




## ORIGINAL ARTICLE

# THE EFFECT OF SMS REMINDERS AND COUNSELING ON PREGNANT WOMEN'S ADHERENCE TO CONSUMING IRON TABLETS

*Efek SMS dan Konseling terhadap Kepatuhan Konsumsi Tablet Besi pada Wanita Hamil*

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## ABSTRACT

**Background:** Supplementation of iron (Fe) tablets are essential to prevent pregnant women from iron deficiency anemia. Several other factors, such as knowledge, attitude, side effects, and personal access to information about iron tablet supplements, reduce the compliance of pregnant women to consume iron tablets. This study uses a combination of interventions, Short Message Service (SMS) reminders, and counseling. **Purpose:** This research aims to discover the effects of SMS reminders and counseling as well as factors that influence pregnant women's compliance in consuming Fe tablets. **Methods:** 170 pregnant women in Balowerti Public Health Center were divided into control and intervention groups. Each group received pre and post-test. The intervention group was given the treatment of SMS reminders and counseling for seven days before the post-test. The data analysis was using McNemar's paired test. **Results:** McNemar test results obtained the effects of the SMS Reminder and counseling on knowledge ( $p = 0.01$ ), attitude ( $p = 0.00$ ), and adherence ( $p = 0.00$ ) of pregnant women in the intervention group as compared to the control group at the time of the post-test. The logistic regression analysis found that the factors that influence the compliance of pregnant women to consume Fe tablets ( $p < 0.05$ ) during the post-test comprise attitude and number of Ante Natal care (ANC). **Conclusion:** SMS reminders and counseling interventions improve pregnant women's adherence, knowledge, and

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behavior to consuming iron tablets. This result is important as a strategy to reach women's empowerment in reproductive health.

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### ABSTRAK

**Latar belakang:** Suplementasi tablet besi (Fe) penting untuk mencegah ibu hamil dari anemia defisiensi besi. Padahal, beberapa faktor lain seperti pengetahuan, sikap, efek samping dan akses personal informasi tentang suplemen tablet besi menurunkan kepatuhan ibu hamil untuk mengonsumsi tablet besi. Penelitian ini menggunakan kombinasi intervensi, pengingat Short Message Service (SMS), dan konseling. **Tujuan:** Penelitian ini bertujuan untuk mengetahui pengaruh SMS reminder dan konseling serta faktor-faktor yang mempengaruhi kepatuhan ibu hamil dalam mengonsumsi tablet Fe di Puskesmas. **Metode:** Pengambilan sampel menggunakan teknik total sampling di wilayah Puskesmas Balowerti dengan jumlah 170 ibu hamil yang dibagi menjadi kelompok kontrol dan intervensi. Setiap kelompok mendapatkan pre-test dan post-test. Kelompok intervensi diberikan perlakuan berupa SMS reminder dan konseling selama tujuh hari sebelum mendapatkan post-test. Analisis data dilakukan dengan menggunakan uji komparatif berpasangan McNemar. **Hasil:** Hasil uji McNemar diperoleh pengaruh SMS Reminder dan konseling terhadap pengetahuan ( $p = 0,01$ ), sikap ( $p = 0,00$ ) dan kepatuhan ( $p = 0,00$ ), ibu hamil pada kelompok intervensi dibandingkan dengan kelompok kontrol pada waktu post-test. Analisis regresi logistik menemukan bahwa faktor-faktor yang mempengaruhi kepatuhan ibu hamil mengonsumsi tablet Fe ( $p < 0,05$ ) selama post-test terdiri dari sikap dan jumlah Ante Natal care (ANC). **Kesimpulan:** Ada perubahan pengetahuan, perilaku dan kesadaran tentang konsumsi tablet fe pada ibu hamil sebelum dan sesudah konseling. Temuan ini penting sebagai upaya pemberdayaan perempuan di bidang kesehatan reproduksi.

