

Pregnant Women's Knowledge And Attitudes About High-Risk Pregnancy: The Effect of Using the JIPH Educational Application

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Abstract

Background: Early detection and screening of risk factors among pregnant women are essential efforts to identify potential risks during pregnancy. The impacts of these risks may include miscarriage, obstructed labor, antepartum hemorrhage, stillbirth, pregnancy-related poisoning, premature birth, low birth weight, and maternal mortality. Given the high incidence of risky pregnancies, healthcare workers are unable to identify all cases individually. Therefore, the involvement of the community in detecting pregnancy risks is crucial. A tool is required to allow pregnant women or community members to independently assess pregnancy risks, with results that can be accessed by healthcare workers through the JIHP education application.

Objective: This study aimed to evaluate the knowledge and attitudes of pregnant women after receiving education through the JIHP Android application.

Method: A quasi-experimental design was used for this study, with a sample of 100 pregnant women divided into two groups: the intervention group (who received education through the JIHP Android application) and the control group (who did not receive education via the ebumil application). Simple random sampling was applied. The study variables were the knowledge and attitudes of pregnant women, and data were collected using questionnaires on these two aspects. The Wilcoxon test was used for data analysis.

Results: The findings indicated a significant increase in knowledge among the intervention group, from a pre-test score of 81.10 (post 1) to 91.50 (post 2), while the control group showed no increase, with scores of 45.75 (post 1) and 45.50 (post 2). Similarly, attitudes improved in the intervention group, with scores rising from 79.40 (post 1) to 90.25 (post 2). In contrast, the control group showed no change in attitudes, with scores of 45.80 (post 1) and 45.75 (post 2). The Wilcoxon test yielded a p-value of 0.000, which is less than $\alpha = 0.05$, indicating a significant effect of the education provided through the JIHP application on the knowledge and attitudes of pregnant women regarding risky pregnancies.

Conclusion: The study concludes that education through the JIHP application significantly influences the knowledge and attitudes of pregnant women about high-risk pregnancies. Furthermore, there was a notable improvement in both knowledge and attitudes following the education intervention. It is expected that pregnant women will be able to apply the online knowledge gained to make informed decisions in managing their pregnancies.

Keywords: knowledge; attitude; *Jaga Ibu Hamil Pesisir* application

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Background

Early detection and screening for risk factors in all pregnant women is a proactive effort aimed at identifying potential risks during pregnancy. High-risk pregnancy refers to a condition that can endanger both maternal and fetal health. The impacts of high-risk pregnancies can include miscarriage, obstructed labor, antepartum hemorrhage, stillbirth (Intra-Uterine Fetal Death), pregnancy-related poisoning, premature birth, low birth weight, and maternal mortality. In 2021, maternal mortality rates in Indonesia were 59.6%, with Southeast Sulawesi Province at 21.1% and Konawe Regency at 10%. The leading causes of maternal death in Indonesia in 2021 included COVID-19 (2,982 cases), bleeding (1,330 cases), and pregnancy-related hypertension (1,077 cases). Konawe Regency, which consists of islands and coastal areas, faces frequent delays in healthcare delivery, especially referrals. This is due to strong reliance on traditional care, limited utilization of healthcare facilities, and a subsequent increase in maternal mortality rates.

An initial study conducted at the Soropia Health Center in Konawe Regency, which is located in a coastal area, found that of 233 pregnant women, 101 (43.34%) had pregnancies with risk factors. Among the 15 villages in Soropia District, the highest rates of high-risk pregnancies were in Bajoe and Mekar villages, with 45 and 22 pregnant women at high risk, respectively (48.9%). Additionally, 43% of pregnant women did not utilize available healthcare services for pregnancy check-ups. These data suggest a significant risk of complications for both mothers and fetuses during pregnancy, childbirth, or postpartum periods due to pregnancies with risk factors.

