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CHARACTERISTICS OF ANEMIC PREGNANT WOMEN RECEIVING SMS INTERVENTION ON IRON SUPPLEMENT CONSUMPTION

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ABSTRACT

The case of maternal deaths due to anemia is increasing. The high level of anemia is caused by a lack of compliance in taking iron supplements. SMS (Short Message Service) features on mobile phones can be used as reminders for patients to take iron supplements. This research aims to describe the characteristics of anemic pregnant women who receive SMS interventions regarding iron supplement consumption. This study uses a descriptive research design conducted in 7 community health centers in the city of Makassar. The sampling technique uses purposive sampling and a total of 68 pregnant women were included (33 received SMS intervention and 35 did not receive SMS intervention). The research involving 33 anemic pregnant women shows that 48.5% are between 17 and 25 years old, and 51.5% have completed high school. Most are unemployed (81.8%), with sufficient husband support (45.5%). Most of them are in the second trimester (57.6%), with the highest parity being multiparous (45.5%) with only one ANC visit (42.4%), and have moderate anemia (51.5%). This study concludes that the respondents are classified as having moderate anemia, multipara, and having only one ANC visit. Regarding socioeconomic status, most of them have completed high school, unemployed, and receive sufficient support from their husbands.

Keywords: Anemia, Iron Supplement, SMS Intervention

INTRODUCTION

Maternal mortality remained high in 2020. Around 287,000 women died during, after pregnancy, or shortly after delivery. Maternal mortality in low- and middle-income nations accounted for about 95% of all fatalities (WHO, 2023). According to the Long Form SP2020 by the Central Bureau of Statistics (2020), there are 189 maternal mortality rates in Indonesia, or deaths of women during pregnancy, delivery, or the postpartum period, for every 100,000 live births.

In terms of the mother's and the growing fetus's health, anemia during pregnancy is essential and critical. This condition can lead to serious complications or even maternal mortality if not properly addressed. Anemia can disrupt the supply of oxygen to the fetus,

putting the unborn baby at risk of growth restriction or premature birth. Additionally, anemic mothers are more vulnerable to infections and bleeding during childbirth, increasing the risk of dangerous complications. Therefore, pregnant women need to ensure adequate nutrition intake, especially of iron and folate, through healthy dietary choices and prenatal supplements. Pregnancy-related anemia is caused by the normal physiological changes that occur during pregnancy, which impact important factors like hematocrit, hemoglobin, reticulocytes, plasma ferritin, and unsaturated iron-binding ability. Iron deficiency anemia and megaloblastic anemia brought on by a folate shortage are the most prevalent kinds of anemia (Georgieff, 2020).

Based on WHO data, the global incidence of anemia in women aged 15-49 was 29.9% in 2019. Anemia was found to be prevalent in 36.5% of pregnant women (WHO, 2019). According to 2018 Basic Health Research (Riskesdas) data, the prevalence of anemia in pregnant women in Indonesia is about 48.9%. The age group 15-24 years old has the largest prevalence of pregnant women with anemia (84.6%) (Indonesian Ministry of Health, 2020) In Makassar City, there were 2,469 cases of pregnant women suffering from anemia in 2016, then decreased in 2017 (2,390 cases) and 2018 (2,189 cases), but then the number increased again to 2,223 cases in 2019 (Makassar City Health Office, 2020).

Various efforts have been made by the government to reduce the number of deaths of mothers during pregnancy due to anemia. To address this problem, the government has attempted to reduce anemia by providing iron supplements. However, anemia remains prevalent among pregnant women due to forgetfulness in taking the supplements. In recent times, advancements in technology and its utilization have been on the rise in various fields, including healthcare. One of the technologies that can be harnessed today is communication technology, such as mobile phones. The increasing use of mobile phones creates opportunities to connect with patients outside of clinical visits. One of the features of a mobile phone is SMS (Short Message Service), which is also utilized in this research. The SMS, supported by cellular communication networks and available on practically all cell phones, can contact anybody over a long distance. In addition, the use of SMS in general only costs a little so it can be used easily to provide healthy behavior interventions to patients (Jo et al., 2019; Lester et al., 2019)

The use of SMS reminders is cost-benefit. The text message can be used as a reminder, education, and communication tool with patients about the disease and treatment plans. The use of SMS reminders indicates improved understanding and behavior regarding iron

supplements. (Chioma Ebuenyi et al., 2021; Prihanti et al., 2022) Based on this, the researchers were interested in studying the characteristics of anemic pregnant women receiving SMS intervention.