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## INTRODUCTION

According to the World Health Organization (WHO), 40% of pregnant women have anemia. It is related to the increasing rate of maternal mortality globally, especially in developing countries (WHO, 2019). Anemia in pregnant women is mostly caused by iron (Fe) deficiency and acute bleeding. Often, these two are related to one another. Anemia is also one of the world's biggest health problems for women of childbearing age (WHO, 2019). According to the RISKESDAS 2018, 48.90% of pregnant women in Indonesia had anemia, higher than data in 2013, which showed the number of pregnant women with anemia in Indonesia was only 37.10% (Kementerian Kesehatan Republik Indonesia, 2018).

Iron tablet supplementation is important prevention of anemia, especially iron deficiency anemia. Therefore, iron tablets given to pregnant women should be consumed every day. But due to several factors such as low adherence, knowledge, attitudes, and side effects of iron tablet supplements, such as induced nausea in several women, pregnant women's compliance to consuming iron tablets decreases (Farzandipour, Nabovati, Anvari, Vahedpoor, & Sharif, 2020). Thus, the benefits of an iron tablet supplement program might not be achieved and could increase iron deficiency anemia numbers in the population (Balowerti, 2019).

Since the clinical rotation held in Balowerti Public Health Center, the Faculty of the Medicine University of Muhammadiyah Malang have a

social responsibility to improve the health status of their community. According to the Public Health Center Performance Assessment and Monthly Health Reports at the Balowerti Community Health Center, Kediri, Indonesia, in 2019, 526 pregnant women were visiting the Ante Natal Care (ANC) program, and 357 pregnant women had their hemoglobin (Hb) checked. The results showed that 21.60% of pregnant women were detected with Hb <11. Meanwhile, the coverage of Fe 1 tablet (30 tablets) at the community health center was 95.40%, and Fe 3 (90 tablets) was 90.70% (Balowerti, 2019). This happens because pregnant women lack awareness and knowledge about consuming iron tablets (Assefa, Abebe, & Sisay, 2019). The importance of knowledge about health information during pregnancy for pregnant women will influence their behavior in maintaining their health. A person's attitude towards an object shows his knowledge of the object (Khorshid, Afshari, & Abedi, 2014; Lamont et al., 2016). Another aspect related to healthy behavior is motivation, which refers to a person's desires that drive them to behave. At the core of adherence to therapy, there should be a willingness from the doctor and patient to work towards understanding and agreement (Frampton et al., 2008).

Informing, educating, and communicating with the patient is one of the eight Picker dimensions of the patient-centered care (PCC) provision (Frampton et al., 2008). Literature reveals that the PCC approach enhances patients' adherence to treatment, improves patients' knowledge regarding illness and health behavior, and improves patients' health outcomes and quality of life (Castro, van Regenmortel, Vanhaecht, Sermeus, & van Hecke, 2016). Providing information to the patient is crucial for the patient's education to become empowered (Frampton et al., 2008). To enhance patients' access to information and adherence to therapy, digital healthcare (as part of the treatment process) contribute by empowering patients to use the advantages of information system for effective patient diagnosis and treatment and information technology tools for self-management (Castro et al., 2016). Mobile phones and SMS technology appear to play an important role in patient's access to care, education, and coordination of care, particularly in low-income developing countries (Eze, Gleasure, & Heavin, 2020).

The SMS reminder method is considered an innovation that is cheap, applicable, fast, without

being hampered by an internet connection (internet-free), and can be done continuously. The information conveyed through the SMS is about the importance of consuming Fe tablets during pregnancy and their benefits, impacts that may occur if they are not consumed regularly, and advice to take iron tablets (Farzandipour et al., 2020). The practicality of SMS interventions for pregnant women in accessing and interacting with educational media related to the health of pregnant women has been shown to influence pregnant women to obtain information and education related to their health (Lamont et al., 2016). However, there was no specific analysis related to SMS as the intervention medium to increase pregnant women's adherence to consuming Fe tablets. Khorshid et al., (2014) specifically took SMS reminder intervention for pregnant women to consume Fe tablets. The finding indicates an increase in the adherence to consuming Fe tablets in the intervention group compared to that in the control group. However, this study only employed SMS media intervention without direct interaction between health workers and pregnant women.

