-based application program and the control Group

To find out the effectiveness of education using digital application on knowledge, attitudes and patterns of breastfeeding, a statistical test was carried out. The initial stage is to determine whether the test is parametric or non-parametric. The variable must be tested for the normality of the data as a condition for using the parametric test. The results of the data normality test on the variables of knowledge, attitudes and patterns of

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breastfeeding with Shapiro Wilk revealed that the three variables are not normally distributed.

The data, then, tested by the non-parametric test using the Wilcoxon test and showed that the average knowledge and attitudes in the exclusive breastfeeding education with Android-based application program group experienced a significant increase after following the intervention process. In comparison, there was no significant increase in knowledge and attitude for the control group. In more detail the results of the analysis can be seen in table 4.

Table 4. Results of Wilcoxon test analysis of knowledge and attitudes before and after exclusive breastfeeding education with Android-based application program and control

Group	Pre-test	Post-test	p-value
Intervention (Exclusive breastfeeding education with an Android-based application program)			
Knowledge	60.66	89.33	0.000*
Attitude	59.00	84.66	0.000*
Control			
Knowledge	70.22	71.88	0.309
Attitude	55.27	55.27	1.00

4. Differences in average knowledge, attitudes and patterns of breastfeeding between the exclusive breastfeeding education group and the Android-based application program and the control group

To find out the effect of breastfeeding education with digital applications on knowledge, attitudes and patterns of breastfeeding, the Mann Whitney test was carried out. Knowledge of breastfeeding pregnant women in the exclusive breastfeeding education group with an Android-based application program was higher than the control group and significant. Detail of the results' analysis can be seen in table 5.

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Table 5. Results of the Wilcoxon test analysis differences in average knowledge and attitudes between the exclusive breastfeeding education group and the android-based application program and the control group

Group	Knowledge	Attitude
Intervention (Exclusive breastfeeding education with an Android-based application program)	89.33	84.66
Control	70.88	55.27
p-value	0.000*	0.000*

5. The average difference between the previous breastfeeding pattern and the current breastfeeding pattern.

The pattern of breastfeeding in the Android-based application program education group showed an increase in changes in breastfeeding patterns after following the education and it was statistically significant. Assessment of breastfeeding patterns includes preparation before breastfeeding, frequency of breastfeeding, duration of each breastfeeding, position of breastfeeding and time of breastfeeding. Detail results of the analysis can be seen in table 6 .

Table 6. Results of the Wilcoxon test analysis of the average difference between the previous breastfeeding pattern and the current breastfeeding pattern in the intervention group and the control group

Group	Pattern of Breastfeeding	p-value
Intervention		
Before	49.00	0.00*
Now	78.66	
Control		
Before	78.66	0.101
Now	56.38	

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6. Differences in the average current pattern of breastfeeding in the intervention group and the control group.

The average pattern of breastfeeding currently in the intervention group is higher than the control group and statistically significant. The results of the analysis can be seen in table 7.

Table 7. Results of Mann Whitney's analysis of average differences in breastfeeding patterns between the intervention group and the control group

Group	Pattern of Breastfeeding Now	p-value
Intervention	76.66	
Control	59.72	0.013*

Regular breastfeeding, starting with giving colostrum shortly after giving birth and then continuing to breastfeed with the right feeding pattern, can result in a significant increase in body weight and optimal baby development.

Looking at the results of the characteristic data above, it can be said that the characteristics of the respondents in both the intervention and control groups were homogeneous. This is in accordance with previous research that this homogeneous characteristic is very necessary in a research (Rosa, 2022). The results of the study linked the characteristics of the mother's occupation indicating that household factors were associated with exclusive breastfeeding (Dede, K.S., Bras, 2020).

Research in 2019 using the "AYO ASI" application found that the intervention with the android application "Ayo ASI" and the control group using booklet were significantly different between knowledge before and after the intervention (Angraini and Ichwan, 2019).

This research is in line with other studies which state that there is a significant increase in mother's knowledge about exclusive breastfeeding after receiving breastfeeding education using Android-based media. The developed electronic resource serves as a way for breastfeeding mothers to access information on breastfeeding issues (Rosa, 2022). Other studies also say that the MyWarung mobile application is able to increase knowledge, attitudes and practices related to food (Zaujan *et al.*, 2021). There is an influence

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before and after the intervention using the Android Studio application media, so that it can increase adolescents' knowledge about nutrition in preventing Covid-19 (Sulistiani, Rahayu and Yuniastuti, 2021).

Other research also says that the Android-based smartphone application media "Mama ASIX" in third trimester pregnant women can help mothers prepare for exclusive breastfeeding by increasing their knowledge and attitudes about breastfeeding to their babies. In this study it can be concluded that M-Health Education based on Android "Mama ASIX" is more effective in increasing knowledge and attitudes of exclusive breastfeeding compared to the conventional method, namely leaflets. The "Mama ASIX" application is an application to make it easier for pregnant women to obtain information about exclusive breastfeeding as a preparation for breastfeeding. This application is included in mobile health education because it uses mobile phones as a way to improve health services and save lives (Dewi, Djamil and Anwar, 2019).

This application resembles the M-Health application. M-Health is an important tool in the orientation of client-centered health services that can invite all parties involved to participate (Derbyshire and Dancey, 2013). Advances in technology make it easy to find information about health promotion, one of which is M-Health or mobile health. WHO defines M-Health as medical and public health practices supported by mobile devices such as cell phones, patient monitoring devices, PDAs (personal digital assistance), and other wireless devices. Health Mobile or M-Health is the use of mobile phones to improve health services. M-Health combines the use of telephones with voice messages and short messages (SMS) and smartphones which are equipped with various applications and are intended for the implementation of health programs (Asiodu *et al.*, 2015).

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Health education conducted via smartphones is a more cost-effective approach when compared to conventional

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methods, such as counseling, leaflets, brochures. The use of smartphones can improve public health status and change people's behavior according to health references. Respondents welcomed the idea of health promotion through their cell phones and had a positive attitude towards the program's success in receiving health education messages to cell phones, not feeling any loss financially. Sending SMS 2-3 times per week is an appropriate frequency to share the information. There isn't any feel disturbed to get health information through the media (Hmone *et al.*, 2016).

The number of mobile medical applications developed specifically for aspects of women's health is increasing, although there is still work to be done, such as being more gender-specific, for women's health. According to feedback women are looking for apps that are easy to use, provide motivation, and most importantly of all, trustworthy and evidence based (Derbyshire and Dancey, 2013).

CONCLUSION

There is an influence of education with an Android-based application "Successful Exclusive Breastfeeding" on knowledge and attitudes as well as on patterns of breastfeeding in infants.

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