



## Haematinic Pill Chart Partner – An Innovative Production for the Management of Anaemia in Pregnancy in Perak, Malaysia

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### ABSTRACT

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Anaemia is one of the most prevalent health problems in the world, affecting almost half a billion women of reproductive age.<sup>1</sup> Major recognised contributing factor of anaemia in pregnancy is iron and folate deficiency. Many antenatal patients are not adherent to the iron supplementations prescribed.

The objectives of this innovation, Haematinic Pill Chart Partner (HPCP), was to improve compliance of iron supplementation by antenatal anaemic patients, to achieve Hb < 11 gm% at 36 weeks of pregnancy, to provide comprehensive and effective health education to all antenatal patients, to reduce time of consultation as well as to produce a pill chart in a cost effective manner.

Time taken for initial doctor's consultation pre and post HPCP was analysed from the clinic's antenatal record book. 10 patients in January 2018 (pre-intervention) and 12 patients in January 2019 (post-intervention) were compared. Mean time taken and cost for production of one pill chart were calculated. There was marked reduction in the percentage of antenatal patients with Hb < 11gm% at 36 weeks of pregnancy by 6.9%; from 8.3% in 2018 to only 1.4%. HPCP proved to be comprehensive and effective. 20 patients (100%) were satisfied (Patient's Satisfaction Survey) and 5 doctors (100%) were satisfied (Doctor's Satisfaction Survey) using HPCP. There was marked reduction in time taken (26 minutes) for doctor's consultation. Cost of production of one HPCP was only RM 8.00.

HPCP was found to be a very useful, user-friendly, and effective in the management of anaemia in pregnancy in Buntong Health Clinic.

### INTRODUCTION

Anaemia is a recognised complication during the antenatal phase. In Malaysia, 30% of women in the reproductive age group have anaemia.<sup>2</sup> One of the major factors of anaemia during pregnancy is due to iron and folate deficiency. Anaemia in pregnancy also frequently happens in patients from the lower socioeconomic status in the community.<sup>3</sup>

Anaemia is defined as a condition in which the number of red blood cells or the haemoglobin (Hb) concentration within them is lower than normal. Haemoglobin is needed to carry oxygen and if there is haemoglobin deficiency or abnormal red blood cells, there will be a decreased capacity of the blood to carry oxygen to the body's tissues. This results in symptoms such as fatigue, weakness, dizziness and shortness of breath. The severity of anaemia is classified as below<sup>3</sup>:

1. Severe anaemia: Hb < 7 gm%
2. Moderate anaemia: Hb 7 – <9 gm%
3. Mild anaemia: Hb 9 - <11 gm%

During the antenatal period, the placenta will require and absorb large amounts of iron from the pregnant mother which will lead depletion in iron supplementation. In majority of antenatal patients, the amount of iron supplements available is not enough to meet the increased requirement

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during the antenatal period. Additional iron supplements is certainly required and this is possible by consuming high iron rich food or by taking iron supplements. About 80% of the iron storage is in the blood circulation, hence, the severe reduction or loss of haemoglobin will be when a person losses blood, especially during delivery.<sup>3</sup>

Anaemia in pregnancy is a major cause of complications contributing to the morbidity and mortality of the mother and baby. These complications include post-partum haemorrhage, giving birth to premature baby, low birth weight baby as well as perinatal mortalities. This can be prevented by taking adequate iron supplementation during pregnancy.<sup>3</sup>

In Malaysia, 49% of pregnant women are not compliant to consumption of iron supplementation.<sup>2</sup> It was also reported that 39% of post-partum women also are not compliant in consuming iron supplementation within the first 2 weeks after delivery.<sup>4</sup> Adherence to iron supplementation is of utmost importance to ensure no complications happen to the mother or baby as stated above.<sup>3</sup>

To ensure that the prevalence of anaemia in pregnancy (Hb < 11gm%) at 36 weeks of pregnancy is better or lower than the year before, “*Bahagian Pembangunan Program Kesihatan Awam Kementerian Kesihatan Malaysia 2015*” had produced a manual, which is known as “*Manual Pelaksanaan Program Kepastian Kualiti National Indicator Approach (NIA)*”, whereby the percentage of antenatal anaemic women achieving Hb < 11gm% at 36 weeks of pregnancy must be better or lower than the previous year.<sup>3</sup>

In Buntong Health Clinic, majority of pregnant women come from the lower socioeconomic class. This poor socioeconomic status is an extremely difficult problem to overcome as it contributes largely to the high percentage of antenatal anaemic women in Buntong Health Clinic. Many of these patients are single mothers, husbands with smoking, alcohol and drug addiction problems.

