UNIVERSITI PUTRA MALAYSIA

PREVALENCE AND FACTORS ASSOCIATED WITH ANAEMIA IN PREGNANCY AMONG PREGNANT MOTHERS ATTENDING PUBLIC HEALTH CLINICS IN SEREMBAN, NEGERI SEMBILAN

PUGANESWARY A/P THANGARAJAH

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PUGANESWARY A/P THANGARAJAH

Dissertation Submitted to the School of Graduate Studies, Universiti Putra Malaysia in Fulfilment of the Requirements for the Degree of Master of Public Health

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Abstract of dissertation presented to the Department of Community Health, Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Public Health

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August 2017

Chairperson : Assoc. Prof Dr. Halimatus Sakdiah Binti Minhat, DrPH
Faculty : Medicine and Health Sciences

Introduction: Anaemia still is a threat towards women, pregnant women in particular.

Objective: To determine the prevalence and factor associated with anaemia in pregnancy among pregnant mothers in Seremban, Negeri Sembilan.

Methods: Cross-sectional study involving 482 pregnant mothers in Seremban, Negeri Sembilan, using cluster sampling. Data was collected in April, 2017, using a validated self-administered questionnaire. Analysis was done via IBM SPSS version 22.0, comprising descriptive and inferential analysis.
Result: Prevalence of anaemia in pregnancy was 22.0% during the period of this study, with 95.3% only mildly anaemic. Majority were Malays (74.5%),at 3rd trimester (74.5%), 80.3% aged between 20 to 34 years old, 52.8% from rural area, 64.1% are with tertiary level of education, 51.9% were unemployed, 56.6% were multipara, 24.5% had their child spacing lesser than 2 years. Factors that are associated were maternal education (p= 0.003), parity (p= 0.039), child spacing (p= 0.037), seafood intake (p<0.001), presence of intake of Iron supplement during (p= 0.010), frequency of Iron supplementation intake (p<0.001), and the method of consumption (p=0.001). Multiple logistic regression analysis revealed statistically significant association between maternal age with anaemia in pregnancy (adjusted OR = 2.941, 95% CI 0.404-12.316).

Conclusion: This study revealed that only a small amount of respondents were anaemic and majority of them was having mild level of anaemia (Hb >9g/dL). All

pregnant mothers should be emphasized on the protective effects of seafood and iron supplement during booking visit to prevent the onset of anaemia in pregnancy.

Keywords: Anaemia in pregnancy, pregnant mothers, antenatal, Seremban

Abstrak disertasi yang dikemukakan kepada Jabatan Kesihatan Komuniti,
Universiti Putra Malaysia sebagai memenuhi keperluan untuk
Ijazah Sarjana Kesihatan Awam

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PREVALEN DAN FAKTOR-FAKTOR YANG BERKAITAN DENGAN ANAEMIA SEWAKTU MENGANDUNG DI KALANGAN IBU-IBU MENGANDUNG YANG MENGHADIRI KLINIK-KLINIK KERAJAAN DI DAERAH SEREMBAN, NEGERI SEMBILAN

Oleh

PUGANESWARY A/P THANGARAJAH

Ogos 2017

Pengerusi : Prof. Madya Dr Halimatus Sakdiah Binti Minhat, DrPH
Fakulti : Fakulti Perubatan dan Sains Kesihatan

Pengenalan: Anemia masih menjadi ancaman terhadap kaum wanita, khususnya terhadap golongan ibu hamil.

Objektif: Kajian ini bertujuan untuk menentukan prevalen dan faktor-faktor yang berkaitan dengan anemia sewaktu mengandung di kalangan ibu-ibu mengandung di Seremban, Negeri Sembilan.

