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Maternal Knowledge on Recommended Iron and Folic Acid Supplementation in Pregnancy: A Hospital-based Cross-Sectional Study in Sri Lanka

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Abstract

Background: Anemia during pregnancy is a significant public health concern. Sri Lankan maternal healthcare system adopted free provision of iron and folic acid supplementation to all its pregnant women since several decades, to mitigate the high prevalence of anemia. Despite the dedicated national maternal healthcare services, the prevalence of maternal anemia remains at a moderate level of public health significance for many years.

Objective: This study assessed maternal knowledge of anemia and iron and folic acid supplementation in pregnancy (and associated factors), and the content of counselling on iron and folic acid supplementation received by women during pregnancy.

Methods: A hospital-based cross-sectional study enrolled 703 women at 0–4 days postpartum. A pretested interviewer-administered questionnaire was used to collect data on socio-demographic characteristics, use of iron and folic acid supplementation, and obstetrics. A self-administered questionnaire was used to assess maternal knowledge with close-ended questions.

Results: Of the 703 women, 69.7% scored 9, i.e., the maximum maternal knowledge score. Maternal ethnicity, education level, and monthly family income were significantly associated with maternal knowledge of anemia and iron and folic acid supplementation. However, the majority of women did not receive information on side effects and ways to minimize them during the antenatal counselling sessions.

Conclusion: Antenatal counselling on anemia and iron and folic acid supplementation should be improved, and the maternal education level should be considered when providing counselling. It is recommended to standardized antenatal counselling sessions for all community clinics in Sri Lanka, where the content must emphasize anemia prevention and compliance with the recommended iron and folic acid supplementation.

Keywords: Maternal Knowledge, Counselling, Iron and Folic Acid, Pregnancy, Sri Lanka

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INTRODUCTION

Anemia in pregnant and reproductive-aged women is a leading public health issue. While anemia is a multifactorial condition, iron deficiency has been identified as the most widespread nutritional deficiency globally and accounts for 75% of all cases of anemia in pregnancy [1, 2]. Southeast Asia reported the highest prevalence of maternal anemia (48.2%) in 2016, while the estimated prevalence was 35.36% in Sri Lanka [3]. There is mounting evidence that maternal anemia is associated with slightly higher rates of preterm birth, low birth weight, arrested child mental development, and stillbirth [4, 5]. Sri Lanka is a middle-lower-income country that provides free healthcare to all citizens. It has a strong and dedicated national health system that operates at the community level via Medical Officer of Health (MoH) areas. Public health midwifes (PHMs) are front-line healthcare workers who provide maternal and child healthcare and facilitate family planning at community clinics and the domiciliary level. For several decades, the Sri Lankan maternal healthcare system has provided all pregnant women with iron and folic acid supplementation (IFAS) and vitamin C tablets, according to the World Health Organization (WHO) recommendation of 30–60 mg of elemental iron and 400 µg folic acid, beginning from the second trimester of pregnancy and continuing until six months postpartum [6, 7]. In addition, primary healthcare providers, especially PHMs, advice women on anemia and IFAS through community antenatal clinics (ANCs) and antenatal education classes held once per trimester. Maternal compliance with the recommended IFAS is high among Sri Lankan mothers (80.1%), while the rate of anemia is moderate [8]. This study assessed maternal awareness of anemia and recommended IFAS, factors associated with maternal knowledge, and the content of counselling.

MATERIALS AND METHODS

This was part of a larger study that assessed the compliance of Sri Lankan women with the recommended IFAS during pregnancy [8]. A descriptive, cross-sectional hospital-based study was conducted between September 2018 and October 2019 at Provincial General Hospital, Kurunegala, Sri Lanka. A more detailed description of the subject recruitment and inclusion and exclusion criteria has been published elsewhere [8]. In brief, data were collected from 733 women who were between 0-4 days postpartum following a singleton new-born delivery. Women with psychiatric or chronic disorders, or obstetric complications were excluded. The final analysis included the data of 703 women after removing incomplete questionnaires. Socio-demographic characteristics, past and present obstetric data, use of IFAS and counselling, and neonatal data were collected using a pretested interviewer-administered questionnaire. Maternal knowledge of anemia and IFAS was assessed using a pre-tested self-administered questionnaire which was provided in subjects' native language (i.e. in Sinhala and Tamil). The questionnaire comprised of 10 close-ended questions, including 3 on the effects of anemia on pregnancy outcomes, 2 each on aspects of anemia and dietary knowledge, and 1 each on awareness of anemia and IFAS, the definition of anemia, and iron demand during pregnancy.

