

ORIGINAL ARTICLE

## An Audit on Anaemia in Pregnancy Treatment in a Local Health Clinic

Mohd Shaiful Ehsan Bin Shalihin<sup>1\*</sup>, Muhammad Akmal Bin Mohd Hisham<sup>2</sup>, Nur Athirah Binti Rozilah @ Abdul Hadi<sup>2</sup>, Nur Irdina Nabilah Bt Mohd Hisham<sup>2</sup>

<sup>1</sup> Department of Family Medicine,  
Kulliyyah of Medicine, 25200 Kuantan,  
International Islamic University of Malaysia

<sup>2</sup> Kulliyyah of Medicine, 25200 Kuantan  
International Islamic University of Malaysia

\*Corresponding author's email:  
shaifulehsan@iium.edu.my

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### ABSTRACT

Anaemia in pregnancy is one of the most common conditions encountered in antenatal follow-up at primary care. Some targets need to be achieved and managed by healthcare professionals, especially at the earliest possible time and optimal level of haemoglobin in the pregnancy period. Nevertheless, some patients may end up with severe anaemia that was not successfully treated even at term. Therefore, an audit was conducted among antenatal women in a local health clinic to assess the patient's haemoglobin level at booking and term, the management plan and to formulate strategies for improvement. This audit was conducted for two weeks using a universal sampling method in November 2022. All antenatal women who were already at term gestational period and attended the clinic during this period were included. The patients' sociodemographic and health characteristics, haemoglobin level at booking and term as well as management plan were recorded. The data were entered into the statistical software SPSS version 23 for analysis. A total of 115 antenatal women were recruited and 87% of them were able to achieve target haemoglobin at term. Twenty-three of them had concomitant iron deficiency anaemia since the pre-pregnant state. Associated factors for successful anaemia treatment were those without concomitant IDA, those without side effects on iron supplements and those who did not require changes in

the treatment course ( $P < 0.05$ ). The majority of patients can achieve normal values of haemoglobin at term. Pre-pregnancy clinics to treat concomitant anaemia before pregnancy selective individualized iron supplementation to avoid side effects and maintaining the same medication groups would help treat more numbers of antenatal women with anaemia.

## INTRODUCTION

Anaemia in pregnancy is one of the most common non-communicable diseases encountered in pregnancy (Frayne & Pinchon, 2019). Therefore, in the local healthcare setting, considering iron deficiency anaemia (IDA) is frequently encountered, all pregnant women will be prescribed instantaneously with haematinics starting the first visit and then step up further in subsequent follow-ups according to the haemoglobin level (Malaysia Ministry of Health, 2020). It is a standard operating procedure to monitor and document haemoglobin levels routinely during antenatal visits (Malaysia Ministry of Health, 2020). Medical doctors are expected to treat the anaemia antenatally through pharmacological and non-pharmacological methods.

Anaemia in pregnancy has many causes. One of the most common is IDA (Goonewardene et al., 2012). Despite several guidelines being adopted, there is still a high number of patients unable to achieve the optimum level of haemoglobin (Hb) near term (Hasneezah et al., 2020). Other causes include folate deficiency, vitamin B12 deficiency and concomitant thalassemia or haemoglobinopathies in pregnancy (Goonewardene et al., 2012). There are a lot of complications of anaemia in pregnancy for the mother and foetus. These include acute heart failure, low birth weight or intrauterine growth restriction, premature delivery, spontaneous miscarriages and intrauterine death (Lin et al., 2018). The most worrisome event is postpartum haemorrhage which can be prevented if the anaemia is treated before term (Omotayo et al., 2021). This strategy

gives rise to the target of Hb 11 g/dL at 36 weeks gestational period (Malaysia Ministry of Health, 2020). Among risk factors of iron deficiency anaemia that can be screened in early antenatal booking include poor nutrition, young age, underlying stressors, concomitant menstrual disorder before pregnancy, multigravida or close spacing of pregnancy (Lin et al., 2018).

There are various causes of the failure to treat anaemia in pregnancy (Churchill et al., 2022). These can be divided into patient factors, healthcare provider factors and healthcare system factors. Patient factors include poor compliance to haematinics and diet advice, intolerance to iron, poor iron absorption as well as a psychological stressor or lack of a good support system (Churchill et al., 2022; Yadav et al., 2019). Doctor factors include delay in stepping up the iron treatment, poor in initiating oral or parenteral iron and failure to assess compliance as well as ignoring diet modification. Healthcare system factors include lack of one-to-one care, inability of medication at primary care level and poor holistic monitoring plan (Churchill et al., 2022; Yadav et al., 2019; Gilder et al., 2019).

Considering these multifactorial causes, it is important to identify and perform a cross-sectional audit to view this problem. From the results of the audit, the problems can be explored clearly and further modifications can be made from there. Therefore, the objectives of this audit were to assess the patient's haemoglobin level at booking and term, the management plan and to formulate strategies for improvement.

