COMPLIANCE OF PREGNANT WOMEN REGARDING IRON SUPPLEMENTATION IN VIENTIANE MUNICIPALITY, LAO P.D.R

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ABSTRACT

The purpose of this study was to determine the factors related to iron tablet consumption behavior among pregnant women in Vientiane Municipality, Lao P.D.R. The sample consisted of 340 pregnant women who received iron tablet from four hospitals, in Vientiane Municipality during 6-30 January 2004. Data were collected by interviewing.

The results showed that a low level of compliance among pregnant women, regarding iron supplementation, was at 65.6%, while a high level of compliance was observed by only 34.4 %.

From the analysis of Chi-square test, factors significantly related to the compliance of pregnant women regarding iron supplementation, at p-value <0.05, were knowledge about anemia, perceived benefits and obstacles of taking action, perceived threat (susceptibility and seriousness) of anemia and cues to action (information and advice from different sources). The factors, which were not related to the compliance of pregnant women regarding iron supplementation, were demographic socio-economic factors such as age, occupation, education level, family income and ethnic group.

The results of this study suggest that health personnel should encourage and provide information and recommendations to people, including pregnant women and their husbands, promote benefits of taking iron tablets and perception of susceptibility of pregnant women of getting anemia.

KEY WORDS: COMPLIANCE / PREGNANT WOMEN / IRON DEFICIENCY ANEMIA/ IRON SUPPLEMENTATION

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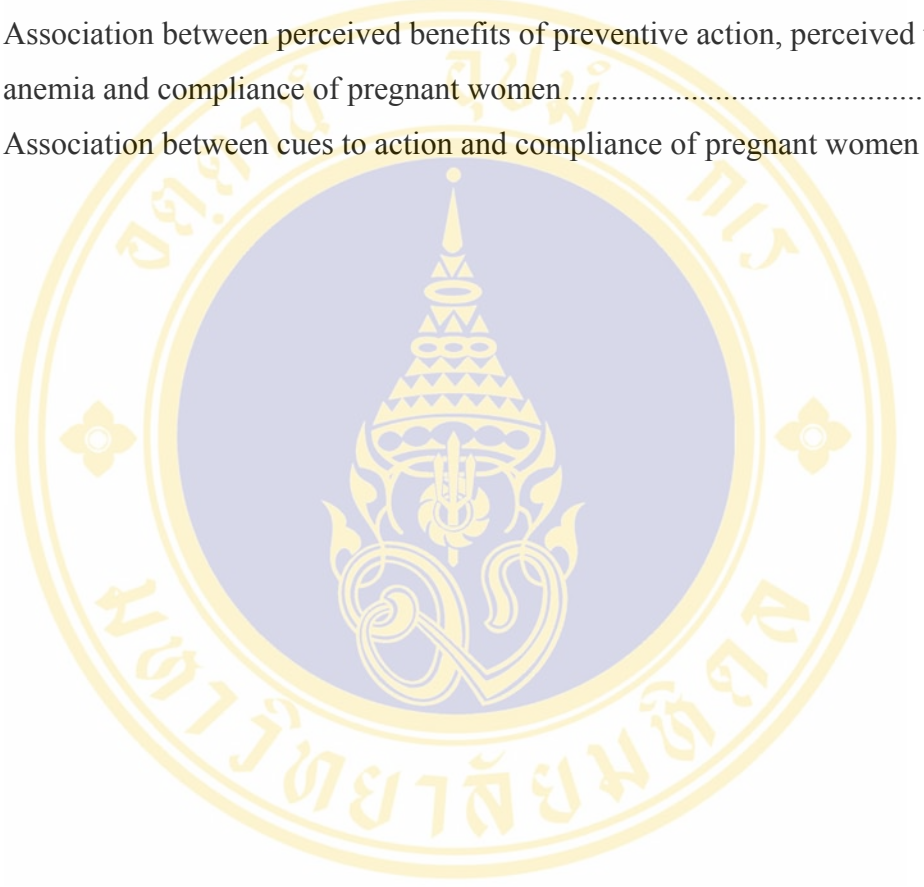

