

RESEARCH STUDY

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A Comparison of Adherence Levels of Pregnant Women to Consuming Multiple Micronutrient Supplements and Iron Folic Acid at Mulyorejo Public Health Center, Surabaya

Perbandingan Tingkat Kepatuhan Mengonsumsi Multi Mikronutrien Suplemen dan Tablet Tambah Darah pada Ibu Hamil di Puskesmas Mulyorejo, Surabaya

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Received: 01-02-2023

Accepted: 27-11-2023

Published online: 08-03-2024

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DOI:

10.20473/amnt.v8i1.2024.17-25

Available online at:<https://e-journal.unair.ac.id/AMNT>**Keywords:**

Pregnant Women, MMS, IFA, Adherence

ABSTRACT

Background: The level of adherence is an indicator of the successful implementation of a program to provide both multiple micronutrient supplements (MMS) and iron folic acid (IFA). Moreover, factors that may have an impact on the level of adherence are knowledge level, consumption acceptability, characteristic acceptability, and family support.

Objectives: To analyze the relationship and differences in the level of adherence of pregnant women to consuming MMS and IFA in the work area of Mulyorejo Public Health Center, Surabaya.

Methods: This study is an observational study (prospective cohort design). A total of 244 samples from each of the two sample groups, which are the MMS group and the IFA group, were observed for 30 days. This study was expected to discover the adherence level of pregnant women to consuming MMS or IFA. In addition, the Mann-Whitney test was used in the comparative analysis, and the chi-square test was used in the relationship analysis.

Results: According to the findings, it was discovered that pregnant women who consumed MMS had a higher average adherence rate (79.9%) compared to those who consumed IFA (71.2%). However, the results showed that there was no significant difference between the two (p -value = 0.400), and identical results applied for knowledge level, consumption acceptability, and characteristic acceptability. Moreover, in comparison to the IFA group (32.2), the MMS group had a higher average family support (34.9). Additionally, there was a relationship between the adherence level and both knowledge level and consumption acceptability (p -value < 0.05), but there was no relationship between the adherence level and family support (p -value > 0.05).

Conclusions: There was no significant difference among the variables. In addition, there was a relationship between the adherence level and both knowledge level and consumption acceptability, but not between the adherence level and family support.

INTRODUCTION

Based on Riskesdas 2018, about 5 out of 10 pregnant women in Indonesia suffered anemia, which accounts for 48.9% of the country's total¹. The provision of iron folic acid (IFA) to meet a mother's need for iron during pregnancy is one of the initiatives taken by the government to prevent anemia in pregnant women. IFA should be consumed by pregnant women as early as possible, until the puerperium. The recommended consumption is at least 90 tablets in total, taken once a day. Moreover, it has been reported that 89.4% of pregnant women in East Java received IFA. This percentage was comprised of 44.5% of pregnant women

who received IFA \geq 90 tablets and only 15.8% of pregnant women who consumed IFA \geq 90 tablets. Additionally, the primary reason keeping mothers from consuming IFA is boredom, at 23.5%¹.

The Indonesian Nutrition Institute (INI) attended a meeting in January 2020 with the government, UNICEF, local universities, and other key stakeholders to discuss switching the provision of IFA to multiple micronutrient supplements (MMS)². In the meeting, more than 20 studies on the positive impacts of MMS on pregnant women and fetuses were discovered². Moreover, the low adherence of mothers to consuming MMS is one of the issues discussed that was also an obstacle to the

implementation of the provision for MMS. This is supported by research from Purwaningsih (2015) conducted at the Juwiring Public Health Center, which found that only 30% of pregnant women regularly consumed MMS and 70% of them did not adhere to consuming MMS³. Contrarily, research conducted by Zagre (2007) showed that the level of adherence of pregnant women to consuming MMS was higher, at 44.4%, than pregnant women to consuming IFA, at 43.8%⁴. These studies have demonstrated that there were differences in the results of research on the level of adherence to the type of supplement consumed (MMS or IFA). These studies were used as references in this study.