Given the high prevalence of high-risk pregnancies, it is challenging for healthcare workers to identify each case individually. Therefore, the community's involvement in detecting pregnancy risks is crucial. To address this, a tool is needed to enable pregnant women or community members to independently assess pregnancy risks, with results accessible to the Konawe Health Office. The *Jaga Ibu Hamil Pesisir* (JIHP) application was developed to address this need, with the primary goal of identifying pregnancy risk status among women in Konawe Regency. While similar applications have been developed in other regions, none exist in Southeast Sulawesi Province. Research on mobile smartphone-based self-care applications for pregnant working women has shown promising results, increasing self-care practices and promoting healthy lifestyle choices during pregnancy. The *Jaga Ibu Hamil Pesisir* application has the advantage of being database-driven, where the data entered by pregnant women is directly uploaded to the Konawe Health Office website, in coordination with the Konawe Communication and Informatics Office (Dinkominfo), ensuring proper application and oversight. Additionally, the application provides contact information for health centers and hospitals in the Soropia District area, as well as maternal and infant health information. The purpose of this study is to assess the knowledge and attitudes of pregnant women after receiving education through the JIHP Android application.

Method

Study Design

This research utilized a Research and Development (R&D) design with a descriptive and quasi-experimental approach.

Setting

The study was conducted among pregnant women in the working area of the Soropia Health Center, Konawe Regency, from April to July 2024.

Sample

The sample consisted of 100 pregnant women, divided into two groups: the intervention group (50 participants), who received education through the JIHP Android application, and the control group (50 participants), who did not receive education through the JIHP Android application. Simple random sampling was used with the inclusion criteria of pregnant women living in the Soropia working area, owning an Android-based smartphone, and being able to operate it. The selected respondents took a pretest before receiving the application and were assisted by the researcher for one week. Posttests were conducted twice: the first posttest was administered one month after the intervention, and the second posttest was administered two months after the intervention.

Instrument

The instruments used in this study included two main components. First, a questionnaire assessing knowledge and attitudes regarding high-risk pregnancies. The questionnaire included sections on respondent characteristics, pregnancy history, and health status. It contained 20 questions assessing

knowledge of high-risk pregnancies with true/false answer options (scores ranging from 0 to 20) and 20 questions assessing attitudes toward high-risk pregnancies using a Likert scale (strongly agree, agree, uncertain, disagree, strongly disagree) with scores ranging from 0 to 100. The second instrument was the JIHP Android application, which included respondent identity features, health history, past and current pregnancy history, and educational content related to pregnancy, childbirth, postpartum care, and newborn health.

Data Collection

Primary data were collected through direct face-to-face meetings with respondents in Konawe Regency over the course of four months. The variables in this study included knowledge about high-risk pregnancies, attitudes toward high-risk pregnancies, and the use of the JIHP Android application.

Data Analysis

Data analysis was conducted using both univariate and bivariate methods with SPSS Version 26. Univariate analysis was used to describe the frequency and percentage distribution of variables, including respondent characteristics (age, education, occupation, income, weight, height, upper arm circumference, gravidity, number of children), knowledge of high-risk pregnancies, and attitudes about high-risk pregnancies before and after the intervention. Bivariate analysis was used to assess the differences before and after the intervention in both the control and intervention groups, in order to evaluate the effect of the JIHP Android application (Jaga Ibu Hamil Pesisir) on the participants. The Wilcoxon statistical test was applied to determine the significance of the changes, with a confidence level of 95% ($\alpha = 0.05$).

Ethical Considerations

The study received ethical approval from the National Nani College of Health Sciences, with the ethical approval recommendation number 1133/STIKES-NH/KEPK/III/2024.

Results

The results of the study include respondent characteristics, current pregnancy history, knowledge of pregnant women regarding pregnancy care before and after the intervention, as well as the independence of pregnant women in managing pregnancy care before and after the intervention. Additionally, the study examines the average knowledge and attitudes of pregnant women before and after the intervention. The results are presented in the following table:

Table 1 Frequency Distribution of Pregnant Women's Characteristics

Characteristic of Respondent	Group Intervention		Group Control		<i>p</i>
	<i>n</i>	%	<i>n</i>	%	
Age (years)					0.741
<20	10	20.0	11	22.0	
20-35	26	52.0	28	56.0	
>35	14	28.0	11	22.0	
Education level					0.817
Elementary	9	18.0	10	20.0	
Junior school	8	16.0	7	14.0	
Senior high school	24	48.0	25	50.0	
Graduate	9	18.0	8	16.0	
Occupation					0.649
Working	18	36.0	21	42.0	
Nor working	32	64.0	29	58.0	
Income					0.684
≥ regional minimum wage	20	40.0	21	42.0	
< regional minimum wage	30	60.0	29	58.0	