Metodologi: Kajian rentas keratan telah dijalankan di kalangan 482 ibu mengandung di Seremban, Negeri Sembilan, menggunakan teknik persampelan secara kluster. Butiran responden diperoleh pada bulan April, 2017, dengan menggunakan borang soal selidik yang telah disahkan.dan dianalisa menggunakan program IBM SPSSversi 22.0

Keputusan: Prevalen anemia sewaktu kehamilan adalah 22.0% dalam tempoh kajian ini. Antara responden yang bermasalah, kebanyakkannya berada dalam trimester ke-3 (74.5%), 95.3% responden mempunyai anemia yang ringan , 74.5% responden anemia adalah orang Melayu, 80.3% berumur antara 20 hingga 34 tahun, 98.1% telah berkahwin, 64.1% mempunyai tahap pendidikan yang tinggi, 25.5% adalah daripada kategori pendapatan tertinggi (≥RM 5000), 51.9% adalah ibu-ibu yang tidak bekerja, 56.6% adalah multipara, 16.0% tidak obes, 19.8% pernah mengalami keguguran, 4.7% mempunyai sejarah pendarahan sewaktu hamil dan 24.5% mempunyai jarak antara kelahiran anak kurang dari 2 tahun. Terdapat hubungan yang signifikan antara anemia sewaktu

hamil dan tahap pendidikan ibu (p = 0.003), pariti (p = 0.039), bilangan tahun jarak antara kelahiran anak terakhir (p = 0.037), pengambilan makanan laut (p <0.001), kehadiran pengambilan suplemen besi sewaktu mengandung (p = 0.010), kekerapan pengambilan suplemen besi (p <0.001), dan kaedah pengambilan suplemen zat besi (p = 0.001). Analisis regresi logistik berganda menunjukkan hubungan ketara secara statistik antara usia ibu dengan anemia semasa mengandung (AOR = 2.941, p = 0.024).

Kesimpulan: Hasil kajian menunjukkan bahawa majoriti ibu mengandung yang terlibat dalam kajian ini adalah bukan anemia; Mereka yang anemia adalah kebanyakan mereka yang mempunyai tahap anemia yang ringan. Semua ibu mengandung perlu diberikan penekanan yang seawal mungkin berkaitan dengan kesan perlindungan pengambilan makanan laut dan suplemen besi agar masalah anemia sewaktu mengandung dapat dielakkan.

Kata kunci: Anemia sewaktu mengandung, ibu mengandung, antenatal, Seremban

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I certify that a Dissertation Examination Committee has met on 1st August 2017 to conduct the final examination of Puganeswary a/p Thangarajah on her dissertation entitled "Prevalence and Factors Associated with Anaemia In Pregnancy Among Pregnant Mothers Attending Public Health Clinics In Seremban, Negeri Sembilan" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Public Health.

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This is to confirm that:

- the research conducted and the writing of this dissertation was under our supervision;
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

WHO	World Health Organization
HIV	Human Immunodeficiency Virus
Hb	Haemoglobin
IDA	Iron deficiency anaemia
Hct	Haematocrit
RBC	Red blood cell
FBC	Full Blood Count
FBP	Full Blood Picture
APH	Antepartum haemorrhage

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Pregnancy is a unique, exciting and often joyous time in a woman's life, as it highlights the woman's amazing and creative nurturing powers while providing a bridge to the future. However, this phase of womanhood could be a journey full of challenges for many women globally. The growing foetus depends entirely on its mother's healthy body for all needs. Consequently, pregnant women must take steps to remain as healthy and well-nourished as they possibly can as the goal of each and every pregnancy is a healthy mother and a healthy baby.

For most women, motherhood is a positive and glorious experience. However, for many it is related to pain, ailments and even death. Risks that may involve the mother's health, baby's health or even both, may endured during pregnancy. Some women had health problems before they became pregnant that could have led to complications, while some may have endured health problems that arise during pregnancy. Some conditions that arise during pregnancy could have been prevented. Approximately, 830 women die from preventable causes related to pregnancy and child birth, on daily basis (World Health Organization [WHO], 2015).

Anaemia, hypertensive disorders, gestational diabetes mellitus and maternal obesity were listed as the most common health conditions or problems a woman may have encountered during pregnancy (Centres of Disease Control and Prevention [CDC], 2016). Early detection and management of the conditions mentioned may have helped to prevent further complications that arise from them. Among the listed conditions, anaemia seemed to be the major threat in public health that affected both rich and poor countries. The differences in socioeconomic conditions, lifestyles and health-seeking behaviours across different cultures contributed to the considerable variation of prevalence of anaemia in pregnancy globally (WHO, 2009)

The World Health Organization (WHO, 2009) described anaemia "as a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs, which vary by age, sex, altitude, smoking, and pregnancy status". It was defined by the World Health Organization as haemoglobin levels of < 11 g/dl, is one of the world's leading causes of disability (UNICEF, 2001), and thus one of the most serious global public health problems.