Mothers' lack of knowledge and low acceptance rates can both contribute to the low level of adherence². In order to increase mothers' knowledge, initiatives that can be implemented include providing education, counseling, and communication via cell phones⁵. According to a book compiled by the Micronutrient Forum (2020), anemia education and MMS consumption recommendations could help reduce infant mortality by 30% due to an improvement in knowledge that was directly proportional to the increase in maternal MMS consumption adherence². In addition, research conducted by Yunika (2021) revealed that respondents with good knowledge indicate higher adherence 5,143 times than respondents with less knowledge⁶.

Maternal acceptance, which has long been of concern, is also a significant factor determining supplement consumption adherence. A person's adherence may increase if a product is more acceptable⁷. Moreover, there are presently few studies that provide a comprehensive picture of maternal acceptance of MMS, despite the fact that the findings may be used as a solution to increase maternal interest and acceptance².

Furthermore, family support is also the most important emotional factor that can increase maternal adherence. According to a study conducted by Astuti (2017), there was a significant relationship between IFA consumption among pregnant women and their husbands' support for adherence (p -value = 0.000)⁸. A similar study conducted by Wahyuni (2018) also showed that there was a significant relationship between family support and adherence to Fe tablet consumption in pregnant women ($p < 0.05$), with a percentage of pregnant women who received high family support accompanied by high adherence of 39.3%⁹. However, no similar research has been discovered that addressed family support for pregnant women to consume MMS; therefore, there is no explanation pertaining to this issue.

Based on the aforementioned explanation, the researchers were interested in comparing the level of adherence of pregnant women to consuming IFA and MMS for 30 days and analyzing the relationship between the level of adherence of pregnant women and consumption acceptability, level of knowledge, and family support.

The research was conducted at the Mulyorejo Public Health Center, Surabaya, because of its wide work area and almost covering the entire Mulyorejo Sub-district, and there has been no research done on the consumption of MMS in its work area. In addition, there was no data related to the level of adherence to MMS

consumption, and there was still a lack of initiative carried out to educate pregnant women regarding MMS consumption in the work area of the Mulyorejo Public Health Center, Surabaya.

METHODS

This study is an observational study using a prospective cohort design. The respondents were divided into two groups: the exposed group, which included pregnant women who consumed MMS, and the unexposed group, which included pregnant women who consumed IFA but not MMS. There were 24 respondents in each group, for a total of 48 respondents. Furthermore, the level of consumption adherence was then assessed after a month of observing respondents from both groups. A person's adherence can be assessed if they receive therapy for a long period of time, or at least 30 days¹⁰. This study was conducted from September to November 2022. This study was expected to provide findings pertaining to the level of adherence of pregnant women to consuming MMS or IFA. Moreover, the level of adherence can be influenced by the level of knowledge, family support, side effects, and acceptability, including the acceptability of supplement characteristics and the acceptability of supplement consumption, which were investigated in this study. In addition, the Mann-Whitney test was used in the comparative analysis, and the chi-square test was used in the relationship analysis.

Data on the characteristics of respondents from both groups were first gathered for this study. The characteristics of respondents were the age of pregnant women, gestational age, family income, parity, and educational level. Furthermore, pre-tests were carried out, and leaflets were distributed to educate people about MMS and IFA consumption. Both groups received the same information, which included the side effects of consumption, the recommended amount of consumption, the content of micronutrients, and the recommendation of MMS and IFA storage. Then, a post-test was carried out. Pre- and post-tests were carried out to assess changes in the level of mothers' knowledge after receiving education, and the average of respondents' pre- and post-test scores was used as a variable to determine the relationship between levels of adherence. After that, respondents in both groups were given MMS or IFA consumption forms for 30 days. At the end of the study, respondents filled out a form about family support, acceptability (consumption and characteristics), and side effects, as well as the submission of an adherence form. In addition, this study has passed an ethical review by the ethics commission of the Faculty of Dentistry, Universitas Airlangga Surabaya, with an ethical clearance number of 685/HRECC.FODM/IX/2022.