Several studies have declared that increasing awareness among pregnant women on the importance of iron supplementation during pregnancy is essential to expect desirable outcomes to improve the quality of life of mothers and newborns. There needs to be a holistic contribution through direct observation of intake by family members and counseling by health professionals associated with better adherence to iron-folic acid supplementation (Palivela, Shehnaz, & Chaturvedula, 2021). In addition, direct health promotion needs to be done to increase knowledge, attitude, and motivation that may affect the compliance of pregnant women to take Fe tablets (Frampton et al., 2008). Therefore, the current study combines SMS reminder intervention with direct (face-to-face) counseling intervention for pregnant women.

Direct counseling can increase the interaction between health workers and pregnant women regarding the importance of consuming iron tablets. Hence, health workers can directly evaluate problems related to pregnant women's compliance with consuming iron tablets. Counseling intervention can raise the awareness of pregnant women in consuming iron tablet supplements compared to those who do not get any counseling (Castro et al., 2016). Nevertheless, this research only assessed the awareness of pregnant women in their adherence to consuming Fe tablets

with a single counseling intervention; no other intervention was included. Also, this research did not evaluate pregnant women's knowledge or attitude.

Another study with two intervention combinations examined the effectiveness of SMS reminders and leaflets in pregnant women's compliance with iron supplementation in Depok, Indonesia. In the finding, SMS reminders and counseling media are insignificant in increasing the respondents' compliance or hemoglobin (Anitasari & Andrajati, 2017). The intervention was limited to a leaflet or SMS reminder without any additional form of intervention, such as additional information about the material in the leaflet. The pharmacist merely gave the leaflet without further explanation, so the respondents could not absorb the information properly (WHO, 2019). It is necessary to have interactive communication directly or indirectly with various supporting media that cover all issues that may hinder the compliance of pregnant women to consume iron tablets. Therefore, this study aims to assess the effects of SMS reminders and counseling and the factors influencing pregnant women's compliance to consuming Fe tablets in Balowerti Public Health Center, Kediri, Indonesia.

## METHODS

The target population of this study was all pregnant women in Balowerti Community Health Center, Kediri, Indonesia. This study was conducted from March to July 2020 with the approval of the local ethics committee approved the research (No.002/17/V/EC/KEPK/Lamb.Candle/2020), and each respondent filled in the informed consent. The samples were taken using a total sampling technique that involved 170 pregnant women. The samples were divided into two groups, intervention and control groups. Each of the intervention and control groups comprised 85 samples, respectively.

Both groups were given pre-test and post-test, which used the same instrument. However, the intervention group was given a series of treatments in SMS reminders and counseling for seven days before the post-test. The respondents of both groups were given a pre-test in the form of a questionnaire containing sections about compliance, knowledge, and attitudes. Each section has different numbers of questions, eight for compliance using the Morisky Medication

Adherence Scale (MMAS-8), 14 for knowledge, and ten for attitude (Fouelifack, Sama, & Sone, 2019). To study the effect of SMS reminders and counseling on pregnant women's adherence to consuming iron tablets, dependent variables were knowledge, attitude, and compliance which were measured before and after the intervention. The Independent variable was the SMS reminder and counseling. The dependent variable was maternal compliance, for the second aim was to analyze factors that influence pregnant women's adherence to consuming iron tablets. The independent variables for the study's second aim were the number of ANC (Antenatal care) visits, knowledge, age, number of pregnancies, occupation, and the educational factor. There were no covariate variables exist in this research.

