

Effectiveness of website application (Sumiferos) for preventing anemia with pregnant women compliance in consuming Fe tablets

Abstract

Background: The consumption of Fe tablets needs to be the attention of midwives as one of the spearheads in providing *antenatal care* services. Due to the low level of compliance of pregnant women to consume Fe tablets, it is necessary to provide appropriate counseling as an effort to increase compliance with Fe tablets.

Objective: This study aimed to determine the effectiveness of the application model (Sumiferos) for preventing anemia with pregnant women compliance in consuming Fe tablets at *Putri Ayu* Health Center in Jambi city.

Materials and methods: This study used a quasi-experimental research design with a post-test design by involving an intervention group and a control group (post-test), two group designs. With the total of 70 subjects; the intervention group, 35 respondents were given a website application (sumiferos), and a control group 35 respondents were given a leaflet. After a month, the number of Fe tablets that have been consumed was monitored. Compliance of pregnant women in consuming Fe tablets required a monitoring or supervision carried out by health workers. Therefore, an intervention was given by using a website-based application (sumiferos) for pregnant women as a communication tool that has been created and designed previously by researchers.

Results: Posttest statistical analysis showed that pregnant women who were given a website application (sumiferos) in the intervention group showed better compliance than pregnant women in the control group given leaflet.

Conclusion: Based on the results, a website application (sumiferos) is more effective than leaflets in improving maternal compliance to consume Fe tablets given by health workers.

Keywords: anemia, website application (sumiferos), pregnant women, Fe tablets

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Introduction

The consumption Fe tablets needs to be a midwife's attention as one of the spearheads in providing antenatal care services. Due to the low level of compliance of pregnant women to consume Fe tablets is still low, it is necessary to provide proper counseling as an effort to increase compliance with Fe tablets.¹ Based on the results of a study conducted by Rahmawati (2012) on compliance to the consumption of Fe tablets in pregnant women, she stated that 58.9% of respondents were not compliant to consume Fe tablets.² Besides, Riskesdas (2013) reported that pregnant women who consumed Fe tablets during pregnancy in Indonesia are equal to 89.1%. They consumed Fe tablets for less than 90 days by 34.4% and 21.4% who did not consume Fe tablets by 90 days.³

An effort to improve compliance of pregnant women is by providing information about side effects, how to consume Fe tablets through the use of information and communication technology without space and implemented remotely which contains several explanations, images, and questions as well as interactive animations.⁴ One of the models developed is a website-based application, with the selection of cellular phones. Due to flexible and easier to operate, cellular phones seem to be one of the basic needs for the community. Until now, cell phones have been used the most, which is around 60 million users (22.3%).

Currently, the model used by health workers to monitor the compliance of pregnant women consuming Fe tablets is to provide

counseling to pregnant women to ensure Fe tablets consumed every day. Besides, asking for the help of their husbands to monitor and remind pregnant women in consuming Fe tablet is also needed.⁵ For now, there has not been available a computer or cellular model that is applied in the form of a computer program used to monitor pregnant women in consuming Fe tablets.

According to Zuravac (2011), there is the effect of short message service (SMS) reminder in improving care quality in patients with malaria.⁶ Based on a randomized trial, it has shown that the use of SMS as a reminder is an efficient way to improve the compliance of pregnant women to consume Fe tablets.⁷

Methods and materials

This study used a quasi-experimental research design with a post-test design with a control group (posttest) two control groups design.

It was conducted by determining the intervention group and the comparison group (control) by estimating what would happen to the two groups. The intervention group application (Sumiferos) was given while in the control group leaflets were given on how to consume Fe tablets.

The intervention group was given an explanation on how to use the application (Sumiferos) before determining the sample with inclusion criteria for pregnant women who have cellphones and are able to

operate cellphones, have quotas, and can read and write. The number of samples in the intervention group was 35 pregnant women, and the control group was 35 pregnant women.

After the application (Sumiferos) was given to pregnant women, health workers made contact with pregnant women three times a week, carry out communication to remind and monitor whether pregnant women consumed Fe tablets regularly for one month.

Finally, the next was to measure the results of both groups by doing antenatal care to bring the remaining tablets of Fe drugs and then checking and counting the remaining drugs and recording in the research form, when comparing the results in the two groups.

Graphic design of application intervention

The process of designing a cellular website control application is used as an intervention in monitoring consumption of Fe tablets. This website application is made by using *php* programming materials for applications via web (brochure), the data limit used is *mysql* application created by using cloud server technology within public *ip* that has been forwarded with the domain name, the consumption application of Fe tablets (Sumiferos).

This application facilitates midwives, pregnant women, and families to monitor and report whether pregnant women consume Fe

tablets or not by entering data into the application of consumption of Fe tablets. Consequently, pregnant women can enter data easily into the application to remember them in consuming Fe tablets regularly.