RESULTS AND DISCUSSION

Characteristics of Respondents

The characteristics of pregnant women consist of age, parity, education level, and income level¹¹. As shown in Table 1, the results of the Mann-Whitney test demonstrated that there were no significant differences in the characteristics of pregnant women in the MMS group and the IFA group, or that the distribution of

characteristics of the two groups was identical. In terms of the age characteristics of pregnant women, the safe age range (20–35 years) has the highest distribution of the two groups, or 70.8%. The recommended maternal age for pregnancy is >20 years and <35 years¹². The reproductive organs' immaturity and lack of preparation to accept pregnancy at the age of <20 years contribute to the risk of pregnancy. It is due to the condition of the uterus and pelvis, which are still small. In addition, the psychological or mental readiness of mothers to endure pregnancy, childbirth, and postpartum is frequently lacking. These factors may increase mothers' risks of premature occurrence, antepartum hemorrhage, and postpartum hemorrhage¹³. Contrary to pregnancy at the age of >35 years, the risk of complications such as premature membrane rupture, hypertension, old partus, stuck partus, and postpartum bleeding has a greater tendency at this older age because the organs in the birth canal are less elastic and the probability of comorbidities is higher¹⁴.

The second trimester lasts from the 14th to the 26th week¹⁵. The sixth month of gestational age (22–26 weeks), with a percentage distribution of 37.5% in the MMS group and 62.5% in the IFA group, was the gestational age at which both groups had the highest distribution. The third characteristic is parity, or the number of live births. Based on the findings, the highest frequency distribution of the MMS group was in the nullipara category, or having never had children before, at 41.7%, while in the IFA group, it was in the primipara

category, or having had as many previous live births as one child, at 37.5%. Both groups were in the safe category. Parity is considered high-risk if there are four or more live births because it increases the risk of anemia, malnutrition, and abdominal wall sagging, which weakens the uterine muscles, resulting in weak contractions during labor and postpartum bleeding¹¹.

The highest frequency distribution of education level was in the category of high school or vocational graduation, with 50% in the MMS group and 54.2% in the IFA group. The level of education is often associated with a person's level of knowledge since it affects a person's ability to comprehend information¹⁶. Moreover, according to Damayanti (2021), the better educated a person, the more knowledgeable they are, with a correlation value of 0.41317¹⁷. In addition, due to the fact that education is associated with the ability to comprehend nutritional information, it has an impact on maternal adherence to the consumption of iron folic acid (IFA)¹⁸.

Residents in Surabaya were considered to be able to earn more than the regional minimum wage (RMW), which was >Rp. 4,300,000. In both groups, the frequency of the highest income was in the underprivileged category (<Rp. 4,300,000), with 62.5% in the MMS group and 66.7% in the IFA group. Additionally, it was discovered that a person's ability to access health services and facilities depends on their economic situation¹⁹.

Table 1. Characteristics of Respondents

Characteristics of Pregnant Women	MMS Group		IFA Group		p-value (Mann-Whitney)
	n=24	%	n=24	%	
Age					
Safe (20–35 years)	17	70.8	17	70.8	
At risk (<20 years)	1	4.2	3	12.5	
2 times at risk (>35 years)	6	25	4	16.7	
<i>Mean Rank</i>	24.79		24.21		0.856
Gestational Age					
4 months (14-17 weeks)	7	29.2	5	20.8	
5 months (18-21 weeks)	8	33.3	4	16.7	
6 months (22-26 weeks)	9	37.5	15	62.5	
<i>Mean Rank</i>	21.75		27.25		0.139
Parity					
Nulliparous	10	41.7	7	29.2	
Primipara	8	33.3	9	37.5	
Multiparous	6	25	8	33.3	
<i>Mean Rank</i>	22.79		26.21		0.369
Level of Education					
Graduated from College	7	29.2	2	8.3	
Graduated from high school/vocational school	12	50	13	54.2	
Graduated from elementary/middle school	5	20.8	8	33.3	
Not completed primary school	0	0.0	1	4.2	
<i>Mean Rank</i>	21		28		
Income Level					
Wealthy (>Rp. 4,300,000)	9	37.5	8	33.3	
Underprivileged (<Rp. 4,300,000)	15	62.5	16	66.7	