Excluding the question on whether they had heard of anemia, all questions were scored as "1" or "0" for the correct and incorrect answer, respectively. All nine questions also had a third option, i.e., "Do not know". The scores for the nine questions were summed to give the total score for each participant. Maternal hemoglobin concentrations at the first ANC visit and third trimester clinic visit were obtained directly from the pregnancy card of each woman. Anemia and non-anemia were defined as a hemoglobin concentration < 11.0 and ≥ 11.0 g/dL, respectively, based on WHO guidelines for hemoglobin levels, to diagnose anemia at sea level during pregnancy [7].

Ethics approval for the study was obtained from the Institutional Ethics Review Committee of Provincial General Hospital, Kurunegala, Sri Lanka (THK/HIRU/ERC/17/21). Study participation was purely voluntary and in accordance with the principles of the Declaration of Helsinki. Informed consent was obtained from all participants before data collection and the participants were free to withdraw at any time during data collection.

Statistical Analysis

The data were entered into Microsoft Excel 2013 (Microsoft Corp., Redmond, WA, USA) and checked for accuracy. All analyses were performed using Minitab 19 statistical software (Minitab Inc., State College, PA, USA). Descriptive statistics are presented as frequencies and percentages. The Kruskal–Wallis test was used to assess differences in median total knowledge score according to various maternal factors, as the continuous variables did not show a normal distribution (Anderson–Darling and Kolmogorov–Smirnov test statistics < 0.05). $p < 0.05$ was considered statistically significant.

RESULTS

Maternal Knowledge of Anemia and IFAS

The basic characteristics of the participants have been published elsewhere [8]. Of the 703 women, 91.47% had heard of anemia and IFAS. The median score for maternal knowledge of anemia and IFAS was 9. More than two-thirds of the participants (69.7%) had the maximum total score of 9. Compared with other factors, high proportions of women did not know the definition of anemia during pregnancy (9.1%), or that anemia during pregnancy is preventable (8.11%). In addition, 11.24% of the women were not aware that eating citrus fruit after a meal can increase iron absorption by the body (Table 1).

Table 1. Maternal responses to the questionnaire on anemia and IFAS.

Question	Correct response, n (%)
Anemia during pregnancy is defined as a blood hemoglobin level greater than 11 g/dL	639 (90.9%)
Anemia during pregnancy can increase the risk of low birth weight delivery	682 (97.01%)
Anemia during pregnancy can increase the risk of preterm delivery	674 (95.87%)
Anemia during pregnancy is not good for the mother either	667 (95.01%)
Anemia during pregnancy is not preventable	646 (91.89%)
General fatigue, weakness, pale skin and dizziness are symptoms of anemia	677 (96.3%)
Pregnancy is a period in which the body needs more iron	694 (98.72%)
Intake of iron-rich food can meet the body's iron needs during pregnancy	624 (88.76%)
Eating citrus fruits after meals can increase iron absorption by the body	683 (97.29%)

Information on IFAS Provided during Counselling

The majority of women (85.9%) reported receiving counselling on anemia and IFAS at some time during their ANC visit for the most recent pregnancy; 15.22% received counselling only from antenatal educational classes conducted at the community ANCs (Table 2). Almost all women (> 98%) reported that they had received counselling on the correct dose, time, frequency and duration of IFAS, and on appropriate storage of supplements. However, more than half of the women did not receive information on the possible side effects that can occur while taking IFAS, and more than three-quarters did not receive information on ways to minimize side effects (Fig. 1).

Relationship between Maternal Characteristics and Maternal Knowledge of Anemia and IFAS

The Kruskal–Wallis test revealed that 4 out of 15 factors studied (ethnicity, maternal education level, monthly family income, and status at the first ANC visit) were significantly associated with maternal knowledge of anemia and IFAS ($p < 0.05$) (Table 2). Maternal knowledge increased with

education level. The median total knowledge score among women with a monthly family income less than 14,000 LKR was significantly lower than that of women in the other income categories. Moreover, anemic status at the first ANC visit was significantly associated with maternal knowledge, although median values were same for the anemic and non-anemic groups. Therefore, the significant *p*-value may indicate a difference in distribution between the anemic and non-anemic groups.