Anaemia affected 1.62 billion people globally (McLean, Cogswell, Egli, Wojdyla & de Benoist, 2009). This was proven to be a public health problem that affected low-, middle- and high-income countries and had significant adverse health consequences, as well as adverse impacts on social and economic development (Stevens et al., 2013). A total anaemia prevalence was approximated at 43% in developing countries and 9% in developed countries (Abriha, Yesuf, & Wassie, 2014).

In a systematic analysis of population-representative data from 1995 to 2011, it was discovered that global prevalence of anaemia decreased from 43% (39–47) to 38% (34–43) in pregnant women; anaemia prevalence was highest in south Asia and central and west Africa in 2011, however, based on data by each country, it can be said that there were some countries that actually had increment on their prevalence of anaemia among pregnant women (Kassebaum et al., 2014).

Countries like Armenia, Bolivia and Zimbabwe were noted to have raised prevalence of anaemia among pregnant women, in which their prevalence between 1995 to 2011 are 25% increased to 28%, 35% to 38% and 32% to 34%, respectively. In fact, this problem was also faced by some developed countries, whereby the prevalence of anaemia in pregnant women elevated from 16% in 1995 to 17% in 2011 in the United States and 30% to 31% in Japan, meanwhile the prevalence remained static at 23% in the United Kingdom (Stevens et al., 2013).

There are several classifications of anaemia, where these classifications were on the basis of the morphology of the red blood cells, the aetiology of the condition as well as the severity of it. Based on the aetiological classification, anaemia could be subdivided into nutritional and non-nutritional anaemias. Till date, nutritional anaemias are the most common globally, specifically the Iron deficiency anaemia (WHO, 2009). Anaemia occurred at all stages of the life cycle but its risk was higher in state of pregnancy due to an increased iron requirement, physiological demand, blood loss and some infections (Stevens et al., 2013).

Globally, almost half of all pregnant women were affected by anaemia (WHO, 2011). Factors such as socioeconomic conditions, lifestyles and health-seeking behaviours across different cultures contributed to the differences of the prevalence of anaemia in pregnancy worldwide. Anaemia in pregnancy may be associated with low birth weight and increased risk of maternal and perinatal mortality (Kozuki, Lee & Katz, 2012).

WHO's Member States have endorsed global targets for improving maternal, infant and young child nutrition and are committed to monitoring progress. There were 6 targets that was set with the 2nd target dedicated to anaemia in

which target of a 50% reduction of anaemia in women of reproductive age by 2025 (WHO, 2014)

Prevention programs catering to this issue are done worldwide, depending on the cause of anaemia. Based on World Health Assembly (WHA) Global Nutrition Targets 2025: Anaemia Policy Brief, several strategies were drawn as steps towards prevention of anaemia. Among those strategies are, daily oral iron and folic acid supplementation is recommended as part of antenatal care, to reduce the risk of low birth weight, maternal anaemia and iron deficiency, in addition to iron and folic acid, supplements may be formulated to include other vitamins and minerals, according to the United Nations Multiple Micronutrient Preparation (UNIMAP), to overcome other possible maternal micronutrient deficiencies. Besides that, it was suggested that in areas where the prevalence of anaemia among pregnant women is lower than 20%, intermittent iron and folic acid supplementation in non-anaemic, pregnant women is advised, to prevent anaemia and to improve pregnancy outcomes. Prevention strategies during the postpartum period is also emphasized in this policy, whereby iron supplementation, either alone or in combination with folic acid, for at least 3 months, may reduce the risk of anaemia by improving the iron status of the mother (WHO., 2014)

Anaemia preventions are carried out for all the populations in certain nations in this world (WHO., 2014), for instance in Viet Nam, weekly iron-folic acid, together with de-worming for all women of reproductive age, was implemented which lead to tremendous drop in the prevalence of anaemia, similarly in India, national implementation of weekly iron and folic acid supplementation was introduced to approximately 120 million adolescent girls (UNICEF, 2011). In Malaysia, every antenatal mother that were registered under the antenatal services in public health clinics are provides with hematinic (Ferrous fumarate 400 mg, Folic 5 mg, Vitamin B-complex 1 tablet and Vitamin C 100 mg) as a measure to prevent occurrence or worsening of any existing anaemia among pregnant women (MOH, 2013).