The Comparison of the Level of Adherence to Consuming IFA and MMS

The number of supplements consumed during the 30 days of the study served as a measure of respondents' level of adherence. According to the adherence rate categories, respondents were considered adherent (100%) if they consumed 30 supplements during the 30 days of the study, moderately adherent (80%–97%) if they consumed 24–29 supplements during the 30 days of the study, and non-adherent (<80%) if they consumed less than 24 supplements during the 30 days of the study. As shown in Table 2, the MMS group had the highest distribution of adherence rate in the medium adherence category, or 45.8%, while the IFA group had the highest distribution of adherence rate in the non-adherence category (<80%), or 50%. Moreover, the MMS group had a higher average adherence rate of 79.9%, or

an average of 23 supplements consumed during the 30 days of the study, while in the IFA group, the average adherence rate was only 71.2%, or an average of 21 supplements consumed during the 30 days of the study. However, the Mann-Whitney test conducted discovered that there was no significant difference between the two groups.

The results of the study are in line with research conducted by Zagre (2007), which showed that the level of adherence of pregnant women to consuming MMS was higher at 44.4% than the level of adherence of pregnant women to consuming IFA, which was 43.8%⁴. In addition, a study of MMS consumption conducted by the Summit Institute of Development (SID) (2020) among more than 30,000 pregnant women in Indonesia showed a high adherence rate of 85%²⁰.

Table 2. The Level of Adherence of Pregnant Women to Consuming IFA and MMS

Variables	MMS Group		IFA Group		p-value (Mann-Whitney)
	n=24	%	n=24	%	
Adherence Level					
Obedient (100%)	5	20.8	5	20.8	
Moderate Adherence (80%-97%)	11	45.8	7	29.2	
Disobedient (<80%)	8	33.3	12	50	
Mean		79.9%		71.2%	
Mean Rank		26.08		22.92	0.400

Factors Associated with the Consumption Adherence of IFA and MMS

The average results of respondents' pre- and post-test scores were used to determine the respondents' level of knowledge. A person's knowledge may affect a person's adherence to carrying out therapy. One of the factors affecting healthy behavior is knowledge¹⁶. Moreover, the adherence rate of someone with more knowledge is five times higher than that of someone with less knowledge⁶. Furthermore, the frequency distribution of knowledge levels in both groups was in the good category. Additionally, the MMS group had a higher percentage of 91.7%, while the IFA group had only 70.8%. However, the Mann-Whitney test indicated that there was no significant difference between the two groups.

Education may increase one's knowledge. The purpose of providing education is to increase the level of knowledge of pregnant women by providing them with new information or insights. According to Pratiwi (2020), providing education on the use of antibiotics increased people's level of knowledge by 61.23%²¹. Another supporting study is research by Zaddana (2019), which demonstrated that there was an increase in knowledge and hemoglobin levels after receiving education about the importance of consuming iron folic acid²². Based on the study, educating people personally through the use of leaflets, which is something pregnant women may receive when they control their pregnancy at a public health center, is one of the most effective ways to increase their levels of knowledge.