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CHAPTER I
INTRODUCTION

1.1 Rationale and justification of the study

The World Health Organization (WHO) estimates that anemia affects about 2 billion people in the world, or about one-third of the population, women suffering the most (1). Iron deficiency and anemia are not synonymous, but the prevalence of anemia is by far the commonest indicator used to monitor Iron deficiency. Compared to other regions in the world, South and Southeast Asia has the highest average prevalence of anemia (56% and 44.7% respectively) (2). Iron deficiency anemia could increase maternal mortality due to post partum bleeding (3). Furthermore, it also could affect physical growth, intellectual and psychomotor development of infants and preschool children (4, 5). In Lao PDR, Iron deficiency anemia is also a commonest problem affecting pregnant women, women of childbearing age and children:

The report of the National Health Survey (2000) reveals the following results: 26% of the population had moderate anemia (Hb between 7-<11 mg/dl). The percentage of anemia was predominant in 0-5 year's group (46.25%) and in over 60 year's group (32.05%). Two percent had symptoms of severe anemia (6). A study conducted by the maternal and child health center in 1997 in Vientiane Municipality (n=608 pregnant women in 116 villages in 9 districts) showed an anemia prevalence of 27.6% (7)

The mortality rates for mothers; infants and children under five in the Laos are approximately 530/100,000 live births, 82/1000 live births and 106/1000 live births respectively (8). It is likely that a reduction in the level of iron deficiency anemia in all the above groups would contribute to a reduction in the respective mortality rates.

As a public health measure, iron supplementation has been the recommended strategy for alleviating anemia in pregnant women. WHO recommended daily dose of two tablets, each contain 60mg of element iron plus 250 μg of folate, taken throughout the second half of pregnancy in developing countries(9).Several randomized controlled studies compared hematological changes in pregnant women who received iron supplementation, ranging between 15and 240 mg/ day (10, 11, 12,13). Study of iron supplementation in Thai rural pregnant women showed that 120mg elemental iron given daily from mid pregnancy until delivery significantly reduced the prevalence of anemia (10, 14, 15).

Unfortunately, most of iron supplementation program has been less effective than expected. The main obstacle to iron supplementation program is low compliance associated with undesirable gastrointestinal side effects, such as nausea, vomiting, constipation and gastrointestinal discomfort (16, 17). In Thai study in the northeastern, side effects from the 120mg /day dose was found to be 10and 13% (10, 15).

Iron supplementation project in Laos aimed to reduce iron deficiency anemia among pregnant women to 10% by 2002(18). The project intends to provide iron /folate tablets to 80.000 pregnant women through MCH clinics and recommends that pregnant women take at least 90 iron tablets during their pregnant. But there is no routine monitoring system in place for assessment of whether women take the iron tablets or not. National health survey report 2000 reveals that only 13.6 % of 1126 pregnant women take these tablets (6)

The Laos reproductive health survey 2000 (RHS 2000) (8) shows that 93% of pregnant women do not take iron tablets, 6% take less than 90 tablets and only 1% takes at least 90 tablets. Since the usage of iron tablets is extremely low, intensive effects need to formulate realistic strategy and actions to improve this situation.

Refers to the problem mention above, Therefore, the main ideological of this research was aimed to study on compliance of pregnant women regarding iron tablets

consumption in Vientiane Municipality, the capital of Lao PDR. This is comprised of nine districts; the estimated population is approximately 531,800 people. The number of reproductive aged women is 60,697 (19).The prevalence of anemia among pregnant women in Vientiane Municipality was 27.6% (7).

The study aims to determine the relationship between the compliance of pregnant women regarding iron tablets consumption and the following factors such as demographic, socio-economic, knowledge of anemia; perceived benefits of preventive action, perceived threat of anemia, cues to action regarding the Health Belief Model.

1.2 Research Question

What are factors related to the compliance of iron tablets consumption among pregnant women in Vientiane Municipality, Lao PDR?

1.3 Research Objective

1.3.1 General Objectives

To determine the factors related to iron tablets consumption behavior among pregnant women in Vientiane Municipality, Lao PDR.

1.3.2 Specific Objectives

To determine the compliance of pregnant women regarding iron supplementation

To determine the relationships between demographic socio-economics factors (Age, occupation, education level, ethnics, family income), knowledge of anemia and compliance of pregnant women regarding iron tablets consumption.

To determine the relationships between Perceived benefits of preventive action and compliance of pregnant women regarding iron tablets consumption.

To determine the relationships between the Perceived threat of anemia and compliance of pregnant women regarding iron tablets consumption

To determine the relationships between cues to action and compliance of pregnant women regarding iron tablets consumption.