Table 1 shows that the majority of respondents in both the intervention and control groups were aged 20-35 years, with 26 individuals (52.0%) in the intervention group and 28 individuals (56.0%) in the control group. The most common level of education among respondents in both groups was high school, with 24 individuals (48.0%) in the intervention group and 25 individuals (50.0%) in the control group. In terms of occupation, the majority of respondents in both groups were unemployed, with 32 individuals

(64.0%) in the intervention group and 29 individuals (58.0%) in the control group. Regarding income, the majority of respondents in both groups had an income below the regional minimum wage (UMR), with 30 individuals (60.0%) in the intervention group and 29 individuals (58.0%) in the control group. The table also indicates that the p-value is greater than 0.05 for the variables of age, education, occupation, and income, suggesting that the characteristics of the respondents are homogeneous across both groups.

Table 2 Frequency Distribution of Current Pregnancy History

Characteristic of respondent	Group Intervention		Group Control		<i>p</i>
	<i>n</i>	%	<i>n</i>	%	
Weight					0.715
Weight According to Gestational Age	22	44.0	21	42.0	
Weight Not According to Gestational Age	28	56.0	29	58.0	
Height					0.574
≥145 cm	35	70.0	27	78.3	
<145 cm	15	30.0	13	21.7	
Upper Arm Circumference					0.721
<23.5 cm	31	62.0	29	58.0	
≥23.5 cm	19	38.0	21	42.0	
Graviditas					0.810
Primipara	20	40.0	23	46.0	
Multipara	15	30.0	18	36.0	
Grande Multipara	10	20.0	9	18.0	
Number of children					0.868
0	14	28.0	13	26.0	
1	8	16.0	10	20.0	
2	9	18.0	11	22.0	
3	8	16.0	6	12.0	
≥4	11	22.0	6	12.0	

Table 2 shows that the majority of respondents in both the intervention and control groups had a weight that did not match their gestational age, with 28 individuals (56.0%) in the intervention group and 29 individuals (58.0%) in the control group. Regarding height, the majority of respondents in both groups were ≥145 cm, with 35 individuals (70.0%) in the intervention group and 27 individuals (78.3%) in the control group. For the upper arm circumference (MUAC), the majority of respondents in both groups had a circumference of <23.5 cm, with 31 individuals (62.0%) in the intervention group and 29 individuals (58.0%) in the control group.

Regarding gravity, the most common category in both groups was primipara, with 20 individuals (40.0%) in the intervention group and 23 individuals (46.0%) in the control group. The largest number of respondents had no children, with 14 individuals (28.0%) in the intervention group and 13 individuals (26.0%) in the control group. The table also indicates that the p-value is greater than 0.05 for all variables—weight, height, upper arm circumference, gravity, and number of children—suggesting that the respondents' current pregnancy history is homogeneous across both groups.

Table 3 Knowledge of Pregnant Women Before and After Intervention

Knowledge of respondent	Group Intervention		Group Control		<i>p</i>
	<i>n</i>	%	<i>n</i>	%	
Pre Intervention					0.561
Good	9	18.0	11	22.0	
Enough	10	20.0	13	26.0	
Less	31	62.0	26	52.0	
Post 1 Intervention					0.000
Good	21	42.0	11	22.0	
Enough	20	40.0	13	26.0	
Less	9	18.0	26	52.0	
Post 2 Intervention					0.000
Good	41	82.0	14	28.0	
Enough	5	10.0	13	26.0	
Less	4	8.0	23	46.0	

Table 3 shows an increase in the number of respondents with good knowledge in the intervention group compared to the control group. Knowledge in the intervention group improved from post-test 1 and continued to increase at post-test 2. In contrast, the control group showed no improvement in good knowledge at post-test 1, and only a slight increase in good knowledge was observed at post-test 2. Before the intervention, the majority of respondents in both groups had poor knowledge, with 31 individuals (62.0%) in the intervention group and 26 individuals (52.0%) in the control group. After one month of intervention (post-test 1), the majority of respondents in the intervention group demonstrated good knowledge, with 21 individuals (42.0%), while the control group had the majority of respondents in the poor knowledge category, with 26 individuals (52.0%). After two months of intervention (post-test 2), the majority of respondents in the intervention group displayed good knowledge, with 41 individuals (82.0%), while the control group still had a higher proportion of respondents with poor knowledge, with 23 individuals (46.0%). The table also shows that the p-value is smaller than 0.05 for both post-test 1 and post-test 2, indicating that the intervention significantly increased respondents' knowledge.