The interview results about the reasons for being willing to consume MMS and IFA for 30 days were used to determine the acceptability of the consumption. The acceptability of consumption can also be interpreted as a person's ability to adhere to the therapy given because

they are aware of its benefits. Moreover, it was discovered that the highest distribution of the two groups regarding the acceptability of consumption was in the good category. However, MMS had a higher percentage of 66.7%, while IFA is 50%, but from the results of the Mann-Whitney test, it was revealed that there was no significant difference between the two groups. The results are in line with research conducted by Aguayo (2005), which stated that there was no significant difference in acceptability between MMS and IFA²³. Based on research by Aditianti (2015), the low level of IFA acceptance had an impact on the low level of adherence of pregnant women to consuming it²⁴. In addition, the interest and acceptability of pregnant women were also addressed in the Micronutrient Forum e-book (2020), which is one of the factors contributing to the low level of adherence to MMS consumption².

Family support is an attitude and act of acceptance toward other family members in the form of informational support, assessment support, instrumental support, and emotional support²⁵. In this study, family support provided was in the form of caring attitudes such as providing support, reminding mothers to consume supplements, and helping mothers when experiencing side effects from MMS or IFA consumption. In addition, informational support includes being aware of the increased need during pregnancy and the impact of not taking MMS or IFA. Family support was provided by other family members who live in the same house, especially the husband.

The results showed that the MMS group had a higher average level of family support at 34.9 compared to the IFA group at 32.2. Moreover, the highest distribution in the MMS group fell into the supportive category at 66.7%, while the highest distribution in the

IFA group fell into the unsupportive category at 54.2%. Family support had an impact on the level of adherence of pregnant women to consuming MMS or IFA because it provided emotional support and other forms of support to help mothers adhere to the therapy given. This is supported by research conducted by Astuti (2017), which

discovered a significant relationship between husband support and IFA consumption adherence in pregnant women (p-value = 0.000)⁸. Another supporting study is research by Wahyuni (2018), which demonstrated that 39.3% of pregnant women with high family support had a high level of adherence to Fe tablet consumption⁹.

Table 3. Knowledge Level, Consumption Acceptability, and Family Support

Variables	MMS Group		IFA Group		p-value (Mann-Whitney)
	n=24	%	n=24	%	
Knowledge Levels					
Good (76-100)	22	91.7	17	70.8	0.067
Moderate (56-75)	2	8.3	7	29.2	
Mean Rank	27		22		
Consumption Acceptability					
Good	16	66.7	12	50	0.283
Moderate	3	12.5	5	20.8	
Low	5	20.8	7	29.2	
Mean Rank	26.42		22.58		
Family Support					
Supportive	16	66.7	11	45.8	
Unsupportive	8	33.3	13	54.2	
Mean	34.9		32.2		

Table 4. Acceptance of Characteristics and Side Effects of MMS and IFA Consumption

Variables	Mean of MMS Group	Mean of IFA Group	p-value (Mann-Whitney)
Characteristics Acceptability			
Color	4.0	4.4	0.042
Shape	4.3	4.0	0.193
Odor	3.3	3.7	0.166
Packaging Appearance	4.2	4.0	0.373
Overall Acceptability	3.9	4.0	0.788
Side effects Acceptability			
Side effects	4.0	4.3	0.583

The acceptability of supplement characteristics was assessed based on the results of respondents' hedonic tests. In Table 4, it was discovered that based on the results of the Mann-Whitney test, only color characteristics had significant differences, while the other three points and overall acceptability did not have significant differences. Moreover, the IFA group had a higher average compared to the MMS group in the color category; there was a difference of 0.4 points. The colors of IFA tablets are red, while the colors of MMS tablets are pale brown. Based on the results of the interview, pregnant women in the IFA group stated that the color of IFA was very attractive, while pregnant women in the MMS group stated that the pale color of MMS was less attractive and tended to seem more like a medicine than a supplement. They disliked the color of the MMS tablets because they believed it deviated from the ideal color, and that affected other quality analyses²⁶. Supplement color preferences are yellow, maroon, gray, and brown, in that order from most to least preferred²⁷. Furthermore, according to other studies, people tend to think or believe that the colors of vitamin supplements are yellow (47%) and orange (39%), or colors with a tendency to be light²⁸. Based on this, it could be concluded that the pale brown color of MMS was considered less attractive because it did not conform to pregnant women's expectations about the color of

vitamins. As a result, the level of acceptability of MMS color was lower than that of IFA.