Principles for preparing applications (Sumiferos)

- There are principles in preparing application that should be considered as follows.
- Applications should always be connected to the internet
- Data on pregnant women are input in the application
- Application easily used by every pregnant woman
- Pregnant women should respond regularly
- Application is also given to husbands and families of pregnant women
- Researchers can monitor whether pregnant women have consumed Fe tablets through mobile installed this application.

More specifically, cellular control application is used as an intervention to monitor compliance of pregnant women in consuming Fe tablets. This application and made with language easily understood by pregnant women by programming mobile applications. This application may run through a computer, and hand phone (Figure 1).

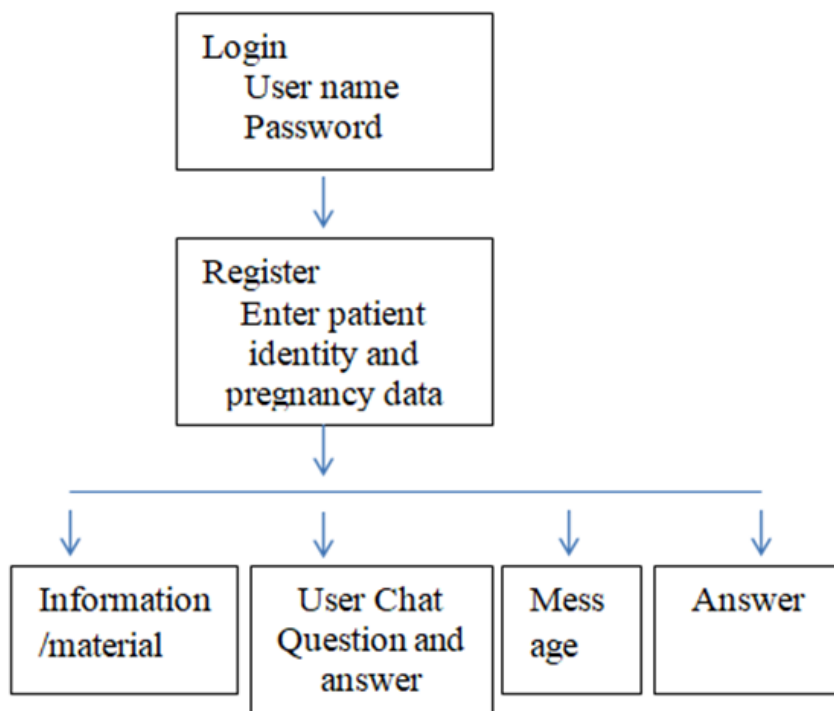


Figure 1 Login design of Application user (sumiferos).

Results

Based on the data, the respondents in this study amounted to 70 respondents, as 35 respondents an intervention group by giving applications (sumiferos) and the control group by giving leaflets as 35 respondents, after 30days of monitoring by using a research form to find out compliance of pregnant women.

Average respondent's compliance in consuming Fe tablets after being given an application (sumiferos)

The statistical analysis by using *Wilcoxon* test showed that average compliance of pregnant women after being given a sumiferos application was 1.51 with a standard deviation of 0.702 with a minimum and maximum value of 0-2 (Table 1).

Table 1 Average compliance of pregnant women after being given an application (sumiferos)

Variable	Treatment	Mean	Std. Deviation	Min–Max
Compliance after being given a sumiferos application	Post-test	1.51	0.702	0–2

Average compliance of pregnant women in consuming Fe tablets after being given leaflets

The statistical analysis by using *Wilcoxon* test showed that the average compliance of pregnant women after being given a leaflet is .51 with a standard deviation of 0.658 with a minimum and maximum value of 0-2 (Table 2).

Table 2 Average compliance of pregnant women in consuming Fe tablets after being given leaflets

Variable	Treatment	Mean	Std. Deviation	Min–Max
Compliance after being given a leaflet	Post-test	0.51	0.658	0–2

Table 3 Effectiveness of application (sumiferos) and anaemia prevention leaflets with compliance of pregnant women in consuming Fe tablets

Variable	Treatment	Z	P value
After being given a sumiferos application and giving leaflets	Post-test	-4.259a	0,000

Effectiveness of application (Sumiferos) and anemia prevention leaflets with compliance of pregnant women in consuming Fe tablets

Statistical results showed that application (Sumiferos) was more effective than giving leaflets in increasing the compliance of pregnant women in consuming Fe tablets with a p value (0,000) (Table 3).

Discussions

The results of study on the group of pregnant women were given an application (Sumiferos) showed that some respondents complied to consume Fe tablets (62.9%), some were quite obedient (25.7%), and a small portion did not comply with Fe tablets (11, 4%). Meanwhile, the difference in the average compliance of pregnant women after being given the application of Sumiferos was (1.51), and compliance after being given a leaflet was (0.51). The existence of this difference indicated that in giving leaflets there were still many pregnant women not compliant to consume Fe tablets although tablets added blood and well distributed by health workers. Compliance to consume Fe tablets in pregnant women meant when pregnant women consume Fe tablets every day regularly and the amount consumed was at least 90 tablets during pregnancy.⁸

Some pregnant women who are not compliant to consume Fe tablets in this study reported that they sometimes forget to take Fe tablets, while others reported that they did not know the benefits of Fe tablets, and some pregnant women also carried out pregnancy checks at doctors and only consumed drugs given by doctors. Though Fe tablets are very useful for preventing anemia and the occurrence of LBW in infants. In addition, the government also made a program of giving blood-added tablets to pregnant women. The purpose of this program was because many people were still classified as less able to meet iron from various food sources.