Many of these patients hardly have income to buy healthy and iron rich food to increase iron supplementation during pregnancy. These patients also have many small children at home to look after, hence, these patients work day and night to earn double income to manage their household expenses. As such, they become not compliant to the iron supplementation pills given in the clinic.

In 2018, level of Hb < 11gm% achieved in Buntong Health Clinic was 8.3% (Key Performance Indicator target

was < 7.2%). Thus, the Key Performance Indicator could not be achieved in 2018.<sup>5</sup> With that, an innovation project was initiated. We produced the Haematinic Pill Chart Partner to help improve the management of antenatal anaemic patients in our clinic.

### OBJECTIVES AND BENEFITS OF HAEMATINIC PILL CHART PARTNER:

1. To improve the compliance of consuming iron supplementation by antenatal anaemic patients in order to achieve the National Key Performance Indicator which has been set at a level of level Hb < 11 gm% at 36 weeks of pregnancy to be < 7.2% using the Haematinic Pill Chart Partner.
2. To provide comprehensive, effective and efficient health education to all antenatal patients by using the Haematinic Pill Chart Partner.
3. To be able to assist doctors by reducing time of consultation when giving the health education in a more effective and efficient manner.
4. To be able to produce a pill chart in a cost effective manner.

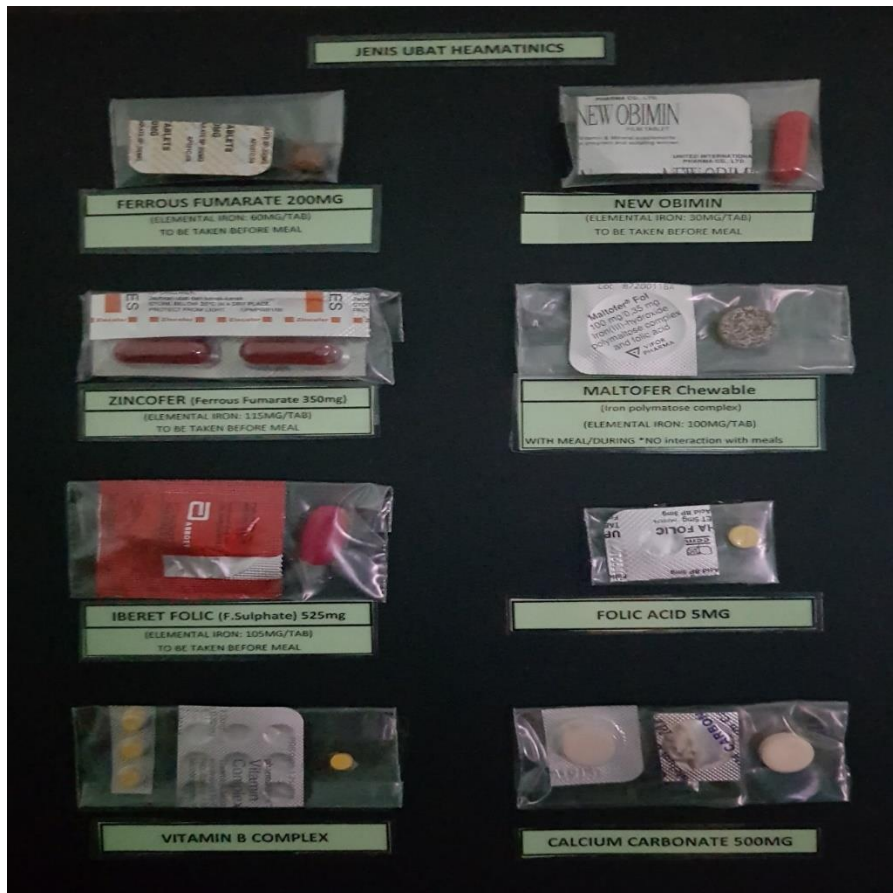
### METHODOLOGY

An innovation group, Buntong Avengers, was formed consisting of four members in December 2018. Members of this group had met and discussed almost monthly on all issues in producing Haematinic Pill Chart Partner and implementing it for use in Buntong Health Clinic. Work flow processes were produced before and after using this pill chart for the initial doctor’s consultation. Haematinic Pill Chart Partner was also replicated for use in Perak state after obtaining permission from *Bahagian Pembangunan Kesihatan Keluarga* and *Bahagian Perkhidmatan Farmasi*, Perak.