The second characteristic is shape. Compared to IFA in round tablet form, MMS in capsule form had a higher acceptance rate. The shape, diameter, and surface area of the supplement affect the speed of absorption and the ease of swallowing. The capsule form may lessen the bitter taste of the supplement ingredients due to its indirect contact with the taste buds²⁹. Contrarily, round-shaped tablets are the most difficult to swallow, despite coating efforts to make the swallowing process easier³⁰. Based on research conducted by Thaha (2022), mothers consume MMS because of its shape and size, which make it easy for them to swallow³¹. Therefore, it could be concluded that MMS in capsule form had a higher acceptance rate because the capsule membrane may lessen any unpleasant feelings that may appear when consuming the supplement and make it easier to swallow.

The third characteristic is aroma. Compared to MMS, IFA had a higher level of aroma acceptance. According to pregnant women from the IFA group, the smell of IFA is not too pungent, despite the fact that there is still a fishy or iron smell when consuming it. Contrarily, pregnant women in the MMS group reported that the smell of MMS was pungent, and some pregnant women reported feeling dizzy and nauseous after consuming MMS. This occurred due to hypersensitivity, and the body

was not used to the smell of MMS, in contrast to the pregnant women in the IFA group, who were mostly accustomed to the smell of IFA because they had previously consumed IFA provided by the public health center. In addition, a study by Clermont (2018) revealed the same results, demonstrating that MMS had a more pungent odor compared to IFA³².

The fourth characteristic is the appearance of the packaging. MMS bottle packaging had a higher acceptance rate compared to IFA blister packaging. Pregnant women in the MMS group liked MMS bottle packaging because it was considered safer and more hygienic. Moreover, when pregnant women in the IFA group were shown the original IFA packaging in the form of blisters, the majority of ratings given were ordinary, but they preferred to be packaged in bottles like the packaging used during the study. This is in line with research conducted by Permatasari (2020) regarding the comparison of the level of preference for MMS packaging in bottles or blisters³³. The study showed that 48.4% of respondents liked bottle packaging, while 40.5% of respondents liked blisters. Bottles are preferable because they have more capacity, are reusable, and are safer³³.

A drug side effect is any undesirable, harmful effect that occurs inadvertently as a result of a drug reaction administered at normal doses for prevention, therapy, and modification of physiological function³⁴. A scale of 1 to 5 was used in this study to measure side effects; the lower the number, the more severe the side effects were perceived. The results showed that the acceptance of side effects in the MMS group was lower

than that in the IFA group, indicating that the MMS group suffered side effects that were more severe than those suffered by the IFA group. As shown in Table 4, there was a difference of 0.3 points. However, based on the Mann-Whitney test, there was no significant difference between the two groups.

The reasons for the low level of adherence of pregnant women to consuming supplement tablets given are forgetting factors, side effects (nausea, vomiting, and dizziness), a lack of maternal awareness regarding the importance of consuming supplements for the fetus and pregnant women, and a lack of counseling or education from health workers³⁵. Table 5 shows the findings obtained from interviews regarding the reasons respondents did not consume MMS or IFA, and they are in line with Winichagoon's (2002) research. It was discovered that the highest reason for not consuming supplements given in the MMS and IFA groups was forgetfulness, at 41.6% and 50%, respectively. Moreover, in the MMS group, the highest reason for non-adherence was due to side effects (12.5%), while in the IFA group, it was due to forgetfulness (25%). Compared to the IFA group, the MMS group had higher side effects, such as nausea and vomiting, at 11.6%³⁶. The high number of respondents who reported suffering side effects from the MMS group were caused by different types of iron that are different from IFA. MMS uses ferrous sulfate-type iron, while IFA uses ferrous fumarate-type iron. Different types of iron in MMS may cause side effects because the body needs to readjust. Therefore, side effects may occur because the body still needs to adjust to MMS².