METHOD

This study used a descriptive research design, conducted from 25 December 2020 to 25 January 2021, at the 7 health centers with the highest number of cases of anemia in the city of Makassar (The Pampang, Dahlia, Cendrawasih, Makkasau, Tarakan, Rappokalling, and Kassi-Kassi Health Centers). The population of this study is anemic pregnant women with gestational age <32 weeks, willing to participate in the study, able to communicate effectively, and have a mobile phone. The sampling technique was purposive sampling. A total of 68 women met the inclusion criteria. The sample was then divided into those who will receive SMS intervention and those who will not receive SMS intervention.

The questionnaire used in this study was administered online through Google Forms. The husband's support was assessed using a questionnaire adapted from Thena (2017). The husband's support questionnaire consists of 14 items with scores of Never (0), Sometimes (1), Often (2), and Always (3). The total score is divided into 3 levels of categories, namely Good (76-100%), Adequate (56-75%), Insufficient (0-55%). The anemia status in pregnant women is obtained from the medical records.

SPSS version 25 was used for the analysis. A univariate test was conducted to see the demographic characteristics of the research population using frequencies and descriptive results. This research received Ethical Eligibility on January 7 2021 from the Health Research Ethics Commission of Alauddin Islamic State University with letter No.E.039a/KEPK/FKIK/I/2021.

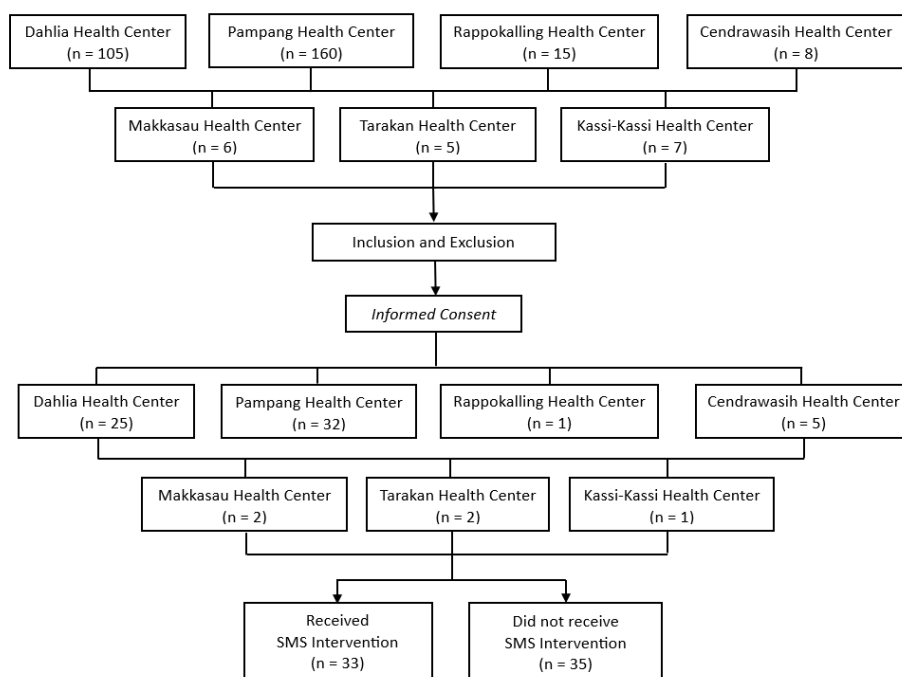


Figure 1. Summarizes the study flow diagram

RESULTS

Sample Characteristics

Based on the basic characteristics of pregnant women who received SMS intervention in Table 1, it was found that a total of 16 (48.5%) were in the age range of 17-25 years, with the majority being in the second trimester age group of 19 (57.6%). The highest number of parities were multiparas 15 (45.5%), while 14 (42.4%) respondents had only one ANC visit. The majority of respondents, namely 17 (51.5%) experienced moderate anemia (7,0-9,9 gr/dL).