The pre-test for the control group was carried out at each of the respondents' residences. Meanwhile, the pre-test for the intervention group was conducted before the counseling session began. The intervention group received treatments through SMS reminders and counseling for seven days. The counseling materials in the picture consist of the benefits of consuming Fe tablets, the effect of Fe deficiency in pregnancy, the definition of anemia in pregnancy, signs, symptoms, causes, risk factors, prevention methods, complications, and recommendations for foods that contain rich Iron. The counseling was held for 30 minutes and divided into two sessions; the first session comprised material delivery for 15 minutes, and the second was a Q (Question) and an A (Answer) session for 15 minutes. Both groups were given a post-test on the eighth day. The post-test was the same form and content as the pre-test. The post-test was carried out at each of the respondent's houses. The collected data were analyzed using the SPSS program version 23. In addition, a paired comparative test was performed with the McNemar test, which aimed to assess the presence or absence of the effects of SMS reminders and counseling on the respondents.

## RESULTS

The distribution of respondents by age, educational level, occupation, number of ANC visits, and number of pregnancies illustrates that 47.70% (n=81) women aged 18 to 29 years old are sampled in this study; while 52.30% (n = 89) are pregnant women aged over 30 years old. Almost 2/3 of pregnant women, 64.10% (n=109), have a high level of education, while those with low

education are 35.90% (n=61). Concerning woman's employment status, majority are unemployed 63.50% (n=108) while smaller percent 36.50% (n=62). Pregnant women who have ANC fewer than or equal to four times are 37.60% (n=64), and those who have ANC more than four times are 62.40% (n=106). Pregnant women included in primigravida are 35.30% (n=60), and the remaining 64.70% (n=110) belong to multigravida.

In the intervention group, the number of pregnant women who adhere to consuming iron tablets in both pre-and post-test is 18.20% (n=31). Meanwhile, 27.60% (n=47), who initially did not comply with the iron tablet consumption in the pre-test, were found to adhere to it after undertaking SMS and reminder counseling (Table 2). In the control group, most pregnant women remained not compliant, 34.70% (n =59), while 12.90% (n=22) of pregnant women were compliant during both pre-test and post-test. Only 2.30% (n=4) that were initially disobedient in the pre-test have become compliant in the post-test. The results indicate a relationship between the treatment and compliance of pregnant women in consuming iron tablets, as shown in the intervention group ( $p = 0.00$ ). While in the control group, no relationship is shown ( $p = 0.13$ ).

**Table 1.**  
Sociodemographic Characteristics of the Respondents

Characteristics	n	%
<b>Age:</b>		
18-29 years old	81	47.70
≥ 30 years old	89	52.30
Total	170	100
<b>Educational Level:</b>		
High (≥ Senior High School)	109	64.10
Low (< Senior High School)	61	35.90
Total	170	100
<b>Occupation:</b>		
Employed	62	36.50
Unemployed	108	63.50
Total	170	100
<b>Ante Natal Care:</b>		
> 4 times	106	62.40
≤ 4 times	64	37.60
Total	170	100
<b>Number of Pregnancy:</b>		
Primigravida	60	35.30
Multigravida	110	64.70
Total	170	100

In terms of knowledge, it is found that in the intervention group, Most pregnant women, 22.30% (n=38), have good knowledge in both pre-test and post-test. Pregnant women who possessed less knowledge at the pre-test became knowledgeable at the post-test by 11.70% (n= 20), while 12.30% (n= 21) of those who still belonged to the less-knowledgeable category. The number of pregnant women in the control group who are knowledgeable/ less knowledgeable at the pre-test remains unchanged, with regard that none of the pregnant women who are less knowledgeable in the pre-test become good in the post-test. It reveals a relationship between the treatment and the knowledge of pregnant women consuming iron tablets found in the intervention group ( $p = 0.01$ ). On the other hand, no relationship is found in the control group ( $p = 1.00$ ).