Table 4 Knowledge of Husbands Before and After Intervention

Knowledge	Group Intervention		Group Control		p
	n	%	n	%	
Pre Intervensi					0.642
Good	5	10.0	6	12.0	
Enough	9	18.0	7	14.0	
Less	36	72.0	37	74.0	
Post 1 Intervensi					0.000
Good	28	56.0	7	14.0	
Enough	15	30.0	7	14.0	
Less	7	14.0	36	72.0	
Post 2 Intervensi					0.000
Good	42	84.0	7	14.0	
Enough	5	10.0	8	16.0	
Less	3	6.0	35	70.0	

Table 4 shows an increase in the number of respondents with good knowledge in the intervention group compared to the control group. Knowledge in the intervention group improved from post-test 1 and continued to increase at post-test 2. In contrast, the control group showed no increase in good knowledge at post-test 1, and only a slight improvement was observed at post-test 2. Before the intervention, the majority of respondents in both groups had poor knowledge, with 36 individuals (72.0%) in the intervention group and 37 individuals (74.0%) in the control group. After one month of intervention (post-test 1), the majority of respondents in the intervention group demonstrated good knowledge, with 28 individuals (56.0%), while the control group continued to have predominantly poor knowledge, with 36 individuals (72.0%) in the poor knowledge category. After two months of intervention (post-test 2), the majority of respondents in the intervention group displayed good knowledge, with 42 individuals (84.0%), while the control group still had a higher proportion of respondents in the poor knowledge category, with 35 individuals (70.0%). The table also shows that the p-value is smaller than 0.05 for both post-test 1 and post-test 2, indicating that the intervention significantly improved respondents' knowledge.

Table 5 Attitudes of Pregnant Women Before and After Intervention

Attitude	Group Intervention		Group Control		p
	n	%	n	%	
Pre Intervention					0.714
Positive	20	40.0	22	44.0	
Negatif	30	60.0	28	56.0	
Post 1 Intervention					0.021
Positive	36	72.0	22	44.0	
Negatif	14	28.0	28	56.0	
Post 2 Intervention					0.000
Positive	45	90.0	25	50.0	
Negatif	5	10.0	25	50.0	

Table 5 shows an increase in positive attitudes among respondents who received the intervention compared to the control group. In the intervention group, the improvement in attitudes began at post-test 1 and continued to increase at post-test 2. In contrast, the control group did not show an increase in positive attitudes at post-test 1, but a slight improvement was observed at post-test 2. Before the intervention, the majority of respondents in both groups exhibited negative attitudes, with 30 individuals (60.0%) in the intervention group and 28 individuals (56.0%) in the control group. After one month of intervention (post-test 1), the majority of respondents in the intervention group showed positive attitudes, with 36 individuals (72.0%), while the control group remained predominantly negative, with 28 individuals (56.0%) still exhibiting negative attitudes. After two months of intervention (post-test 2), the majority of respondents in the intervention group demonstrated positive attitudes, with 45 individuals (90.0%), while the control group showed a higher proportion of negative attitudes, with 25 individuals (50.0%). The table further indicates that the p-value is smaller than 0.05 for both post-test 1 and post-test 2, indicating that the intervention significantly influenced the improvement in respondents' independence.

Table 6 Attitudes of Husbands Before and After Intervention

Attitude	Group Intervention		Group Control		<i>p</i>
	<i>n</i>	%	<i>n</i>	%	
Pre Intervention					0.671
Positive	13	26.0	12	24.0	
Negatif	37	74.0	38	76.0	
Post 1 Intervention					0.000
Positive	35	70.0	13	26.0	
Negatif	15	30.	37	74.0	
Post 2 Intervention					0.000
Positive	46	92.0	14	30.0	
Negatif	4	8.0	36	70.0	