Table 1. Basic Characteristics of Mother

Characteristics	Did not receive SMS		Received SMS	
	n	%	n	%
Mother's Age (Years)				
17 – 25	12	34,3	16	48,5
26 – 35	18	51,4	13	39,4
36 – 45	5	14,3	4	12,1
Length Of Pregnancy				
Trimester I	5	14,3	11	33,3
Trimester II	28	80	19	57,6
Trimester III	2	5,7	3	9,1
Parity				
0 (Nulliparous)	10	28,6	11	33,1
1 (Primiparous)	11	31,4	6	18,2
2–5 (Multiparous)	14	40	15	45,5

>5 (Grandemultipara)	0	0	1	3
ANC Frequency				
1	13	37,1	14	42,4
2	7	20	9	27,3
3	9	25,7	4	12,1
≥4	6	17,1	6	18,2
Hb Levels				
Mild Anemia (10,0–10,9 gr/dL)	19	54,3	16	48,5
Moderate Anemia (7,0–9,9 gr/dL)	16	45,7	17	51,5
Severe Anemia (<7 gr/dL)	0	0	0	0

Based on the socioeconomic characteristics of pregnant women who received SMS intervention in Table 2, it was found that 17 (51.5%) respondents had graduated from high school, while 21 (63.6%) respondents' husbands were included. Most of the respondents did not have a job, 27 (81.8%), while almost all of the respondent's husbands had jobs, 32 (97%). Although most of the respondents do not have a job. The majority of respondents considered the support from their husbands to be sufficient, namely 15 (45.5%).

Table 2. Socioeconomic Characteristics of Mother and Family

Characteristics	Did not receive SMS		Received SMS	
	n	%	n	%
Mother's Education				
No Education	0	0	1	3
Elementary Graduate	5	14,3	9	27,3
Junior High School Graduate	4	11,4	2	6,1
High School Graduate	19	54,3	17	51,5
Bachelor's Degree	7	20	4	12,1
Husband's Education				
No Education	0	0	1	3
Elementary Graduate	7	20	6	18,2
Junior High School Graduate	4	11,4	3	9,1
High School Graduate	19	54,3	21	63,6
Bachelor's Degree	5	14,3	2	6,1
Mother's Occupation				
Working	6	17,1	6	18,2
Not Working	29	82,9	27	81,8
Husband's Occupation				
Working	34	97,1	32	97
Not Working	1	2,9	1	3,0
Monthly Income				
< 1.000.000 IDR	9	25,7	11	33,3
1.000.000 – 3.000.000 IDR	19	54,3	16	48,5
>3.000.000 IDR	7	20	6	18,2
Husband's Support				
Good	10	28,6	6	18,2
Fair	14	40	15	45,5
Less	11	31,4	12	36,4

DISCUSSION

Basic Characteristics of Mother

Age can affect the increase in iron supplement consumption. Syafitasari et al. (2020) suggest that early adulthood shows positive behavior in preparing for pregnancy and birth, thus they made more efforts to maintain their health. Even without the SMS intervention, early adult respondents will take the iron supplement as it was advised. In a cross-sectional study of 148,528 pregnant women between the ages of 15 and 49, Ba D et al. (2019) found that women over 25 had better adherence to iron supplements because they were already aware of the advantages of taking them to prevent anemia or experience iron deficiency-related negative outcomes. The ability to receive and understand information also differs between ages.

Anemia is common among pregnant women in the age range of early to late adulthood. Age can reflect a person's willingness to take action. Pregnant women in early adulthood may demonstrate positive behaviors in maintaining their health during pregnancy. Furthermore, their thoughts can help them prioritize good information, leading them to consider their health and the health of their children by consuming iron supplement tablets.

The majority of respondents in this study are multiparous. According to a study conducted by Nimwesiga et al. (2021) involving 230 multigravida pregnant women, it was found that multigravida pregnant women demonstrated higher adherence to consuming iron supplement tablets compared to low-parity primigravida. Low parity numbers were associated with lower adherence rates, possibly due to a lack of knowledge and understanding of health during pregnancy, leading to decreased adherence to consuming iron supplements.

In this study, it was found that there were still some who had low experience with pregnancy. Women who have had several pregnancies may be more likely to comply with iron supplement recommendations if they are aware of their benefits. Personal experience can influence directly or indirectly on subsequent behavior.