1.4 Conceptual framework

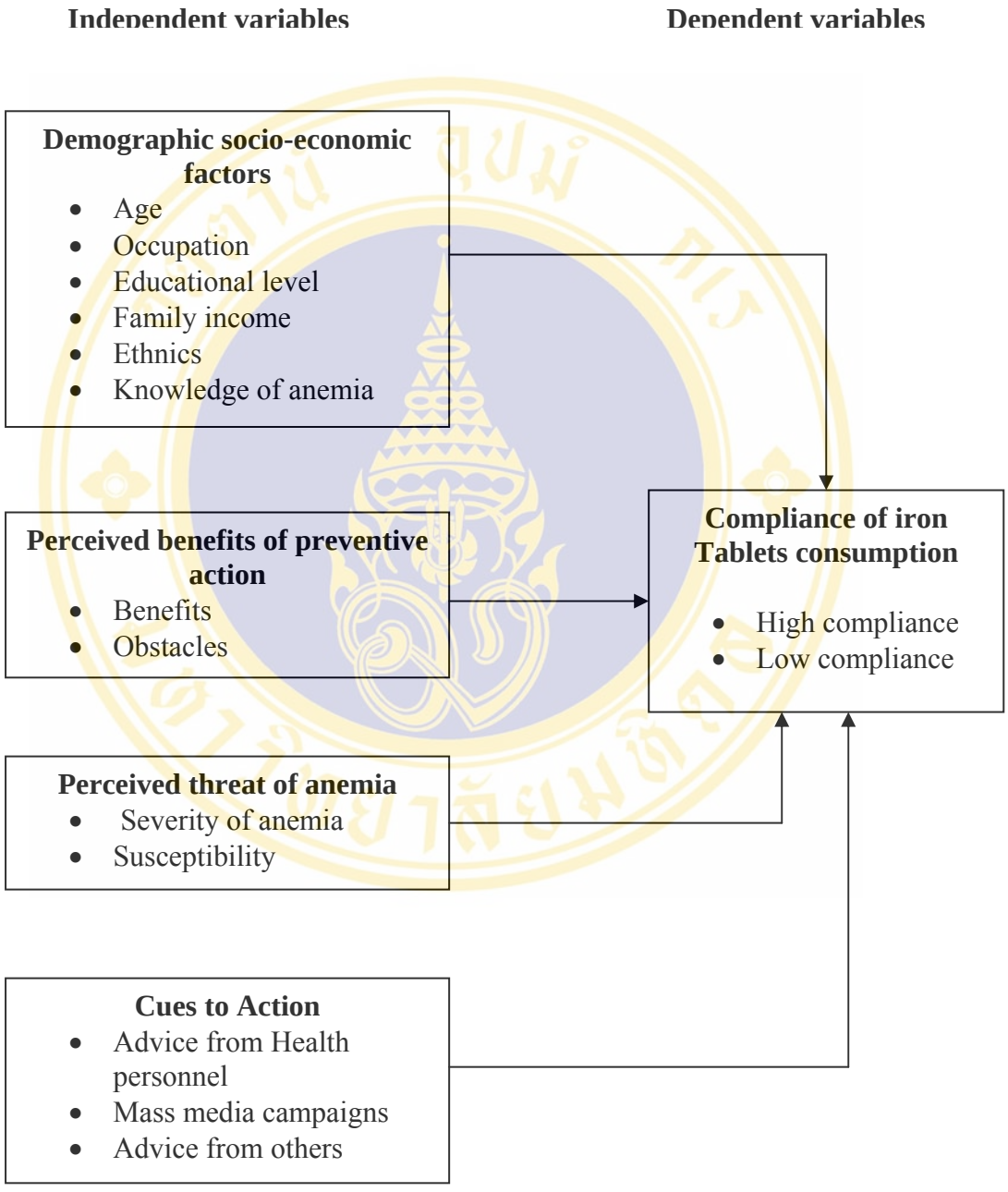

Figure 1 : Conceptual framework

1.5 Research Hypothesis

1. There are relationships between age and compliance of pregnant women regarding iron tablets consumption.

2. There are relationships between occupation and compliance of pregnant women regarding iron tablets consumption.

3. There are relationships between education and compliance of pregnant women regarding iron tablets consumption.

4. There are relationships between family income and compliance of pregnant women regarding iron tablets consumption.

5. There are relationships between ethnic and compliance of pregnant women regarding iron tablets consumption.

6. There are relationships between knowledge of iron deficiency anemia and compliance of pregnant women regarding iron tablets consumption.