Based on the results of this study, the reasons for respondents not to consume Fe tablets because of the nausea after consuming Fe tablets. Ministry of Health in Indonesia (2015) states that one of the reasons for non-compliance of pregnant women in consuming blood-added tablets is due to side effects from the drug such as nausea, vomiting, diarrhea or difficult bowel movements. In addition, other reasons are low knowledge of respondents about the benefits of blood-added tablets. On the other hand, if pregnant women know and understand the benefits of consuming Fe tablets, they will have good health behaviors and it is very useful to avoid anemia.⁵

Compliance in consuming Fe tablets is the observance of pregnant women in carrying out the advice of health workers to consume Fe tablets, while the compliance in consuming Fe tablets can be measured by the accuracy of the number of Fe tablets consumed, accuracy of how to consume, and frequency of consumption per day.⁹

However, based on the data, after being given an intervention with the application (Sumiferos), compliance of pregnant women was increasing. This showed that the cellular control application used by respondents as an intervention to monitor compliance of pregnant women in consuming Fe tablets turned out to be very useful. The results of this study were in line with a study conducted by Liang,¹⁰ it turned out that there was a significant effect of the provision of mobile interventions in the care of patients with type 2 diabetes mellitus.¹¹

According to the data, women pregnant with given leaflets and obedient to consume Fe tablets were 8.6%, while those who were quite obedient were 34.3%, and those who were not compliant 57.1%. Whereas, the difference in the average compliance of pregnant women after being given a Sumiferos application was 1.51% and compliance after being given a leaflet was (0.51). The existence of this difference meant that in giving leaflets there were still many pregnant women not compliant to consume Fe tablets.

Moreover, the results of the study in control group with 35 pregnant women given leaflets, apparently most were not compliant to consume Fe tablets on the grounds, because they felt that they do not need to take Fe tablets, did not know the benefits of Fe tablets, and felt dizziness. In this case, when pregnant women know and understand the benefits, ways and time to consume Fe tablets, they will have good health behaviors to avoid anemia.¹¹ This was consistent with a study conducted by Liang.¹⁰ He emphasized that there was a significant improvement in the treatment of diabetes mellitus type 2 by giving interventions via cellphones to patients.^{11,12}

The results of this study indicated that the application (Sumiferos) was more effective the giving leaflets because the application (Sumiferos) is very useful to remind and control for consuming Fe

tablets. This was similar to the application of SMS reminder for the treatment of diabetes mellitus. It was very important in receiving patients to messages. It also used formal and polite language and showed the sender's appreciation for the recipient of the message.¹³

The application (Sumiferos) is one of the technology-based strategies which is forgotten to be able to describe the close relationship with pregnant women by communicating about the health problems. With the application (Sumiferos), it can increase the compliance of pregnant women in consuming Fe tablets. This is in line with one of the technologies designed to improve patient behavior in medicine, providing controlled treatment services to patients at home by using mobile technology.¹⁴ Likewise, one of the SMS-based reminder system technologies has been tested to find out the effect of SMS reminder on patient compliance to oral anti diabetic drugs by using real time medication monitoring (RTMM). The results of this study proved that SMS reminder was effective in increasing the compliance treatment of type 2 diabetes mellitus patients and sending SMS was well received by patients.¹⁴

The result of this study was also consistent with Heatley et al.¹⁴ who reported that SMS reminder in pregnant women can increase compliance and can be a very effective reminder system for pregnant women to consume Fe tablets.¹⁴

Conclusion

The results of this study concluded that there were some pregnant women who were not compliant to consume Fe tablets on the grounds that they not only forgot to consume regularly, but also do not know the importance of consuming Fe tablets. They noted that there was nausea when consuming Fe tablets. This was caused by the lack of information obtained by pregnant women and the lack of means of communication between pregnant women and adequate health workers in sharing information for pregnant women anytime and anywhere, and even at any time if pregnant women experienced problem and requiring urgent information.

The use of application (Sumiferos) is more effective than leaflets in increasing the compliance of pregnant women to consume Fe tablets. In addition, the application (Sumiferos) can also be used as a means of communication between health workers and pregnant women.

The application (Sumiferos) also contains some important material about Fe tablets to be read and understood carefully. It can increase the compliance of pregnant women in consuming Fe tablets due to direct contact or communication between officers and pregnant women continuously so that the condition of pregnant women can be monitored. Thus, it can improve the compliance of pregnant women in consuming Fe tablets regularly.

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Conflicts of interest

The authors declare there are no conflicts of interest.

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