Anaemia during pregnancy seemed to be a common problem; however, the consequences could have been highly impactful. The need to prevent the occurrence of anaemia generally, and specifically in pregnant women is vital.

1.2 PROBLEM STATEMENT

Maternal and neonatal mortality were responsible for 3.0 million deaths in developing countries for 2013 and were the important contributors to overall global mortality (WHO, 2015). Based on the Global health estimates 2014 summary tables, it was than further predicted that 90 000 deaths in both sexes and all age groups were due to iron deficiency anaemia alone (WHO, 2014). The maternal mortality rate for Malaysia in the year 2015 was 40 per 100,000 live births (WHO, 2016) and based on the yearly report.

In Malaysia, anaemia was considered as one of the challenges in public health. According to the WHO database on anaemia, 38.3% of women were anaemic in 2004. Based on the 2015 National Health and Morbidity Survey (NHMS) of Malaysia, the overall prevalence of anaemia was 24.6%, and by gender the prevalence was higher among female: 35.5%. In the context of severity of Anaemia, the mild anaemia's prevalence was higher (15.7%) compared to moderate (7.9%) and severe (1.0%). In the latest survey done by the Institute of Public Health (IPH), it was noted that 8.3% of pregnant women aged 15 to 49 years had associated medical conditions, in which the prevalence of anaemia in pregnancy was 29.3% (IPH, 2016). There were 5 different diseases/conditions that were included in the survey and the prevalence of anaemia was the highest, followed by maternal obesity (14.6%), hyperglycaemia in pregnancy (13.5%), hypertension in pregnancy (5.8%) and heart disease in pregnancy (0.5%).

The National Health and Morbidity Survey for 2015 also revealed the prevalence of anaemia among general population by the states in Malaysia, whereby Negeri Sembilan was noted to have the highest prevalence of 29.7%, compared to all other states in Malaysia. Similar to the estimated national prevalence, the distribution of prevalence among the mild anaemia was the highest (17.4%) compared to moderate (11.7%) and severe (0.6%). However, during the NHMS 2016: Maternal and Child Health, it was noted the prevalence of anaemia in pregnancy in Negeri Sembilan was 15.1%. As a developing country, Malaysia need to combat to further reduce the occurrence of anaemia, specifically among pregnant women, where by this condition is preventable and treatable.

A pregnant mother is physiologically more at risk to develop anaemia. She may have been anaemic throughout the gestation or during specific trimester. Based on various authors, the causes of anaemia were being considered as a multifactorial. Various studies revealed that anaemia had many contributing factors including nutritional, genetic, and infectious disease factors. However, iron deficiency was the cause of 75% of anaemia cases (Balarajan, 2013; Baig-Ansari., 2008; & Haidar, 2010). Conditions involving micronutrients deficiency such as iron deficiency, folate deficiency and vitamin B12 deficiency were considered as the main contributors to the development of anaemia in pregnancy especially in developing countries (Tolentino & Friedman., 2007). Besides, a woman, especially during pregnancy, could have progressed from a healthy non-anaemic status, to a state of low iron storage, to iron deficiency with no anaemia and finally to a clinical iron deficiency anaemia; and this situation was very likely among those with poor compliance towards iron supplementation (WHO, 2001).

The complications that arise from anaemia during pregnancy vary according to the severity. An anaemic pregnant mother faces a higher risk of complications at delivery, a higher risk of early and preterm deliveries, and a higher risk of delivering premature children and children with a low birth weight

for their gestational age (Cogswell, Parvanta, Ickes, Yip & Brittenham, 2003). Maternal death, post-partum haemorrhage and spontaneous abortion are the consequences of maternal anaemia, especially those with severe anaemia, Hb <7 g/dl. (Rasmussen, 2007). Furthermore, anaemia during pregnancy, particularly those with anaemia in all the trimesters, were associated with low birth weight and may lead to intra uterine growth retardation (Moghaddam & Barjasteh, 2015).