Haematinic Pill Chart Partner was used in Buntong Health Clinic from January 2019 until now. The time taken for initial doctor’s consultation pre and post using the pill chart was recorded and analysed from the antenatal record book available in the clinic. There were 10 patients given anaemia counselling in the month of January 2018 (pre-intervention) and 12 patients in the same month, January 2019 (post-intervention). Mean time taken for the consultations were compared and analysed. The cost for the production of one pill chart was also calculated.

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**Figure 1: Haematinic Pill Chart Partner**

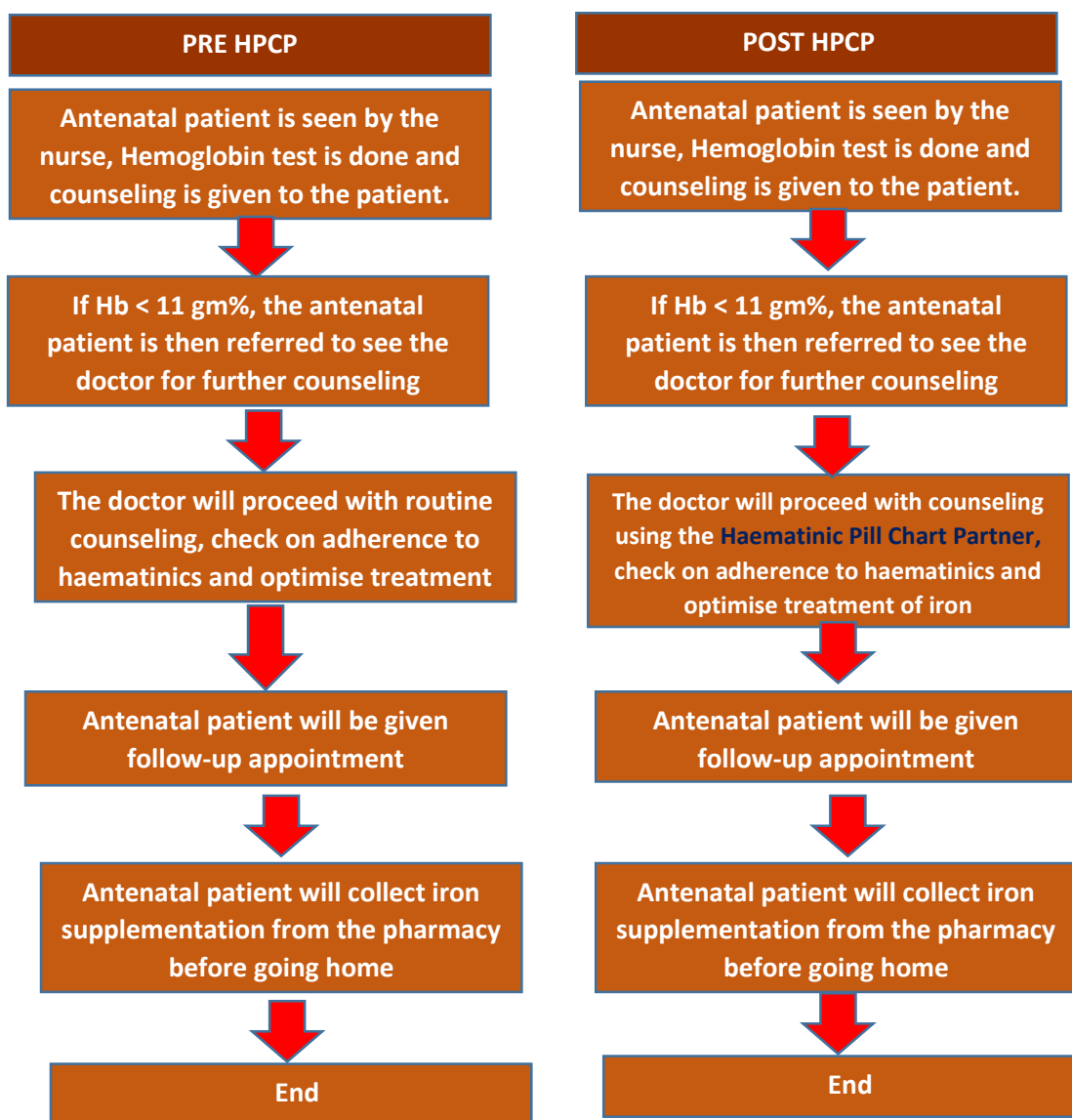


**Table 1: Implementation Plan**

MONTH	IMPLEMENTATION PLAN
December 2018	Buntong Avengers group was formed. Haematinic Pill Chart Partner production idea was established (17.12.2018) Permission was obtained from the District Health Officer prior to the production and usage of Haematinic Pill Chart Partner.
January 2019 until now	Haematinic Pill Chart Partner was used from January 2019 until now.
December 2019	Permission was obtained from the Deputy Director of Health, Perak State Health Department prior to proceeding with this innovation project of Haematinic Pill Chart Partner on 5.12.2019.
January-March 2020	Data collection and analysis pre-intervention (January 2018) and post-intervention (January 2019) was carried out.
March 2020	Copyright certification was obtained on 3.3.2020.

April-June 2020 Innovation project report was completed. Haematinic Pill Chart Partner innovation was replicated for use in Perak State on 18.6.2020. This pill chart was incorporated into the “Manual Pengendalian Ibu Hamil Anemia Di Klinik Kesehatan Negeri Perak Bahagian Kesehatan Awam Dengan Kerjasama Bahagian Perkhidmatan Farmasi Jabatan Kesehatan Negeri Perak 2020”.

Figure 2: Work Process Antenatal Anaemic Patient’s Initial Doctor’s Consultation Pre And Post Using The Haematinic Pill Chart Partner