## MATERIALS AND METHODS

An internal audit was performed in a local health clinic for two weeks duration starting from 25 October 2022 to 8 November 2022. A two-week study period was perceived as sufficient for data collection to include background characteristics of patients and retrospective documentation of antenatal

management of patients with anaemia. The objectives of this study were: (1) to describe the characteristics of antenatal women follow-up in the health clinic and their haemoglobin status, (2) to identify the associated factors for the antenatal women achieving normal haemoglobin at term and (3) to identify the predictors for treating the anaemia successfully. The data were collected from the antenatal book of the patient reaching 36 weeks within those two weeks. All relevant data were recorded manually in the audit form before being entered into the SPSS version 26.0 to be analysed. Descriptive analysis was used to describe the background of the antenatal women in the form of frequency, percentage and mean. Simple and multiple logistic regression was used to identify the associated factors and predict factors for achieving resolved anaemia at term gestational week.

This audit had been approved by the clinic administrative authority and managing specialist as well as an elective proposal by Kulliyyah of Medicine, International Islamic University of Malaysia.

## RESULTS

A total of 115 patients' records were analyzed, in which the majority of patients were Malay, educated up to secondary school and still working (Table 1). The majority have the normal value of haemoglobin at booking and do not have iron deficiency anaemia. Surprisingly, despite available standard operating procedures, 67% of the antenatal women were treated with haematinic late in the third trimester and 13% of the cases were unable to resolve their anaemia at term.

**Table 1** Characteristics of patient and antenatal parameters

Variables		Frequency (N)	Percentage %	Median	Range
Age				28.0	25
Race	Malay	97.0	84.3		
	Chinese	8.0	7.0		
	Indian	3.0	2.6		
	Others	7	6.1		
Gravida	One	35	30.4		
	Two	35	30.4		
	Three	25	21.7		
	Four	9	7.8		
	Grand multigravida	11	9.6		
Education	No	2	1.7		
	Primary	5	4.3		
	Form 3 (PMR)	2	1.7		
	SPM	45	39.1		
	STPM	3	2.6		
	Certificate	4	3.5		
	Diploma	25	21.7		
	Degree	28	24.4		
	PhD	1	0.9		
Work	Housewife	43	37.4		
	Work	72	62/6		
Hb at booking				12.3	8.20
Hb at term				12.0	7.50

IDA present	Yes	23	20.0		
	No	92	80.0		
Iron supplement initiation	1st trimester	27	23.5		
	2nd trimester	11	9.6		
	3rd trimester	77	66.9		
Types of iron supplementation	Sangobion	1	0.9		
	Obimin	1	0.9		
	Ferrous fumarate	4	3.5		
	Iberet	20	17.4		
	Zincofer	88	76.5		
	Maltofer	1	0.9		
Iron modification	Yes	22	19.1		
	No	93	80.9		
Experience side effects	Yes	18	15.7		
	No	97	84.3		
Hb treated	Yes	100	87.0		
	No	15	13.0		

Simple logistic regression proved that those antenatal women without iron deficiency anaemia (IDA) at booking, and good compliance with the same type of haematinics without changing the group were the ones that were statistically proven to be associated with successful anaemia treatment (Table 2). Nevertheless, the only predictor for success was those without concomitant IDA (Table 3).

**Table 2** Associated factor for achieving normal haemoglobin at term vis simple logistic regression

Variables	P value	Crude odd ratio (OR)	95.0% C.I. for OR	
			Lower	Upper
IDA (without)	< 0.001	0.075	0.022	0.253
Change iron (no)	0.001	0.142	0.045	0.455
Iron side effects (no)	0.001	0.141	0.043	0.465

**Table 3** Predictors for resolved anaemia at term

HbCorrected <sup>a</sup>		B	Std. Error	Wald	Df	Sig.	Exp(B) Lower bound	95% Confidence Interval for Exp(B)	
								Upper bound	
Yes	Intercept	3.415	.575	35.310	1	<.001			
	[IDA = 1]	-2.573	.683	14.180	1	<.001	0.076	0.020	0.291
	[IDA = 2]	0 <sup>b</sup>	.	.	0	.	.	.	.
	[Changelron = 1]	-0.612	1.368	0.200	1	0.655	0.542	0.037	7.924
	[Changelron = 2]	0 <sup>b</sup>	.	.	0	.	.	.	.
	[Sideeffects = 1]	-1.417	1.448	0.958	1	0.328	0.242	0.014	4.139
	[Sideeffects = 2]	0 <sup>b</sup>	.	.	0	.	.	.	.

## DISCUSSION

Anaemia in pregnancy is common but challenging to manage at the primary care level. It usually requires early and effective management including self-empowerment by consuming a high-iron diet on top of daily haematinics prescribed by the managing team (Kumar et al., 2022). Nevertheless, there are always ways to improve the haemoglobin control by the healthcare team through education, training as well and by conducting the audit (Morrison et al., 2021).