Table 6 shows a noticeable increase in positive attitudes among respondents who received the intervention, compared to the control group. The increase in the intervention group's attitudes began at post-test 1 and continued to improve at post-test 2. In contrast, the control group did not show any significant change in positive attitudes at post-test 1, with only a slight improvement observed at post-test 2. Prior to the intervention, the majority of respondents in both groups exhibited negative attitudes, with 37 individuals (74.0%) in the intervention group and 38 individuals (76.0%) in the control group. After one month of intervention (post-test 1), the majority of respondents in the intervention group displayed a positive attitude, with 35 individuals (70.0%), while the control group remained predominantly negative, with 37 individuals (74.0%) still showing negative attitudes. After two months of intervention (post-test 2), the majority of respondents in the intervention group exhibited a positive attitude, with 46 individuals (92.0%), whereas the control group continued to show a higher proportion of negative attitudes, with 36 individuals (70.0%). The table further indicates that the p-value is less than 0.05 for both post-test 1 and post-test 2, confirming that the intervention significantly affected the improvement in respondents' attitudes.

Table 7 Average Knowledge and Attitudes of Pregnant Women in Post 1 and Post 2 in the Intervention Group and Control Group

Variable	Group	N	Post 1	Post 2	SD Post 1	SD Post 2	Sig	<i>p value</i>
			Mean	Mean				
Knowledge	Intervention	50	81.10	91.50	12.7211	2.5767	0.000	0.000
	Control	50	45.75	45.50	13.2142	15.7561	0.003	0.000
Attitude	Intervention	50	79.40	90.25	8.9421	2.7236	0.000	0.000
	Control	50	45.80	45.75	15.4012	16.7198	0.000	0.000

Table 7 shows a significant increase in knowledge in the intervention group compared to the control group. Specifically, in post-test 1, the intervention group scored 81.10, while the control group scored 45.75. In post-test 2, the intervention group increased to 91.50, while the control group remained relatively unchanged at 45.50. These data suggest that the online application had a more immediate

impact in enhancing respondents' knowledge. Additionally, Table 7 reveals a notable difference in the average increase in attitudes between the intervention and control groups. In post-test 1, the intervention group had a score of 79.40, while the control group scored 45.80. By post-test 2, the intervention group increased to 90.25, compared to 45.75 for the control group. This indicates that the online application also had a quicker effect on improving respondents' attitudes. The results of the Mann-Whitney test, with a p -value < 0.05 , clearly demonstrate that the provision of the high-risk pregnancy application and leaflets in the intervention group had a significant influence compared to the control group.

Discussion

The results of the analysis revealed a significant improvement in the knowledge of both mothers and their husbands regarding the detection of high-risk pregnancies, as evidenced by the increase in pre-test and post-test scores following the educational intervention using the Android-based Pregnancy Information Application. This finding highlights the potential of digital health tools as a viable alternative for women to access crucial information about high-risk pregnancies, particularly in environments where access to traditional healthcare may be limited. Knowledge acquisition is a fundamental process that stimulates attitude and motivation, and in the context of pregnancy, it plays a pivotal role in ensuring better maternal and fetal health outcomes.

Knowledge itself is a stimulus that is absorbed by an individual through their senses, which subsequently triggers cognitive, affective, and motivational responses. Among the five senses, sight is the most dominant in transmitting knowledge to the human brain, particularly when it comes to visual learning materials. In the case of pregnancy care, a lack of knowledge or awareness about potential risks associated with pregnancy and childbirth can serve as a significant barrier for expectant mothers. In many cases, insufficient support from the pregnant woman's family, including the husband, further exacerbates this challenge. Consequently, women may lack the necessary resources and attention required to address the various needs and risks that accompany pregnancy.

To address this knowledge gap, educational interventions that are designed to deliver essential information about pregnancy care and high-risk pregnancies are necessary. One such intervention involves the use of application-based platforms, which can efficiently deliver educational content. The introduction of the Android-based Pregnancy Information Application, specifically the E-JIHP application, has proven to be an effective tool for improving knowledge and encouraging better health practices during pregnancy. Through this application, pregnant women can access essential information that helps them understand the risks associated with pregnancy and how to manage them effectively.

Health education plays a critical role in fostering maternal knowledge, particularly regarding high-risk pregnancies. The use of engaging and interactive media, such as mobile applications, can significantly enhance the learning experience, ensuring that the information is not only accessible but also retained. The positive effects of this intervention are evident in the significant increase in knowledge observed among the study participants, which, in turn, contributed to a change in their attitudes toward pregnancy care. When pregnant women are equipped with knowledge, they are more likely to develop a supportive attitude toward their health, leading to a more proactive approach in detecting and managing high-risk pregnancies.