RESULTS

Table 2: Antenatal Anaemic Patient’s Initial Doctor’s Consultation Pre And Post Using Haematinic Pill Chart Partner

Numbers	Pre-HPCP Time taken for doctor’s consultation (Minute) January 2018	Post-HPCP Time taken for doctor’s consultation (Minute) January 2019
1	60	25
2	50	20
3	55	20

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4	60	20
5	50	30
6	55	35
7	50	35
8	40	20
9	50	30
10	55	15
11	-	40
12	-	30
<b>Total time taken (Minutes)</b>	525	320
<b>Mean time taken for each consultation (Minutes)</b>	52.5	26.7

**TABLE 3: COST FOR PRODUCTION OF HAEMATINIC PILL CHART PARTNER**

<b>MATERIAL</b>	<b>COST/PER UNIT</b>	<b>TOTAL COST</b>
<b>Ferrous fumarate 200mg tablets</b>	<b>RM 0.217/tablet</b>	<b>RM 0.217 x 3 tablets = RM 0.651</b>
<b>Zincofer Capsules</b>	<b>RM 0.0992/capsule</b>	<b>RM 0.0992 X 4 caps = RM0.3968</b>
<b>Obimin/New Obimin (F. Suphate/Fumarate)</b>	<b>RM 0.0071/tablet</b>	<b>RM 0.0071 X 2 tablets = RM0.0142</b>
<b>Maltofer Chewable (Iron polymatose complex)</b>	<b>RM 0.59/tablet</b>	<b>RM 0.59 X 2 tablets = RM 1.18</b>
<b>Iberet Folic (F.Sulphate) 525mg</b>	<b>RM 0.62/Tablet</b>	<b>RM 0.62 x 2 tablets = RM 1.24</b>
<b>Folic acid tablets</b>	<b>RM 0.0209/Tablet</b>	<b>RM 0.0209 X 2 tablets = RM 0.0418</b>
<b>Vitamin B complex tablets</b>	<b>RM 0.0502/Tablet</b>	<b>RM 0.0502 x 4 tablets = RM 0.2008</b>
<b>Calcium Carbonate tablets</b>	<b>RM 0.0594/Tablet</b>	<b>RM 0.0594 x 3 tablets = RM 0.1782</b>
<b>Card board &amp; plastic cover</b>	<b>~ RM 4</b>	<b>RM 4.00</b>

**Total cost = RM 7.90 = RM8.00 for production of each pill chart**

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All the objectives and benefits from using the Haematinic Pill Chart Partner were achieved. There was marked reduction in the percentage of antenatal patients with Hb < 11gm% at 36 weeks of pregnancy by 6.9%; from 8.3% in 2018 to only 1.4% in 2019 with the usage of this pill chart, whereby many more antenatal patients are now more adherent to taking the iron supplementation.