The audit was conducted among 115 antenatal patients within two weeks. Zincofer® was the commonest haematinic prescribed in this clinic (76.5%) followed by Iberet® (17.4%), as shown in Table 1. Both Zincofer® and Iberet® contain 115 mg and 105 mg elemental iron respectively which are among the highest iron content among the oral pharmacological drugs available for treating anaemia in primary care clinics (Abu et al., 2020). They provide equivalent efficacy and side effects. However, Zincofer® has higher folic acid content, causing it to be highly chosen in this clinic setting. The trend is clear that most medical doctors would like to start haematinic with the highest iron content at the onset of the treatment, to treat the anaemia successfully (Lewkowitz et al., 2022). This study also detected a high tendency among medical doctors to start treatment in the third trimester (66.9%) compared to other trimesters, as shown in Table 1. Due to the short duration of time left prior to term gestational week, the highest iron content haematinic would be given.

However, this practice of starting haematinic only in the third trimester is against the standard practice of managing antenatal women in primary care (Malaysia Ministry of Health, 2020). Haematinics should be given since booking, regardless of the level of haemoglobin of the women. This is because, even though they are not anaemic, the requirement of iron in pregnancy is

increased and they require at least 30 – 60 mg of elemental iron per day. Meanwhile, for the treatment, the requirement would be increased further to 60 – 120 mg of elemental iron (Means, 2020). Therefore, the inertia in initiating haematinic supplementation should be avoided. The absolute reason for this practice should be explored by the clinical specialists and at the health district office level through the assessment of the medical doctor's knowledge in managing antenatal women. This knowledge can be assessed through discussion in a clinical medical education (CME) or workshop session that should be conducted regularly.

Malaysia Ministry of Health (2020) had proposed a standard target to achieve normal haemoglobin levels at term gestation. However, not all healthcare providers are able to change such a benchmark into an achievable outcome. This study showed that around nine-tenth of these antenatal women were able to treat the anaemia at term and this is relatively a good achievement despite the failure to achieve 100% treatment among the women. Simple logistic regression (Table 2) reveals that compliance issues and prior diagnosis of iron deficiency before pregnancy were the main reasons why the anaemia was unable to be resolved within antenatal visits. Concomitant iron deficiency anaemia requires a higher dose of haematinic and therefore, will cause a barrier for sustainable treatment in pregnancy. Previous studies have shown that IDA is common among Malaysians as well as worldwide and requires appropriate modification in the treatment protocol (Abd Rahman et al., 2022; Breymann, 2015; Igbinosa et al., 2022; Di Renzo et al., 2022).

Compliance issues are another important factor in determining the outcome of the treatment (Rattanapiratanon et al., 2021). In this study, it was noted that almost one-fifth of the antenatal women required changes in the haematinics during the antenatal follow-up (Table 1). This was supported by 15.7% of the women experiencing intolerance to the

medication which required replacement of the initial haematinics. These changes require some time to adapt to the compliance and suitability of the drugs. Therefore, this study proved that those on haematinics without side effects and the need to change the drugs would have achieved resolved anaemia at term successfully compared to those who have with odds value of 0.14 ( $P < 0.001$ ) (Gómez-Ramírez et al., 2018). In relation to this, a clear algorithm should be made available in the clinic for medical doctors to refer to in choosing the most appropriate hematinic since the beginning of antenatal care. The list of haematinics should also be revised by the clinic authority to provide more efficacious haematinic in future with fewer side effects (in subsequent budget plan).

Multiple logistic regression, however, identified that concomitant IDA status at booking was the only significant factor predicting the anaemia treatment outcome ( $P < 0.01$ ). This has indeed been observed in other studies done previously (Abd Rahman et al., 2022; Breymann, 2015; Igbinosa et al., 2022; Di Renzo et al., 2022). Therefore, it is recommended for all medical doctors to assess and verify the past medical history of all antenatal patients including previous history of iron deficiency anaemia so that specific treatment can be tailored accordingly. The role of pre-pregnancy care and services should be emphasized and be carried out properly in the clinic together with a regular audit on its implementation.

## LIMITATION

Our study was based on the clinical audit outcome in which proper sample size calculation was not required to be done. Therefore, the number of our samples might be considered low. Our study also was unable to capture diet history among patients, which is important to be screened to identify possible nutritional deficiency as the main cause of anaemia. Therefore, in future, a more structured clinical study should be conducted

involving bigger sample sizes from a large number of health clinics within a longer study duration. Policymakers and higher authorities from the Ministry of Health should also be invited to be involved in the study to tackle this issue seriously.

## CONCLUSION

Resolving anaemia at term gestational age is indeed challenging. Identifying IDA status at the early gestational period together with maintaining compliance with the same highly effective dose haematinic would make the achievement possible. It is recommended that optimal efficacy haematinic is used since early antenatal booking to avoid intolerance and side effects.

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