The E-JIHP application has shown that technology can play a crucial role in improving maternal health by providing women with the tools to monitor their pregnancy independently. This empowerment enables pregnant women to become more involved in their own health care, even in the face of busy lifestyles or limited access to healthcare facilities. One of the key advantages of the E-JIHP application is its ability to offer women the flexibility to access information and health services at their convenience, without the need to visit a healthcare facility in person. This is particularly beneficial in rural or underserved areas, where healthcare resources may be scarce.

In addition to the application's educational components, the inclusion of online or web-based consultation facilities further supports pregnant women in managing their health. These consultation services allow users to seek professional medical advice remotely, which is particularly useful for women who may not have immediate access to healthcare professionals. This feature also enables pregnant women to address any concerns or queries about their pregnancy at any stage, promoting early detection and timely intervention for high-risk pregnancies. The results of the study indicate that the application not only increased the knowledge of pregnant women but also contributed to a positive shift in their attitudes toward pregnancy care. This shift in attitude is vital, as it fosters a greater sense of responsibility and awareness regarding the risks associated with pregnancy. Furthermore, it enables women to take proactive steps in seeking medical care when necessary, thereby improving maternal and fetal outcomes. The educational intervention provided through the E-JIHP application has demonstrated its potential to

create lasting changes in health behavior by making health information more accessible and understandable to pregnant women.

The use of the E-JIHP Android-based application for education about high-risk pregnancies has shown significant promise in improving both knowledge and attitudes among pregnant women and their families. This digital intervention offers an innovative solution to the challenges faced by expectant mothers, particularly those in remote areas, by providing them with the tools they need to monitor and manage their pregnancy independently. As the results suggest, this approach not only enhances maternal knowledge but also empowers women to take charge of their health, ultimately leading to better health outcomes for both mothers and their babies. The integration of technology into maternal health education can serve as a critical step toward reducing maternal morbidity and mortality rates, particularly in regions with limited healthcare infrastructure.

Conclusion

The provision of different interventions in each group in this study demonstrated the impact of the JIHP application on increasing the knowledge and attitudes of pregnant women regarding high-risk pregnancies. This was statistically proven through the Wilcoxon test, which yielded a p-value of 0.000 ($< \alpha = 0.05$). The group that received education through the JIHP application showed a significant increase in knowledge, with post-test scores of 81.10 (post 1) and 91.50 (post 2), compared to the control group, which showed no notable change in knowledge, with post-test scores of 45.75 (post 1) and 45.50 (post 2). Similarly, there was an improvement in attitudes in the intervention group, with scores rising from 79.40 (post 1) to 90.25 (post 2), while the control group exhibited no significant change in attitudes, with scores of 45.80 (post 1) and 45.75 (post 2). These results, supported by the Wilcoxon statistical test (p-value = 0.000, $< \alpha = 0.05$), indicate that the education provided through the JIHP application significantly influenced the knowledge and attitudes of pregnant women toward high-risk pregnancies.

Declaration of Conflicting Interest

The authors declare that there is no conflict of interest.

Author Contributions

The author has made significant contributions to the conceptualization and design of the study, as well as the collection of data or its analysis and interpretation. They played a crucial role in drafting the manuscript and provided substantial revisions to enhance its intellectual rigor. Additionally, the author approved the final version of the manuscript for publication and agreed to take responsibility for all aspects of the work. This includes being accountable for the accuracy and integrity of the research, ensuring that any concerns regarding the work are thoroughly investigated and resolved.

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References

Purba A, Sirait A, Sinaga TR. (2021). Skrining Faktor Risiko Kehamilan dan Pemberdayaan Suami serta Kader di Desa Pantai Labu Serdang Bedagai. War Pengabd. 15(1):37–45.