At this era, with all the technology and development in medicine, anaemia still remains as a burden globally. Even being one of the most common condition encountered during pregnancy, there are very few studies being done to address this issue in Malaysia, especially in Negeri Sembilan, therefore gives a purpose to this research. It is with great hope that the findings from this study will be useful for the development of anaemia awareness and prevention programs.

1.3 RESEARCH QUESTION

A few research questions were developed to address the issue of anaemia during pregnancy:

1. What is the prevalence of anaemia in pregnancy among pregnant mothers in Seremban, Negeri Sembilan?

2. What are the contributing factors associated with anaemia in pregnancy during pregnancy among pregnant mothers in Seremban, Negeri Sembilan?

3. What are the predictors of anaemia in pregnancy among pregnant mothers in Seremban, Negeri Sembilan?

1.4 SIGNIFICANCE OF STUDY

Despite tremendous effort to battle this issue, anaemia still manage to sustain as one of the major public health concern nowadays. Minimal studies were done in Malaysia in regards to iron deficiency anaemia in pregnancy. In fact, there are no studies related to this issue in Negeri Sembilan. As mentioned earlier, the prevalence of anaemia Negeri Sembilan is 15.3% in 2016. The knowledge on specific reason for the high occurrence of anaemia among pregnant women in Malaysia, specifically in Negeri Sembilan, is still mysterious. Therefore, it is highly vital to conduct this study to determine the associated factors and the predictors of anaemia in pregnancy among pregnant mothers. It is hoped that information obtain from this study could assists relevant authorities and agencies to plan relevant preventive programs in improvising the current anaemia control, prevention and awareness program in Negeri Sembilan to further reduce the prevalence of anaemia in pregnancy.

1.5 RESEARCH OBJECTIVES

1.5.1 General Objective

The general objective of this study is to determine the prevalence and factor associated with anaemia in pregnancy among pregnant mothers in Seremban, Negeri Sembilan.

1.5.2 Specific Objectives

The specific objectives of this study are:

i. To determine the prevalence of anaemia in pregnancy among pregnant mothers in Seremban, Negeri Sembilan.

ii. To determine the distribution of the respondents according to:

   a. Socio-demographic characteristics (Maternal age and type of residence)

   b. socio-economic factors (Maternal educational level, maternal employment status and family/household income)

   c. obstetric history/factors [Parity, history of abortion, history of bleeding during current pregnancy (antepartum haemorrhage, APH), last child birth before current pregnancy (pregnancy spacing), number of fetus in current pregnancy]

   d. nutritional factors (status of vegetarianism, intake of chicken/meat and egg, intake of seafood, intake of vegetables daily, intake of fruits daily intake of cereals daily and excessive intake of tea in a day.)

   e. compliance towards iron supplementation

   f. presence of comorbidity (maternal obesity and maternal smoking habit)

iii. To determine the association between anaemia in pregnancy and:

a. socio-demographic characteristics
b. socio-economic factors
c. obstetric history/factors
d. nutritional factors
e. compliance towards iron supplementation during pregnancy
f. presence of comorbidity

iv. To determine the predicting factors of anaemia in pregnancy among pregnant mothers in Seremban, Negeri Sembilan.

1.6 HYPOTHESIS

The research hypothesis are:

H_1 There is an association between socio-demographic characteristics (maternal age and type of residence) with anaemia in pregnancy.

H_2 There is an association between socio-economic factors (maternal education level, maternal employment status and family/household income) with anaemia in pregnancy.

H_3 There is an association between obstetric history/factors (parity, history of abortion/ bleeding during pregnancy, last child birth and number of fetus) with anaemia in pregnancy.

H_4 There is an association between compliance towards Iron supplementation during pregnancy with anaemia in pregnancy.

H_5 There is an association between nutritional factors (status of vegetarianism, intake of meat/chicken/fish per day, intake of green vegetables per day, intake of fruits per day and intake of black tea per day) with anaemia in pregnancy.

H_6 There is an association between maternal comorbidities (maternal obesity and maternal smoking habit) with anaemia in pregnancy.

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