Considering the attitude category, in the intervention group, most pregnant women, 21.70% (n=37), retain a good attitude in both pre and post-test, while 13% (n=29) are found to change their bad attitude to a good attitude (Table 2). In the control group, only 2.30% (n=4) of pregnant women change their attitude, while most of them, 19% (n=33), still perform a bad attitude towards adherence to consuming Fe tablets. A significant relationship is found between the treatment given and the attitude of pregnant women in consuming iron tablets in the intervention group ( $P = 0.00$ ); that is in contrast with the control group, there is not any relationship found at the time of the post-test ( $p = 0.12$ ).

Further, we analyzed differences in knowledge, attitudes, and compliance in the pre-test and post-test groups. After applying the Chi-Square test to exhibit the differences between the control and intervention pre-test group of pregnant women, results show no significant results for all variables knowledge ( $p=0.87$ ), attitudes ( $p=0.44$ ), and compliance ( $p=0.13$ ) (Table 3).

In the post-test group of pregnant women, the Chi-Square test indicates a significant result for attitude and compliance between the control and intervention groups except for knowledge (Table 4).

Concerning the knowledge variable, it is a noticeable increase (13.88%) of knowledgeable pregnant women in the intervention group at the pre-test compared to the post-test from 42.43% (n=44) to 56.31% (n=58). In comparison, the number of those considered less knowledgeable in the intervention group at pre-test fell (10.32%) from 50.61% (n=41) to 40,29% (n=27) in the

intervention group at post-test (Table 3 and 4), and this difference is found as statistically significant ( $p=0.00$ ) (Table 2) and clinically significant. Further, the difference in attitude on post-test is found as significant ( $p=0.03$ ) (Table 4), comparing the difference in several pregnant women who had a positive attitude of 61.18% ( $n=52$ ) or less positive attitude of 38.82% ( $n=33$ ) in the control group with 77.65% ( $n=66$ ) and 22.35% ( $n=19$ ) in the intervention group. The good attitude increase between pre and post-test is 8.68% from good attitude in intervention group 47.25% ( $n=43$ ) at pre-test to 55.93% ( $n=66$ ) at post-test. The bad attitude in the intervention group decreases by 16.62%, from 53.16% in the pre-test to 36.54% in post-test (Table 3 and 4).

**Table 2.** Compliance, Knowledge, and Attitudes of Pregnant Women in Taking Iron (Fe) Tablets

		Compliance Post-test		p-value *
		Yes	No	
Compliance Pre-test	Intervention	Yes	31	.00
		No	18.20%	
Control	Yes	47	7	.12 <sup>a</sup>
	No	27.60%	4.11%	
		Knowledge Post-test		
		Good	Less	
Knowledge Pre-test	Intervention	Good	38	.01
		Less	22.30%	
Control	Good	20	21	1.00
	Less	11.70%	12.30%	
		Attitude Post-test		
		Good	Bad	
Attitude Pre-test	Intervention	Good	38	.00
		Bad	22.3%	
Control	Good	20	21	.12
	Bad	11.70%	12.30%	

\*Mc-Nemar Tests

**Table 3.** Pregnant Women’s Knowledge, Attitudes, and Compliance in the Pre-test

		Control	Intervention	p-value*
Knowledge	Good	45	44	0.87
	Less	40	41	
Attitude	Positive	48	43	0.44
	Less	37	42	
Compliance	Yes	22	31	0.13
	No	63	54	

\*Chi-square Tests

**Table 4** Pregnant Women’s Knowledge, Attitudes, and Compliance in the Post-test

		Control	Intervention	p-value*
Knowledge	Good	45	58	0.06
	Less	40	27	
Attitude	Positive	52	66	0.03
	Less	33	19	
Compliance	Yes	26	78	0.00
	No	59	7	