DISCUSSION

In Sri Lanka, the prevalence rate of anemia in pregnancy is currently 35.36% [3]. There is a high prevalence of maternal anemia in the third trimester of pregnancy (44.9%), which is presumably due to poor dietary compliance (26.6%) despite high IFAS supplementation compliance (80.1%) [8]. In the present study, more than two-thirds of the participants (69.7%) had heard of anemia and the IFAS was similar to that reported in a Kenyan study [9]. Almost all women received information on the correct dose, time, frequency, and duration of IFAS, and the correct way to store supplements. However, low proportions of women received information on possible side effects (49.78%) and ways to minimize side effects (24.18%). This is probably associated with the lack of individual counselling for pregnant women on IFAS, or omission of this content from the counselling sessions. Several studies have shown that experiencing side effects is a common reason for noncompliance with IFAS by women, including the current study (data published elsewhere). As women may stop taking IFAS on experiencing side effects, it is important to provide accurate information on possible side effects and ways of managing them effectively to ensure maternal compliance with IFAS [10-12]. Moreover, the counselling should cover enhancers and inhibitors of iron absorption. The present study revealed that improved maternal knowledge of anemia and IFAS was associated with maternal ethnicity, education level, and monthly family income. Since education level is a determinant of income, the higher maternal knowledge of women with higher income levels might be a result of their better education [9]. Therefore, antenatal counselling sessions should consider the education level of each individual woman. Simply presented information and providing all women with educational materials in the form of brochures, might help to improve knowledge, especially among less educated women. Posters in community clinics would also help improve understanding and knowledge. Kamau et al. suggested that counselling programs on IFAS for expectant women should encompass the "why, when, and how", actual supplement names, duration and maintenance of supplementation, side effects or challenges and, most importantly, how to handle them [9]. There are some limitations of this study. Firstly, some of the data were taken from each woman's pregnancy card, which may have been affected by reporting errors or inter-laboratory variation. Secondly, although we found maternal knowledge is associated with maternal ethnicity, level of education and monthly income, the median total knowledge score among different groups showed no big difference and this might be due to the small cohort used in this study. In addition, small subject numbers in some categories used in the statistical analysis is a major limitation of this study.

CONCLUSIONS

This study suggests more than two-thirds of the women had good knowledge of anemia and IFAS. Maternal ethnicity, education level, and monthly family income had significant associates with maternal knowledge. Information on possible side effects and ways to minimize side effects seem to be lacking in antenatal counselling sessions. This indicates that there is a need to improve antenatal education programs and, by extension, maternal compliance with the recommended IFAS and pregnancy outcomes. Antenatal counselling sessions should be standardized for all community clinics in Sri Lanka, where the content must emphasize anemia prevention and compliance with the recommended IFAS. Women should be counselled on an individual basis and programs should be simplified so that they can be understood by all women, regardless of education level. Written materials could also facilitate understanding.

Table 2. Total maternal knowledge score by maternal characteristics

Variable	Subcategory	n	Median total knowledge score (Interquartile Range)	H statistic	*p*-Value
Ethnicity	Sinhalese	594	9 (1.00)	8.28	0.041*
	Tamil	10	8 (2.00)		
	Muslim	92	9 (1.00)		
	Other	06	9 (1.00)		
Education level	No schooling or up to primary education	14	8 (2.25)	28.56	<0.001*
	Up to standard level	355	9 (1.000)		
	Up to advanced level	269	9 (1.00)		
	Higher education	65	9 (0.00)		
Area of residence	Urban	153	9 (1.00)	1.69	0.429
	Suburban or village	547	9 (1.00)		
	Estate	03	8 (1.00)		
Employment status	Not employed	587	9 (1.00)	1.46	0.227
	Employed	116	9 (1.00)		
Monthly family income (LKR)	< 14,000	26	8 (2.00)	22.21	<0.001*
	14,000 – 19,999	55	9 (1.00)		
	20,000 – 31,999	190	9 (1.00)		
	≥ 32,000	429	9 (1.00)		
Family type	Nuclear family	444	9 (1.00)	2.64	0.104
	Extended family	258	9 (1.00)		
Parity	Primiparous	224	9 (1.00)	2.37	0.124
	Multiparous	479	9 (1.00)		
History of LBW delivery	Yes	33	9 (1.00)	3.78	0.052
	No	659	9 (1.00)		
History of preterm delivery	Yes	32	9 (1.00)	1.46	0.227
	No	658	9 (1.00)		
History of abortion	Yes	122	9 (1.00)	2.34	0.217
	No	581	9 (1.00)		
History of anemia	Yes	17	9 (1.00)	0.77	0.381
	No	674	9 (1.00)		