- Nurazizah, A., Hastuti, D.T., Zalsabila, L.I., Nur'aini, M.P., Chumair, N.O., Purnami, C.T., Winarni, S., Agushybana, F., (2023). Pemanfaatan Aplikasi Self-Care Ibu Hamil Selama Pandemi di Negara Maju dan Berkembang : Sebuah Tinjauan Pustaka. *Berkala Ilmiah Kedokteran dan Kesehatan Masyarakat*. Vol.1, No.1,42-51.
- Moulaei, K., Bahaadinbeigy, K., Ghaffaripour, Z., Ghaemi, M.M., (2021) The design and evaluation of a mobile based application to facilitate self-care for pregnant women with preeclampsia during covid-19 prevalence. *Journal of Biomedical Physics and Engineering*. Shriaz University of Medical Sciences. Vol. 11. p.551-60.
- Tanjung, R.P., Mubarak, A., (2021). Aplikasi Usia Kehamilan dan Berat Janin Berbasis Android. *Jurnal Infortech*. Volume 3 No. 1.
- Respati, S. H., Sulistyowati, S., & Nababan, R. (2019). Analisis Faktor Determinan Kematian Ibu di Kabupaten Sukoharjo Jawa Tengah Indonesia. *Jurnal Kesehatan Reproduksi*, 6(2), 52.
- Najmah, S., Suryani, Imelda, (2022). Efektivitas Edukasi Kesehatan dengan buku KIA dan media elektronik terhadap Deteksi Dini Kehamilan Risiko Tinggi pada Ibu Hamil di Puskesmas Simpang Tuan. *Jurnal Nursing Update*. Vol. 13 NO. 3.
- Dharmayanti, I., Azhar, K., Hapsari, D., & H, P. S. (2019). Pelayanan Pemeriksaan Kehamilan Berkualitas yang Dimanfaatkan Ibu Hamil untuk Persiapan Persalinan di Indonesia. *Jurnal Ekologi Kesehatan*, 18(1), 60-69.
- Kemenkes, R. ., (2021). *Kemenkes Perkuat Upaya Penyelamatan Ibu dan Bayi. Sehat Negeriku*. Jakarta: Kemenkes RI.
- Kemenkes, RI., (2021). *Pedoman pelayanan antenatal, persalinan, nifas, dan bayi baru lahir di Era Adaptasi Baru*. Jakarta: Kemenkes RI.
- Kemenkes RI., (2021). *Profil Kesehatan Indonesia Tahun 2021*. Jakarta: Kemenkes RI.
- Kemenkes RI., (2019). *Profil Kesehatan Indonesia Tahun 2019*. Jakarta: Kemenkes RI.
- Dinkes Sultra, (2022). *Profil Kesehatan Sulawesi Tenggara*. Kendari: Dinkes Sultra.
- Dinkes Kab Konawe, (2022). *Profil Kesehatan Kabupaten Konawe*. Konawe: Dinkes Konawe.
- Pratamaningtyas, S., Titisari, I., 2022. Pengaruh Penggunaan Aplikasi Wellingbom 2.0 terhadap Kemampuan Suami Mendeteksi Dini Kehamilan Risiko Tinggi. *Jurnal Promosi Kesehatan Indonesia* Vol 17 / No. 1.
- Sunjaya, A. P. 2019. Potensi, Aplikasi dan Perkembangan Digital Health di Indonesia. *Journal of Indonesian Medical Association*, 69(April), 167-169.
- Olson, J.A., Sandra, D.A., Colucci, É.S., Bikaii, A., Chmoulevitch, D., Nahas, J., et al., (2022) Smartphone addiction is increasing across the world: A meta-analysis of 24 countries. *Comput Human Behav*. 129:1-35.
- Lee Y, Choi S, Jung H., (2022). Self-Care Mobile Application for South Korean Pregnant Women at Work: Development and Usability Study. *Risk Manag Healthc Policy*. Vol.11, No.15, 997-1009.
- Pambudi, A., Nurchim, Srirahayu, A., (2020). Aplikasi Kesehatan Ibu Hamil Berbasis Android. *Infokes J Ilm Rekam Medis dan Inform Kesehat*. 10(2):55-62.
- Roy, S., (2022). How far could the mobile applications aid in maintaining maternal and child healthcare in times of COVID-19 pandemic ? *Sri Lanka J Child Heal*. 51(1).
- Choudhury, A., Asan, O., Choudhury, M.M., (2021). Mobile health technology to improve maternal health awareness in tribal populations: Mobile for mothers. *J Am Med Informatics Assoc*. 28(11):2467-74. 17.
