

## Effectivity of Pregnancy Paper Fan and Android Notification System Toward Knowledge, Attitude, and Adherence of Pregnant Women on Iron Supplements Consumption

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### ABSTRACT

**Background:** Anemia during pregnancy is a kind of problem that most expectant mothers are dealing with. Consuming iron supplements is one kind of solution to lower the cases of anemia. However, the number of anemia in expectant mothers in West Sumatra is still high, 43% of them experience anemia in pregnancy and 52% of them did not adhere to consuming iron supplements. **Purpose:** Creating two kinds of media to motivate expectant mothers in consuming iron supplements, which are pregnancy paper fan and an Android notification system installed on their mobile phones, as well as to determine the effectivity of both media on knowledge, attitude, and adherence on consuming iron supplements. **Methods:** The population of this research is expectant mothers with a number of sample 110 respondents, where 55 respondents were intervened with pregnancy paper fan and 55 respondents were intervened by an android notification system. **Results:** The result of the bivariate analysis shows that the Android notification system has a significant impact on the adherence, knowledge, and attitude of expectant mothers on consuming iron supplements during pregnancy. However, the pregnancy paper fan has a significant impact only on knowledge and the adherence of expectant mothers on consuming iron supplements, while there is no significant impact on attitude toward consuming iron supplements. **Conclusion:** The use of the Android Notification System is effective on knowledge, attitudes, and compliance of expectant mothers on consuming iron supplements.

**Keywords:** Adherence, Android Notification System, Attitude, Knowledge, Pregnancy paper fan.

### INTRODUCTION

World Health Organization (WHO) classified that one of the major global problems is the adherence on iron supplement consumption (World Health Organization, 2016). where 20%-50% of patients estimated not taking their treatments or medicines appropriately (P. Virtudes, M. Sala-gonz, no date). Anemia is one of the biggest problems occurred on expectant mothers, especially during pregnancy, where WHO reported that 40% of expectant mothers globally experience anemia during pregnancy. The consumption of iron supplement most likely to be a solution to intervene the causes of anemia. Based on this assumption, government developed a program as a solution to overcome this problem, where the Government of West

Sumatera implemented a program on providing costless iron supplements for expectant mothers (K. Padang, 2017). However, the problem of anemia on expectant mothers still exists. Research shows that there are 52% of respondents with nonadherence on iron supplements consumption during pregnancy, which caused 43% anemia occurred during pregnancy in West Sumatera (Manda, 2012; Matsuo, 2015; Yurnila, 2016).

Nonadherence on iron supplements consumption may be caused by several factors, such as therapy-related factors, condition-related factors, health system factors, social-economic factors, as well as patient-related factors, such as knowledge and attitude (World Health Organization, 2016).

Internet usage in Indonesia has been growing rapidly, which

approximately 85% of the total internet users in Indonesia accessing internet by mobile phones, while the rest use PCs and laptops, research proves that there is effectiveness of using smartphone to improve adherence of patients to consume medications. Besides, in this current technology era, health medication reminder application has becoming popular to improve people's health. However, there is no media that links technology or media to educate expectant mother on iron supplements consumption during pregnancy (L. Dayer, S. Heldenbrand, P. Anderson, P. O. Gubbins, 2013; B. Jennifer, Alfonso, 2016; Rahayu and Lestari, 2018).

During pregnancy, expectant mothers mostly dealing the change of the body, physiology and also their metabolism system (Prawirohardjo, 2010; C. Piérard-franchimont, T. Hermanns-lê, 2016). This condition was not comfortable for expectant mother, especially in Padang, West Sumatera where the tropical climate and the air temperature is dry, which will definitely increase the metabolism process (S. Nugroho, no date; UNISDR, 2017). Due to this condition, pregnancy paper fan was made as an innovation related to the condition of metabolism on expectant mother that can be used daily.

Based on this background, it is implemented an identification on effectiveness of pregnancy paper fan and android notification system toward knowledge, attitude and adherence of expectant mothers on iron supplements consumption during pregnancy.

## METHODS

The first media used on this research was pregnancy paper fan, is a double-sided manual fan created from paper, developed based on the information related to the identification of problems that occur at the research site which obtained through previous qualitative research. First side consisted of information related to iron supplement, anemia, side effect of iron supplement, instruction of iron supplement consumption, as well as treatment to side effect of iron supplement. The other side of the fan contained of table of 14 days daily checklist for iron supplement

consumption. Furthermore, the pregnancy paper fan was provided with a pen to fill the checklist table.



Figure 1. Pregnancy Paper Fan.

The second media used on this research was an Android notification system called 'Notifikasi TTD', a mobile application which provided the information related to iron supplement, anemia, instruction of iron supplement consumption, side effect of iron supplement, as well as a daily report checklist as found in pregnancy paper fan. The difference between Notifikasi TTD and pregnancy paper fan is that this Android notification system can provide notification to the user as a reminder of iron supplement daily consumption.