Table 5. The Reasons for Not Consuming MMS and IFA and Types of Side Effects Suffered

Variables	Obedient (100%)		Moderate Adherence (80%-90%)		Disobedient (<80%)		Total	
	n	%	n	%	n	%	n	%
Reasons Not to Consume MMS								
100% Obedient	5	100	0	0.0	0	0	5	20.8
Forgot	0	0.0	8	80	2	20	10	41.6
Side Effects	0	0.0	1	25	3	33.3	4	16.6
Forgot and Side Effects	0	0.0	2	50	2	50	4	16.6
Others (do not like to consume drugs / get a prescription from a doctor)	0	0.0	0	0.0	1	100	1	4.2
Total	5	20.8	11	45.8	8	33.3	24	100
Reasons Not to Consume IFA								
100% Obedient	5	100	0	0.0	0	0.0	5	20.8
Forgot	0	0.0	6	50	6	50	12	50
Side Effects	0	0.0	0	0.0	3	100	3	12.5
Forgot and Side Effects	0	0.0	1	100	0	0.0	1	4.2
Others (do not like to consume drugs / get a prescription from a doctor)	0	0.0	0	0.0	3	100	3	12.5
Total	5	20.8	7	29.2	12	50	24	100

Table 6. Types of Side Effects

Types of Side Effects	MMS Group		IFA Group	
	n	%	n	%
Dizzy	5	20.8	8	33.3
Nausea and vomiting	10	41.6	7	29.2
Diarrhea	1	4.2	0	0
No appetite	0	0	1	4.2
Itchy throat	0	0	1	4.2

Furthermore, it was discovered that, as the most common type of side effect felt, the MMS group suffered nausea and vomiting, at 41.6%, while the IFA group suffered dizziness, at 33.3%, as the most common side effect. According to research conducted by Persson (2012), nausea and vomiting are side effects that

pregnant women who consumed MMS suffered more frequently (11.6%) than those who consumed IFA (6.9%), but there was no significant difference between the two supplements³⁶. The body must begin readjusting to the supplements consumed since side effects may occur when beginning a new treatment.

Table 7. The Relationship between Knowledge Level, Consumption Acceptability, and Family Support and Both MMS and IFA Consumption Adherence Levels

Variables	Adherence Levels						Total		p-value (chi-square)
	Obedient (100%)		Moderate Adherence (80%-90%)		Disobedient (<80%)		n	%	
	n	%	n	%	n	%			
Knowledge Levels									
Good (80-100)	10	25.6	17	43.6	12	30.8	39	81.2	0.009
Moderate (60-70)	0	0.0	1	11.1	8	88.9	9	18.8	
Total							48	100	
Consumption Acceptability									
Good	10	35.7	18	64.3	0	0.0	28	58.3	0.000
Moderate	0	0.0	0	0.0	8	100	8	16.7	
Low	0	0.0	0	0.0	12	100	12	25	
Total							48	100	
Family Support									
Supportive	8	29.6	9	33.3	10	37	27	56.2	0.289
Unsupportive	2	9.5	9	42.9	10	47.6	21	43.8	
Total							48	100	

The results of the study displayed by cross-tabulation showed a relationship between the level of knowledge and the level of adherence (p-value = 0.002), which was tested using the Fisher exact test because the data did not meet the requirements of the chi-square test. Moreover, the percentage of respondents with a good level of knowledge and moderate adherence (80%–90%) to adherence (100%) consuming IFA and MMS was 69.2%, or 27 respondents out of 39 respondents. This is supported by Triastuti’s (2020) theory that the level of knowledge can affect a person’s level of adherence. Furthermore, the result is in line with research conducted by Asmin (2021) that 22% of pregnant women who were adherent to consuming IFA had a relatively good level of knowledge^{37,38}. In addition, a good level of knowledge can increase awareness of pregnant women’s health. When compared to someone with less knowledge, someone with good knowledge has an adherence rate five times higher⁶.