The compliance variable describes that in the control group of post-test 89.39% ( $n=59$ ) of pregnant women were not compliant and only 25.00% ( $n=26$ ) were. These results are unlike the intervention group, where 75.00% ( $n=78$ ) of pregnant women were compliant, and only 10.60% ( $n=7$ ) were not. The Chi-Square test result also shows a significant difference ( $p=0.00$ ) (Table 4). The increase of the compliance in the intervention group at pre and post-test is 16.51% from 58.49% ( $n=31$ ) to 75% ( $n=78$ ) (table 3 and 4) with statistically significant ( $p=0.00$ ) (Table 2). Several ANC visits ( $p=0.03$ ) and attitudes ( $p=0.03$ ) during the post-test affect the compliance of pregnant women during the post-test in consuming Fe tablets (Table 5). However, knowledge, age, number of pregnancies, occupation, and educational factors do not affect pregnant women's compliance during the post-test in consuming Fe tablets (Table 5).

Based on the study's results, it is found that the use of SMS reminders and counseling can improve pregnant women's knowledge, attitudes, and compliance with consuming iron tablets. Furthermore, it is based on the results of the post-test of the respondents of the intervention group

that achieved higher scores than the respondents of the control group and also on the pre-test score. SMS reminders and counseling interventions affect pregnant women's compliance in taking iron tablets with a significance value of 0.00 ( $p < 0.05$ ). It is probably due to a reminder system that reminds pregnant women to consume iron tablets. Many pregnant women claim that they often forget to consume iron tablets; by getting regular SMS reminders, it can be prevented (Wagnew et al., 2018).

**Table 5**  
Factors that Influence Pregnant Women's Compliance in the Post-Test

	Compliance		p-value* OR CI
	Yes	No	
Knowledge Good	66 64.1%	37 35.9%	NA
Knowledge Less	38 56.7%	29 43.3%	
Good Attitude	78 66.1%	40 33.9%	0.03 2.18 (1.10- 4.33)
Bad Attitude	26 50%	26 50%	
Age 18-29	48 59.3%	33 40.7%	NA
Age > 30	56 62.9%	33 37.1%	
Number of ANC visits >4	59 55.7%	47 44.3%	0.03 2.11 (1.06- 4.16)
Number of ANC visits ≤4	45 70.3%	19 29.7%	
Primigravida	34 56.7%	26 43.3%	NA
Multigravida	70 63.6%	40 36.4%	
Employment	38 61.3%	24 38.7%	NA
Unemployment	66 61.1%	42 38.9%	
High Education	70 64.2%	39 35.8%	NA
Low Education	34 55.7%	27 44.3%	

ANC: Ante Natal Care

\*Logistic Regression Test

## DISCUSSION

The SMS reminder not only serves as a reminder to consume iron tablets, but also contains information about the benefits of iron tablets, the risks of iron deficiency in pregnancy, and other important information. Thus, it can increase the

motivation of pregnant women to consume iron tablets (Saha, Mazumder, & Samanta, 2018). Khorshid et al., (2014) states that the SMS reminder is an effective method to increase the compliance of pregnant women to consume iron tablets during their pregnancy. In addition, a meta-analysis study conducted by Kassavou & Sutton (2018) found that the SMS intervention can improve treatment adherence.

The consultation also provides a lot of information about the importance of taking iron supplements, anemia during pregnancy, and the importance of ANC (Abdulrehman et al., 2019). Intermittent use of iron supplements by non-anemic pregnant women is recommended to prevent anemia and improve their health during pregnancy (Mwangi, Prentice, & Verhoef, 2017). This result is in line with the previous studies arguing that interventions through counseling and pamphlets for promoting healthy lifestyles, especially the prevention of anemia in pregnant women, is effective to raise the participants' knowledge about anemia. It is by the definition of counseling to spread information and instill trust in everyone (Palivela et al., 2021). The finding is also in line with Nugroho et al., (2020) that states that anemia counseling substantially increases hemoglobin and hematocrit levels, birth weight, anemia knowledge, iron-rich food intake, and total iron tablet intake compared to the control group.