Anemic or non-anemic at first ANC visit	Anemic (hemoglobin < 11.0 g/dL)	146	9 (1.00)	9.73	0.002*
	Non-anemic (hemoglobin ≥ 11.0 g/dL)	557	9 (1.00)		
Anemic or non-anemic at third trimester ANC visit	Anemic (hemoglobin < 11.0 g/dL)	316	9 (1.00)	3.09	0.079
	Non-anemic (hemoglobin ≥ 11.0 g/dL)	387	9 (1.00)		
Frequency of receiving counselling on anemia and IFAS	Not received	99	9 (1.00)	10.1	0.124
	Only during antenatal classes	107	9 (1.00)		
	When receiving IFAS from the ANC for the first time	04	8 (1.00)		
	Every time IFAS received from the ANC	86	9 (1.00)		
	When obtaining hemoglobin test results from the ANC	346	9 (1.00)		
	When receiving IFAS from ANC for the first time and when obtaining hemoglobin test results from the ANC	08	9 (1.00)		
	Every time received IFAS from ANC and when obtaining hemoglobin test results from ANC	53	9 (1.00)		
Mode of counselling	Individual basis	20	9 (1.00)	0.41	0.523
	Group basis	683	9 (1.00)		

Data were compared using the Kruskal–Wallis test. *p < 0.05. LKR, Sri Lankan Rupee; LBW, low birth weight; ANC, antenatal clinic; IFAS, iron and folic acid supplementation

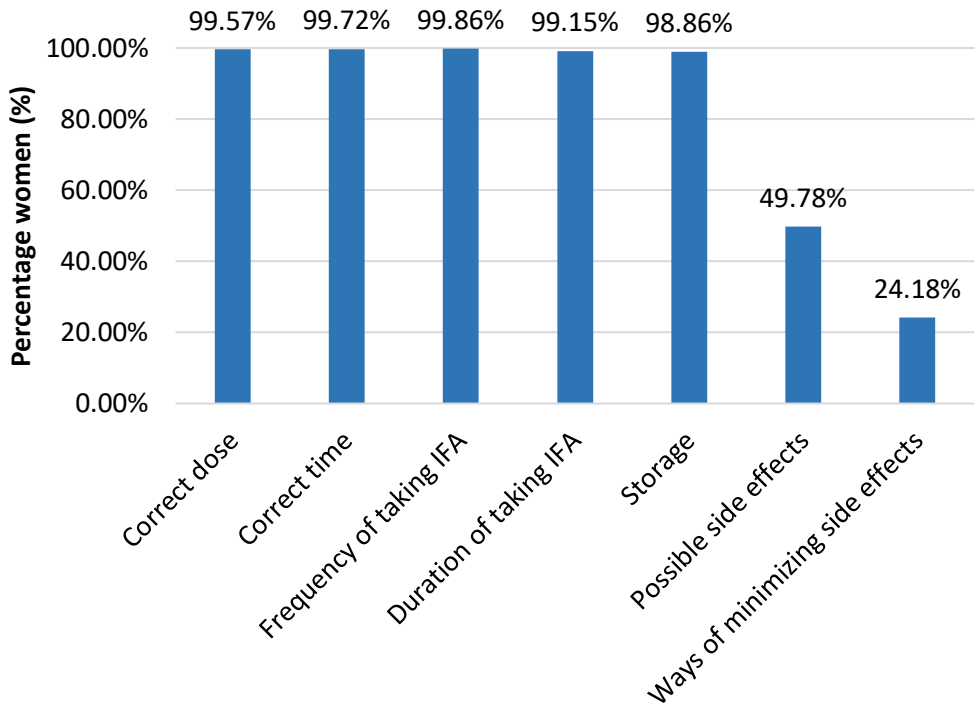

Figure 1. Content of antenatal counselling on IFAS; Ways of minimizing side effects was the least available component in the antenatal counselling sessions

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Author declaration

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Author Contributions:
MLP, KS and MS conceptualized the study. MLP collected data, analysed data and drafted the manuscript. KS, MS, KMSW and DDS critically review and edited the manuscript. MLP wrote the final manuscript by accommodation all co-authors comments.

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The authors declare that there is no conflict of interest regarding the publication of this paper.

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Data Availability:
Data will be available on request from the corresponding author.