7. There are relationships between perceived benefits of preventive action (benefits, obstacle) and compliance of pregnant women regarding iron tablets consumption.

8. There are relationships between perceived susceptibility, seriousness of anemia and compliance of pregnant women regarding iron tablets consumption.

9. There are relationships between cues to action and compliance of pregnant women regarding iron tablets consumption.

1.6 Operational definition of studied variables

1.6.1 Independent variable

Age of pregnant women: In this study, the ages of sample populations were divided in to 3 groups. Pregnant women who were < 20 years old were classified in group 1, those who were aged between 20-30 years old were in group 2, the pregnant women who were aged > 30 years old were classified in group 3.

Occupation: The occupation was defined as what are the pregnant women doing in her daily life, this included activities made (or did not make) income to her families. In this term the occupation was divided into 5 categories:

- Housewife and farmer
- Private staff
- Business
- Government staff
- Others

Education level: The Education level of the pregnant women was classified into the following:

- Primary level: included pregnant women who completed 5 years in primary school and Illiterate
- Secondary level: this included pregnant women who completed 3 years at the lower secondary school & 3 years of upper secondary school
- University level: included who finished university level

Family income: in this study, the average earned of money by both husband and wife was considered as a monthly income of the family. The family income in this study was classified in to three groups:

- Low income (< 300.000 kip /M)
- Medium income (300.000 – 900.000 kip/M)
- High income (> 900.000 kip/M)

Ethnics: In this study, ethnic of the pregnant women was classified into two categories:

- Lao lum and foreigners (people of Lao, Tai ethnic and foreigners who lives in low land area)
- Lao sung and Lao theung (people of Hmong and mon-kmer ethnic who lives in mountain area)

Knowledge of anemia: The knowledge of anemia was composed of 12 questions about cause, symptom, effect, treatment and prevention of anemia. The correct answer will be given one score, incorrect answer will be given 0 score. The total score was 0-12. The knowledge of anemia was classified into 3 groups.

Good level = 80-100 % of total
Middle level = 60-79 % of total
Low level = 0-59 % of total

Perceived benefits and obstacles of preventive action: Were consisted of 12 questions about benefits of iron supplementation in reducing the threat of anemia and obstacles of taking iron tablets among pregnant women. The answer of each question had three rating scales: agree, disagree, not sure. The positive perception questions were got the score as follow:

Agree = 3 scores
Not sure = 2 scores
Disagree = 1 score

The negative perception questions will be vice versa. The total score was 12 – 36 scores. Than the perceived benefits and obstacles was divided in to 2 groups:

High level ($\geq \overline{X}$)
Low level ($< \overline{X}$)

Perceived threat of anemia: Were consisted of 12 questions about severity of anemia and susceptibility to anemia of pregnant women. The answer of each question had three rating scales: agree, disagree, not sure. The positive perception questions were given the score as follow:

Agree = 3 scores

Not sure = 2 scores

Disagree = 1 score

The negative perception questions will be vice versa. The total score was 12 – 36 scores. Than the perceived threat of anemia was divided in to 2 groups:

- High level ($\geq \overline{X}$)
- Low level ($< \overline{X}$)

Cues to action: Were consisted of seven questions about received information of anemia from different sources such as from poster leaflet, newspaper, journals (active action); from TV, radio, doctor others medical personnel, close friends, husband (passive action)

The answer of each question had two rating scales: yes and no. The positive answer from 2 active action questions will be given 2 scores, and another positive answer from passive questions will be given 1score. The total score was 0-9 scores. Then the cues to action were divided in to 3 groups:

- Good level ($> \overline{X}$ + S.D)
- Middle level ($\overline{X} \pm$ S.D)
- Low level ($< \overline{X}$ - S.D)

1.6.2 Dependent variable

Compliance of iron tablets consumption:

In this study, the compliance of the pregnant women regarding iron tablets consumption was classified in to 2 categories: high compliance and low compliance

- High compliance: take iron tablets every day or > 3 days/week
- Low compliance: don't take or take iron tablets ≤ 3 days/ week

1.7 Limitation of the study

Because of the limitation of time and budget, the sample of the study was selected from 4 hospitals (Hospital based)

CHAPTER II
LITERATURE REVIEW

Regarding the objectives of the study, the following information was reviewed

2.1 Important of iron
2.2 Iron metabolism
2.3 Iron absorption
2.4 Iron during pregnancy
2.5 Iron deficiency anemia
2.6 Prevalence of anemia
2.7 Implementing programs to control Iron deficiencies
2.8 Factors affecting compliance of iron tablets consumption
2.9 Health Belief Model

2.1 Important of iron

Iron is an important nutrient, which plays vital roles in the metabolism including for production of hemoglobin, myoglobin, cofactors of protein and enzymes. Hemoglobin is an essential element of erythrocytes, and hemoglobin is the largest pool of iron in the body (20, 21, 22).