- Chen, M., Liu, X., Zhang, J., Sun, G., Gao, Y., Shi, Y., et al., (2020). Characteristics of online medical care consultation for pregnant women during the COVID-19 outbreak: Cross-sectional study. *BMJ Open*. 10(11).
- Kamulegeya, L.H., Bwanika, J.M., Musinguzi, D., Bakibinga, P., (2020). Continuity of health service delivery during the COVID-19 pandemic: the role of digital health technologies in Uganda. *Pan Afr Med J*;35(Supp 2):4-6.
- Musiimenta, A., Tumuhimbise, W., Mugenyi, G., Katusiime, J., Atukunda, E., Pinkwart, N.A., (2020). Mobile Phone-based Multimedia Application Could Improve Maternal Health in Rural Southwestern Uganda: Mixed Methods Study. *Online J Public Health Inform*. 12(1):1-24.
- Bohnhoff, J., Davis, A., Bruin, B.W., Krishnamurti, T., (2021). COVID-19 Information Sources and Health Behaviors During Pregnancy: Results From a Prenatal App-Embedded Survey. *JMIR Infodemiology*. 1(1):e31774.
- Ankudinov, N.O., (2021). Remote Monitoring of the Health Status of Pregnant Women in the COVID-19 Pandemic. *Biomed J Sci Tech Res*. 40(1):31793-7.
- Wicahyono, G., Setyanto, A., Raharjo, S., (2019). Aplikasi Mobile Smart Birth Untuk Monitoring Ibu Hamil. *Jurnal IT CIDA*. Vol. 5 No. 1: 2477-8125.
- Suparni, Fatkhudin, A., Zuhana, A., (2021). Efektivitas Sibumil (Aplikasi Deteksi Risiko Kehamilan Mandiri) berbasis Android di Kota Pekalongan. *Jurnal Litbang Kota Pekalongan*. VOL. 19 NO. 2.
- Sayekti, W.N., Syarif, S., Ahmad, M., Nurkhayati, E., Suciati, S., (2020) Education Media Of Android-Based Hazard Pregnancy To Increase Pregnancy Mother's Knowledge. *Oksitosin: Jurnal Ilmiah Kebidanan*. Vol. 7, No. 2, 76-86.
- Puspitasari, I., Indrianingrum, I., (2020). Use of M-Health Applications to Increase Knowledge, Attitudes, and Behaviors to Prevent Pregnancy Hazard Signs in Pregnant Women. *Prosiding Seminar Nasional Unismu*. Vol.3.
- Martini, N.L.P., Nursanti, I., Widakdo, G., (2020). Aplikasi web cek risiko terhadap pengetahuan ibu mendeteksi dini risiko tinggi pada kehamilan. *Jurnal Keperawatan Silampari*. Volume 4, Nomor 1.
- Pratamaningtyas, S., Titisari, I., (2022) Pengaruh Penggunaan Aplikasi Wellingbom 2.0 terhadap Kemampuan Suami Mendeteksi Dini Kehamilan Risiko Tinggi. *Jurnal Promosi Kesehatan Indonesia*. Vol 17. No. 1.
- Ismayanty, D., Sugih, S., Aziz, M.A., Sastramihardja, H.S., Garna, H., Wijayanegara, H., (2020). Pengaruh Aplikasi Deteksi Dini Risiko Kehamilan (DDILAN) terhadap Peningkatan Pengetahuan dan Sikap Tentang Risiko Kehamilan. *JSK*. Volume 5. Nomor 3.
- Nurdianti, D., (2021). The increase in knowledge of pregnant women after being given the Pregnant Mother's Friend Application (ASIH) in the Purbaratu Health Center, Tasikmalaya City. *Jurnal Kebidanan*. Vol 7, No 1.
- Kholisotin, Wijaya, A., Rizal, F., (2019). Aplikasi Monitoring Jumlah Gizi Yang Dibutuhkan Ibu Hamil Untuk Mengurangi Risiko Gangguan Fisik dan Mental Janin. *Explore IT*. 13 (1) 2021 Hal.1-5.

Lisnawati, Widiyanti, R., Hapitria, P., (2022). Pengaruh penggunaan GEMBIL dalam meningkatkan pengetahuan ibu hamil tentang kehamilan, persalinan, nifas dan bayi baru lahir. Jurnal Kebidanan Kestra (JKK). Vol. 5 No.1