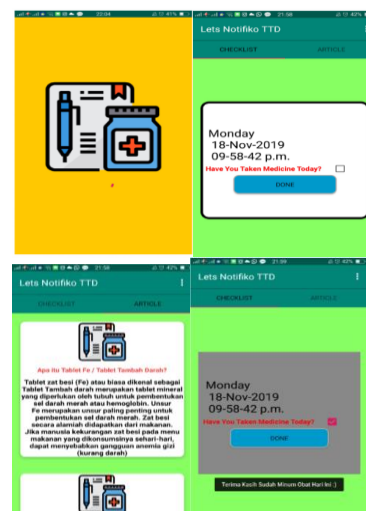


Figure 2 Android Notification System 'Notifikasi TTD'.

This is a quantitative-research with the pre-experimental approach with two-group pre-test and post-test design. The data was collected on June - November 2022. Of 18,365 population of expectant

mothers, samples were selected through non random sampling with a consecutive technique, resulting 110 eligible samples which fulfill the inclusion criteria, which are expectant mother that consume iron supplement, literate ability, willing to be respondents, has downloaded the Notifikasi TTD Android application on smarthphone (for group of expectant mothers with notification system intervention). Samples were divided into two groups of interventions, where 55 samples were intervened with pregnancy paper fan, while the other 55 samples were intervened with Notifikasi TTD, which both groups then will be measured on effectiveness of both media to knowledge, attitude and adherence on iron supplements consumption.

The data as collected through pre-test and post-test before and after intervention by using questionnaires to determine knowledge and attitude of respondents on iron supplements consumption. While adherence of iron supplements consumption was determined by using the database report on the Notifikasi TTD from their individual smarthphone—for the Android groups—and daily checklist report on the pregnancy paper fan—for the paper fan groups.

This study was ethically approved by Research Ethics Committee of Faculty of Medicine, Andalas University in the form of Letter of Statement No. 404/KEP/FK/2019.

## RESULTS AND DISCUSSION

**Table 1.** Characteristics of Respondents.

N o.	Variable	Pregnancy Paper Fan		Notifikasi TTD		Total	
		n	%	n	%	n	%
<b>1</b>	<b>Age</b>						
	<20 Years Old	3	5.4 %	4	7.3%	8	7.3%
	20-35 Years Old	45	80.4 %	42	76.4%	86	78.2%
	> 35 Years Old	7	12.5%	9	16.4%	16	14.5%
	Total	55	100%	55	100%	110	100%
<b>2</b>	<b>Occupation</b>						
	Teacher	0	0%	2	3.6 %	2	1.8%
	Honorary Employee	1	1.8%	5	9.1 %	6	5.5%
	Housewife	46	82.1%	35	63.6 %	81	73.6%
	Employee	2	3.6%	3	5.5 %	5	4.5%
	Entrepreneur	0	0%	1	1.8 %	1	0.9%
	Civil Servants	0	0%	2	3.6 %	2	1.8%
	Private Employee	6	10.7%	4	7.3 %	10	9.1%
	Private Sector	0	0%	3	5.5 %	3	2.7%
	Total	55	100%	55	100%	110	100%
<b>3</b>	<b>Educational Background</b>						
	Elementary School	2	3.6%	0	0%	2	1.8%
	Junior High School	5	9.1%	8	14.5%	13	11.8%
	Senior High School	25	45.4%	15	27.3%	40	36.4%
	Vocational High School	7	12.7%	11	20.0%	18	16.4%
	Diploma 1	3	5.5%	0	0%	3	2.7%
	Diploma 3	6	10.9%	4	7.3%	10	9.1%
	Bachelor Degree	7	12.7%	17	30.9%	24	21.8%
	Total	55	100%	55	100%	110	100%
<b>4</b>	<b>Number of Gravid</b>						
	Primigravida	23	41.8%	31	56.4%	54	49.1%
	Multigravida	31	56.4%	24	43.6%	55	50%
	Grandemultipara	1	1.8%	0	0%	1	0.9%
	Total	55	100%	55	100%	110	100%

Based on the results of the analysis, it is obtained that majority of respondent on pregnancy paper fan group intervention aged of 20-35 years old (80.4%), while majority of respondent on Notifikasi TTD group intervention aged of 20-35 years old (76.4%). Moreover, it is obtained that majority of respondent on

pregnancy paper fan group intervention with the occupation as housewives (82.1%), while majority of respondent on Notifikasi TTD group intervention with the occupation as housewives (63.6%).

It is obtained that majority of respondent on pregnancy paper fan group intervention with the educational background of high school (45.4%), while

majority of respondent on Notifikasi TTD group intervention with the educational background of high school (27.3%). Furthermore, It is obtained that majority of respondent on pregnancy paper fan group intervention with the number of gravid as multigravida (56.4%), while majority of respondent on Notifikasi TTD group intervention with the number of gravid as primigravida (56.4%).