The level of knowledge can be increased by efforts to provide education. In this case, public health center staff and other health workers may provide education. The findings revealed that the knowledge of pregnant women increased after receiving education about MMS and IFA consumption. This can be seen from the changes in scores, and the average pre- and post-test of both groups of respondents increased. Based on research by Zaddana (2019) and Pratiwi (2020), education can increase the level of knowledge of research subjects about the given material^{21,22}. Moreover, according to a book compiled by the Micronutrient Forum (2020), education about MMS consumption is important because it can reduce infant mortality by up to 30% due to maternal adherence to consuming MMS². Therefore, it could be concluded that prenatal education

is important and should be provided to increase maternal knowledge about the therapy provided so that mothers are adherent to carrying out therapy, which in this study consists of consuming MMS and IFA.

There was a significant relationship between the acceptability of consumption and the level of adherence (p-value = 0.000). The acceptability of consumption is defined as a person’s ability to carry out the therapy given because they are aware of its benefits. This is in line with research conducted by Aditianti (2015), which found that there was a relationship between the low level of acceptability and the low level of adherence of pregnant women to consuming IFA²⁴. In addition, the Micronutrient Forum ebook (2020) explained the low adherence to MMS consumption in pregnant women caused by the low interest and acceptability of pregnant women². Moreover, in this study, there were as many as 28 respondents out of 48 respondents, or 58.3%, who had good acceptability or consumed MMS or IFA because they were aware of its benefits and noticed positive changes as a result of consumption and had moderate levels of adherence (80%–90%) to adherence (100%).

However, there was no significant relationship between family support and adherence rates (p-value = 0.289). In contrast, research by Astuti (2017) and Wahyuni (2018) discovered a significant relationship between the level of adherence of pregnant women to consuming IFA and husband and family support^{8,9}. However, the results of this study are in line with research by Wahyuni, S. (2022), which found no significant relationship between family support and Fe tablet consumption³⁹.

The researchers’ assumption was caused by factors contained in the mother herself, such as the lack of maternal awareness of the importance of consuming

MMS and IFA during pregnancy, which is shown by this study's respondents who were too lazy to consume MMS and IFA because they did not like to consume medicine. In addition, the factor of forgetting even though mothers have been reminded by husbands or other family members and the side effects of consuming MMS and IFA are considered too severe, so they often miss the time to consume MMS and IFA. The aforementioned reasons were also found in the research of Wahyuni, S. (2022), which showed no relationship between family support and maternal adherence levels due to forgetfulness, lack of motivation and self-awareness, laziness, boredom, and side effects³⁹.

The disadvantage of this study is that the researchers did not directly witness pregnant women (respondents) consuming the supplements given, so there might be bias in filling out adherence forms. In addition, the researchers could not determine the increase in adherence to MMS and IFA consumption in pregnant women because there was no preliminary data on the level of adherence to consumption.

CONCLUSIONS

The average level of adherence, knowledge, acceptability, consumption, and family support of the MMS group was higher than that of the IFA group, but there was no significant difference between the two groups. Moreover, the IFA group had a higher average than the MMS group on the acceptability of characteristics and the acceptability of side effects. According to the relationship test, the level of knowledge and acceptability of consumption had a significant relationship with the level of adherence, while family support did not have a significant relationship. In addition, further studies can examine other factors that have not been investigated, such as the support of health workers, ease of access to health facilities, disease history, and maternal psychological conditions that may have an impact on the level of maternal adherence.

ACKNOWLEDGMENTS

The author would like to thank the Mulyorejo Public Health Center Surabaya for giving permission and assisting in the search for research respondents, and the supervisor for the guidance and advice in the preparation of this article so that it could be completed.

Conflict of Interest and Funding Disclosure

No potential conflicts of interest were reported by the authors. This research used private funds.

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