ANC visits play a crucial role in enhancing the compliance of pregnant women in various aspects, including the consumption of iron supplements. A study conducted by Mamo et al. (2021) found that out of the surveyed individuals, 320 had less than four visits to ANC services, while 76 had more. The study revealed that pregnant women who visited ANC services four or more times were 2.5 times more likely to adhere to iron supplementation compared to those who visited less than four times. The rationale for this is that the pregnant woman will receive advice from the healthcare professionals during her ANC appointments,

and repeated ANC visits will raise awareness of the need for iron supplements.

According to a recent study by Nasir et al. (2020), involving 250 pregnant women, those who started antenatal care (ANC) in the first trimester were more likely to comply with taking iron supplements than those who began in the second or third trimester. ANC visits offer essential services for expectant mothers, including early detection, which is crucial for maternal and fetal health. This may be due to increased interaction with healthcare providers and a better understanding of the benefits and risks associated with taking iron supplements to prevent anemia during pregnancy.

Socioeconomic Characteristics of Mother and Family

Mother's education can indeed influence the amount of iron supplement consumption. Parents with higher education may have more knowledge about childbearing, making them more aware of the benefits of iron supplementation (Devi et al., 2021). According to research conducted by Assefa et al. (2019), it was found that most pregnant women had attained diploma education and above, and some had completed secondary education. The level of knowledge held by pregnant women is relevant to this. Pregnant women who have knowledge about anemia are more likely to comply with taking iron supplements compared to those who do not. This suggests that pregnant women who are more educated comprehend the advantages and purposes of taking iron supplements. The level of education associated with the number of iron supplements consumed in this study could explain why pregnant women are more inclined to prioritize their health and adhere to consuming iron supplements.

Almost all pregnant women with anemia who received SMS interventions in this study were unemployed. Research conducted by Moshi et al. (2021), with 1,498 respondents who were not employed found that pregnant women who did not work tended to be more compliant in taking iron supplements compared to those who worked or had independent jobs. Based on the findings, it appears that pregnant women who are not employed have more opportunities to attend their prenatal appointments on schedule and, as a result, are more likely to take iron supplements regularly compared to those who work. Being employed or self-employed can restrict the amount of time one has to attend these appointments, which can affect how much iron pregnant women consume. According to Illahi's (2017) research, there is a correlation between family income and stunting, specifically malnutrition. Families with higher income levels are more likely to fulfill the nutritional needs of their members. Conversely, lower family income leads to a lower likelihood of meeting nutritional

requirements.

Several factors are likely to influence the increase in iron supplement consumption in pregnant women, including family support, especially husband support. Referring to the characteristics of anemic pregnant women who received SMS interventions, it was found that the husband's support was considered sufficient. Research conducted by Mangopang et al. (2022) investigated the impact of family support on adherence to iron supplement consumption among 32 pregnant women and found that lack of family roles as supervisor and controller will have an impact on iron supplement consumption in pregnant women. According to research conducted by Desta et al. (2019) on 16,818 pregnant women, it was found that family support is mandatory to overcome barriers to compliance with taking iron supplements. The absence of support from the family, especially from the husband, can increase stress and anxiety and this can result in pregnant women forgetting iron supplements, thereby reducing compliance in taking iron supplement.

CONCLUSION

We found characteristic descriptions in age, education, occupation, parity, husband's support, and frequency of ANC among anemic pregnant women who received SMS intervention. The majority of them were aged 26-45 and had only completed high school. Almost all of them were unemployed and only attended ANC once, with the majority of them being multiparous. The support provided by their husbands was considered sufficient. We suggested further research to utilize other recent media applications, which would enable the researchers to monitor whether the patients have read the messages or not. Additionally, it is recommended that the researchers consider sending SMS messages more than once per week over one month to enhance mothers' adherence to taking iron supplements. In addition, the sample size used in this study is still lacking. Therefore, further research is expected to have a larger sample size.

ABBREVIATIONS

SMS: Short Message Service, ANC: Antenatal Care, Hb: Hemoglobin

COMPETING INTEREST

There is no conflict of interest in this study

AUTHORS' CONTRIBUTION

AF: developed research concept and design, assisted in data analysis, provided suggestions, input, and improved manuscript, AB: drafted the research, collected and analyzed data, and prepared manuscript. TT: provided input and suggestions.

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