This finding corresponds with the result of Heryadi, Sauriasari, & Andrajati (2017) who states that the consumption of iron tablets shows significant differences in the two studied groups. It shows that counseling can increase the awareness of pregnant women to take iron tablet supplements. The consumption patterns in the group undergoing the counseling session are different from that of the other group. The respondents have acquired ample knowledge and education to fix some improper habits. Through good knowledge, one of which is obtained through counseling sessions, pregnant women will have a high level of awareness regarding both maternal and child health, including in preparing for birth to being ready to face complications that can occur, one of which is a result of iron deficiency (Mbonu & Ogonna, 2018). There is an increase in knowledge and positive behavior toward consuming iron tablets and folic acid in the group of pregnant women receiving counseling. The SMS reminder effectively promotes socialization and healthy behavior (Kamau, Kimani, Mirie, & Mugoya, 2020).

After the counseling, pregnant women with good knowledge and attitude tend not to skip the consumption of iron tablets as they no longer worry about the scientifically-incorrect myths about iron tablets, such as it may cause higher blood pressure height and a big fetus. Many pregnant women initially skipped iron tablets due to their side effects, especially nausea. After counseling, they get information on overcoming the side effects of iron tablets, like taking the pill at night two hours before or after eating to reduce the nausea effect (Kamau et al., 2020). The study's finding provides valuable information for public education in practical ways that can help optimize health benefits.

Compliance of pregnant women to consume iron tablets routinely is related to their attitude and ANC visit (Kassa, Awwaris, Daba, & Tenaw, 2019). Pregnant women with good knowledge and attitude tend to be aware of the importance of iron tablets consumption for their babies and their health (Assefa et al., 2019). ANC visits can be a valuable opportunity to provide pregnant women with information regarding their health and the evolution of pregnancy, including the importance of iron tablet supplementation. Hence, the number of ANC visits also affects pregnant women's compliance with consuming iron tablets. It may be because the more ANC visits are carried out, the more information about iron tablets is acquired. Further, it may raise their compliance (Begum et al., 2018).

Public health workers' use of cellular technology indicates a significant increase in pregnant women's knowledge about maternal and child health (Balogun et al., 2020). The impact of using cellular technology as a means of strengthening the health system is a way to improve the implementation of interventions for health workers (Hackett et al., 2018). SMS can be two-way communication and is preferred as a means of intervention (Alhaidari et al., 2018; Jo et al., 2019). In addition, SMS is a simple and cost-effective intervention that can be automated and has the potential to reach anyone with any type of cellphone, anywhere in the world, as changes in health behavior are important for health outcomes, even simple effects, especially when it is achieved at low cost and beneficial for promoting healthy behavior (Jo et al., 2019). Texting can also improve the health monitoring of pregnant women. The study found that the respondents receiving the SMS intervention support the activities to improve the health promotion of pregnant women (Lamont

et al., 2016). Additionally, SMS is associated with a statistically significant increase in the average number of ANC visits (Alhaidari et al., 2018).

### Research Limitations

This study is limited because the researchers do not directly observe the consumption of iron tablets in women every day and are dependent on the reports of each respondent. In addition, the SMS reminder intervention that has been sent cannot be monitored whether the recipient has read it or not.

### CONCLUSION

SMS Reminder and counseling interventions reduce the number of pregnant women who do not comply with Fe tablets in Balowerti Public Health Center, Kediri, Indonesia. SMS reminder and counseling provides valuable information for public education in practical ways that can help optimize health benefits.

### CONFLICT OF INTEREST

There is no conflict of interest.

### AUTHOR CONTRIBUTIONS

GSP did the statistical analysis, concept, and design of this article. RA, SS, and SDP analyzed and interpreted the data. The article was drafted by GSP, RI, FYI, and LPD. Critical revision of the article for important intellectual content was done by GSP, TRB, SK, and VG. GSP and TRB did the final approval of the article. RI did the collection and assembly of data.

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