**Table 1.** Result of Paired Sample T-Test.

No	Variable	p-value
1	Knowledge before and after use pregnancy paper fan	0.030
2	Attitude before and after use pregnancy paper fan	0.438
3	Adherence before and after use pregnancy paper fan	0.000
4	Knowledge before and after use Notifikasi TTD	0.006
5	Attitude before and after use Notifikasi TTD	0.000
6	Adherence before and after use Notifikasi TTD	0.000

Based on the results of the analysis, it is obtained that pregnancy paper fan is effective to improve knowledge and adherence of expectant mother related to iron supplement consumption ( $p\text{-value} \leq 0.05$ ). However, pregnancy paper fan is not effective to attitude of expectant mother related to iron supplement consumption ( $p\text{-value} > 0.05$ ). On the other side, it is obtained that Notifikasi TTD is effective to improve knowledge, attitude and adherence of expectant mother related to iron supplement consumption ( $p\text{-value} \leq 0.05$ ).

Knowledge is the result of curiosity through sensory processes that influenced by several factors, such as education and facilities, which has a very important role in shaping behavior. Research showed that behavior change which caused by the knowledge improvement will last longer than behavior without knowledge improvement (Notoatmodjo, 2012, 2014; Donsu, 2017; Wawan and Dewi, 2017; Saadah, Suparji and Sulikah, 2020). In

addition, research by Ekayanthi (2020) shows that there was an effect of education on adherence to taking iron tablets and increasing Hb levels in pregnant women (Ekayanthi and Purnamasari, 2020), this statement explains that knowledge may be important on improving adherence of iron supplement consumption.

Based on the result, it is obtained that both pregnancy paper fan and Notifikasi TTD significantly effective to improve knowledge on both treatment group ( $p\text{-value} \leq 0.05$ ), eventhough Notifikasi TTD ( $p\text{-value} = 0.006$ ) has more significance compared to pregnancy paper fan ( $p\text{-value} = 0.030$ ). This research is in line with other researches which shows that comprehensive program may have significant impact on knowledge of research subjects (Gibney *et al.*, 2009). Furthermore, the utilization of Android system possibly make it easier to be understood by research subject (Handoyono and Rabiman, 2020).

Attitude is individual tendency on stimulus by accepting, rejecting, or being indifferent, which may be different on every individual due to factors such as knowledge, habits and beliefs, (Sabri, 2010; Purwanto, 2014; Rahmah, 2016). To pursue a positive behavior change, comprehensive education and motivation enhancement are needed (Putri and Pritasari, 2017), which means that it is essential to improve attitudes as an effort to develop the expected behavior change.

Based on the statistical analysis, it is obtained that Notifikasi TTD is significantly effective on improving attitude of expectant mothers on iron supplement consumption ( $p\text{-value} = 0.000$ ), while pregnancy paper fan is ineffective on improving attitude of expectant mothers on iron supplement consumption ( $p\text{-value} = 0.438$ ).

This research is in line with other research conducted by Syahrina, et. al. (2020), which shows that educational Android application Edu-Anemia is effective on improving attitude of iron supplements consumption (Syahrina, Gambir and Petrika, 2020).

Notifikasi TTD contains information of iron supplement and anemia in pregnancy. The use of Android application by expectant mothers expected to be useful as a reminder on daily supplement consumption as well as knowledge and

attitudes towards iron supplement consumption.

Based on the statistical test, both pregnancy paper fan and Notifikasi TTD is effective to improve adherence on iron supplement consumption ( $p\text{-value} \leq 0.05$ ). However, it is known that Notifikasi TTD is more effective on improving adherence of expectant mother on iron supplements consumption, with an increase in average compliance from 5 tablets per day to 10 tablets per day. While on pregnancy paper fan, it can only increase the compliance of expectant mothers on consuming iron supplements by an average of 5 tablets per day to 9 tablets per day. This result concludes that Notifikasi TTD is 1 point more effective than the use pregnancy paper fan.

This research is in line with other research conducted by Lestari (2015), which shows that health education and message reminder is effective on improving adherence of iron supplement consumption. Other research by Krismawati, et. al. (2022) also shows that Aplikasi Sahabat Ibu Hamil (ASIH) is effective on improving adherence of expectant mothers on iron supplement consumption (Lestari, 2015; Krismawati, Widjanarko and Rahfiludin, 2022).

## CONCLUSION

Notifikasi TTD has significant impact on knowledge, attitude and adherence of expectant mothers on iron supplements consumption during pregnancy. However, pregnancy paper fan only has significant impact on knowledge and adherence on iron supplements consumption during pregnancy, while there is no significant impact on attitude. It is suggested that Notifikasi TTD can be used as an alternative in educational activities and antenatal care services, especially on the antenatal visits of expectant mothers who consumes iron supplement.

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