Iron deficiency could affect physical growth, intellectual and psychomotor development of infants and preschool children. (23, 24,25, 26). In all age group, iron deficiency can increase fatigue, decrease immunity and increase infections (3, 17).

Iron deficiency anemia increase risk of maternal mortality, premature, prenatal complications and anemia in label infancy (3,27,28,29,30)

2.2 Iron metabolism

Iron in the body can be divided into two groups functional and non-functional iron, functional iron is iron used in the metabolism like hemoglobin and myoglobin and iron that is the component of enzymes. Non-functional iron is storage iron and transport iron. Almost all of human iron is in hemoglobin red blood cells (20,21,22). Usually; human body can balance absorbed iron and iron losses (14). A tight balance operating in the intestinal mucosa controls an uptake of iron from external sources. When the iron store is lowered, the absorption increases. Once iron is absorbed, it is incorporated into transferring and transported to tissues. Excess iron is stored as ferritin or hemosiderin in the liver and reticulo-endothelial system (14).

2.3 Iron absorption

Iron is absorbed in duodenum and jejunum of small intestine (21). There are two forms of iron intake from food, namely, heme iron and non-heme iron. Heme iron is readily absorbed (31). Heme iron can be absorbed in cell by binding to its receptors and entering into cell, after that heme is degraded to iron, carbon monoxide and bilirubin by enzyme heme oxygenase (32). This iron is, then, transported into blood circulation to serve cells in the body (20).

Nonheme iron has two forms, ferrous and ferric form (20). Irons in ferric form are reduced to ferrous iron ions. Then iron is transferred to protein in the human and becomes iron-binding protein. Then, iron –binding protein binds to specific transporter to transferrin- like protein. After that, transferring-like protein delivers iron to cells (32).

2.4 Iron during pregnancy

Iron requirement increases during pregnancy, drastic increases in iron requirements begin around the second trimester of pregnancy when the expansion of

red cells mass starts. This rise reaches its peak at the beginning of the third trimester (33).

Before the increase in red cell mass, plasma volume expands to supply circulatory fluids for both mother and fetus (34).

Total iron demands during pregnancy with a single fetus average 1,000 to 1,100mg (35,36) the expansion of red cell mass to increase the maternal blood volume is about 450mg of iron (37). Iron transferred to and accumulated in fetus, umbilical cord and placenta are approximately 350mg (38). About 150-250 mg irons is in the blood loss at delivery (39). Basal losses of iron from the body continue during pregnancy and amount to about 230- 240mg (35,36).

The need for iron increase almost linearly until term (40,41). Requirement during the first trimester are relatively small, 0,8mg /day, and rise during the second and third trimesters to a high of 6.3mg/day (42). The additional required for pregnancy is 2,5mg /day throughout the whole pregnancy. Women without iron stores or with minimum stores going into pregnancy will require supplements for synthesis of the amounts of hemoglobin required (14).

2.5 Iron deficiency anemia

Anemia is widely used as a measure of iron deficiency. Several complicating factors must be borne in mind, both in terms of the relation between anemia and iron deficiency and in terms other causes of anemia. Iron deficiency is estimated to be twice as prevalent as anemia, where malaria is not endemic (43).

The population can be divided into four groups: anemic and iron deficient, anemic for reasons other than iron deficiency, iron-deficient and not anemic, and neither anemic nor iron-deficient (44) (Fe↓- no anemia, Fe↓- anemia, Fe = - no anemia, Fe = anemia).

Anemia is usually consider a measure of iron deficiency, because prevalence of anemia not related to iron deficiency anemia (not closely that caused by malaria) and non-anemic iron deficiency may roughly balance, but this relationship has not been verified for a range of countries (2).