Comprehensive, effective and efficient health education can be given to all antenatal patients using the Haematinic Pill Chart Partner. A Patient's Satisfaction Survey was done on 20 antenatal patients in August 2020 and it was found that 20/20; 100% of them reported that they were very satisfied with the usage of this pill chart as they can understand and comprehend much better and easily on the type and dosage of the supplementation taken. Another Doctor's Satisfaction Survey was also carried out in the same month, August 2020, whereby all 5/5; 100% of the doctors involved in providing antenatal care to patients in Buntong Health Clinic reported that they found using this pill chart was very useful and they were satisfied. Buntong Avengers also obtained an appreciation letter from another district, Muallim District to say that Haematinic Pill Chart Partner has helped in the overall management of anaemia in pregnancy.

There was a marked reduction in the time taken for doctor's consultation as evidenced by reduction of 26 minutes for initial doctor's consultation after using Haematinic Pill Chart Partner. Hence, doctors can see more patients within the same time given with enhanced quality of counselling given during consultations to enable anaemic antenatal patients to comply better to iron supplementation. This will increase the overall productivity of the management of anaemia in pregnancy.

The cost of production of one good quality pill chart is also only RM 8.00 which is very cost effective. The overall cost with regards to iron supplementation can also be saved whereby with the usage of this pill chart, there will be no more wastage of iron supplements as patients will be more compliant and adherent to taking them instead. This is evident with the marked reduction in the percentage of antenatal patients with Hb < 11gm% at 36 weeks of pregnancy which is now only 1.4% in 2019.

### DISCUSSION

The innovation of Haematinic Pill Chart Partner was found to be a very useful, user-friendly, effective and comprehensive chart to improve the overall management of anaemia in pregnancy in Buntong Health Clinic. Buntong Avengers had obtained the Copyright Certification from *Bahagian Hakcipta, Perbadanan Harta Intelek Malaysia (MyIPO)* with the certificate number: CRLY00023775 on the 3.3.2020.

Perak State Health Department has also issued a letter to all health clinics in Perak to replicate the use of this

pill chart in the management of all antenatal anaemic patients. This pill chart has also been incorporated into the "*Manual Pengendalian Ibu Hamil Anemia Di Klinik Kesihatan Negeri Perak Bahagian Kesihatan Awam Dengan Kerjasama Bahagian Perkhidmatan Farmasi Jabatan Kesihatan Negeri Perak 2020*"; page 13.

With the use of Haematinic Pill Chart Partner, Buntong Avengers hopes that this innovation project will benefit all health clinics in Perak and help to achieve Hb < 11gm% at 36 weeks of pregnancy as stated in the National Key Performance Indicator, just as how it has helped Buntong Health Clinic.

### ETHICAL APPROVAL

This innovation project was approved by Ministry of Health Malaysia and was contested for *Anugerah Inovasi KKM Kategori Perkhidmatan 2020*.

### CONFLICT OF INTEREST

None of the authors have any conflict of interest in this study.

### FUNDING

We did not receive any funding to conduct this research.

### DATA SHARING PLAN

Raw data uploaded in publicly available databases can be shared and available upon request.

### HOW DOES THIS PAPER MAKE A DIFFERENCE IN GENERAL PRACTICE?

- Despite iron deficiency anaemia being one of the most prevalent health problems in the world, affecting almost half a billion women of reproductive age, many antenatal patients are not adherent to the iron supplementations prescribed.
- There was marked reduction in the percentage of antenatal patients with Hb < 11gm% at 36 weeks of pregnancy by 6.9%; from 8.3% in 2018 to only 1.4% in 2019 with the usage of this pill chart, whereby many more antenatal patients are now more adherent to taking the iron supplementation.
- The innovation of Haematinic Pill Chart Partner was found to be a very useful, user-friendly, effective and comprehensive chart to improve the overall management of anaemia in pregnancy in Buntong Health Clinic.
- There was a marked reduction in the time taken for doctor's consultation, hence, doctors can see more patients within the same time given with enhanced quality of counselling to ensure improved compliance.
- The cost of production of one good quality pill chart is very cost effective and there will be no more wastage of iron supplements as patients will be more compliant.

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