Anemia may be defined as a state which the quantity or quality circulating red cells is reduced below the normal level by measuring the hemoglobin concentration in the blood which is controlled by a haemostatic mechanism (45). WHO gives hemoglobin level "below which anemia is likely to be present "(46):

a. Children 6 months - 6 years <110 g/l
b. Children 6 months- 14 years <120 g/l
c. Adult males < 130 g/l
d. Adult female (non-pregnant) < 120 g/l
e. Adult female (pregnant) < 110 g/l

Table 1 The definition of degrees of severity

Degree of anemia	Hemoglobin (Hb.) (g/l)	Hamatocrit(PCV) (%)
Moderate	70 – 109	24 – 37
Severe	40 – 69	13 – 23
Very severe	< 40	< 13

The causes of anemia are a deficiency of hemopoietic factors, genetic disorders infections and increased losses of blood (45).

Generally, there are 3 main causes of anemia:

- Blood loss from circulation, external or internal hemorrhage
- Hemolytic, i.e. destruction of red cell (thalasemia)
- Reduced production of red cells and hemoglobin, dyshemopoiesis including nutritional anemia (deficiency of one or more essential nutrients) which most common are iron, folic acid and vitamin B 12 (46).

2.6 Prevalence of anemia

The relative levels of anemia by region in non-pregnant women can be seen in table 2. South Asia has the highest average prevalence of anemia, at about 56%; the prevalence is 44.7% in Southeast Asia. The prevalence in Sub-Saharan Africa is about 40.8 %,and the Near East and northern Africa and Central and South America have prevalence between 20%and 30%.Comparison test (ANOVA) between regions show that the situation in South Asia is significantly worse than that in all other regions, except Southeast Asia(2).

The estimates for pregnant women are shown in table 3. The prevalence in South Asia is again significantly worse than in other regions, except Southeast Asia and sub-Saharan Africa. The variation by region tends to be higher among the pregnant women, which confirms a wider spread in anemia prevalence's between subgroups and perhaps more questionable reliability. Despite this variation, a consistent trend of higher prevalence's among pregnant women than among non-pregnant women is evident across all regions (2).

Table 2 Prevalence of anemia (hemoglobin, <120g/l) in pregnant women 15-49 years of age

Prevalence of anemia (%)				
Region*	**Sample size (Country-years)**	**Average for 1975-1997**	**Estimate for 1995**	**Trend (% point/year)**
South Asia	19	56.0	53.4	-0.21
Southeast Asia	18	44.7	42.5	-0.23
Middle America Caribbean	25	28.3	27.6	-0.07
South America	14	22.8	25.0	+0.15
Sub-Saharan Africa	32	40.8	36.0	-4.45
Near East and northern Africa	14	25.4	24.3	-0.18
China	4	23.2	-	-
Pacific islands	3	33.6	-	-

Source: Mason J; Mahshid L; Nita D, Kavita S and Megan D. The Micronutrient report Co-published by Micronutrient Initiative 2001, Ottawa, Canada

*****Region as defined by ACC/SCN (1992, P.5**)**

Trends calculated by regression .None of the trends were significant. Trend for all data: B = -0.56, n = 129, p =0.11.

South Asia significantly higher than Near East and northern Africa and the American regions($p < 0.05$)

Table 3 Prevalence of anemia (hemoglobin, <110g/l) in pregnant women 15-49 years of age

Region*	Prevalence of anemia (%)			
	Sample size (Country-years)	Average for 1975-1997	Estimate for 1995	Trend (% point/year)
South Asia	18	59.7	53.9	- 0.48
Southeast Asia	23	52.1	52.7	+ 0.01
Middle America Caribbean	26	38.0	34.8	- 0.33
South America	18	34.0	27.2	- 0.60
Sub-Saharan Africa	43	46.4	48.5	+ 0.21
Near East and northern Africa	19	37.7	34.1	- 0.50
China	6	30.3	-	-
Pacific islands	2	20.8	-	-

Source: Mason J; Mahshid L, Nita D, Kavita S and Megan D. The Micronutrient report. Co-published by Micronutrient Initiative. 2001, Ottawa, Canada.

*Region as defined by ACC/SCN (1992, P.5).

Trends calculated by regression. None of the trends were significant. Trend for all data: ***B*** = -0.56, n=129, p=0.11.

South Asia significantly higher than Near East and northern Africa and the American regions ($p<0.05$)

There are few studies of anemia in the Laos:

Survey of women of childbearing age in Luangprabang province in 1995 found an anemia prevalence of 31-40 % (47).

Study of anemia among pregnant women conducted by the maternal and child health center in March – May 1997 in Vientiane Municipality (n= 608 pregnant women in 116 village in districts) showed an anemia prevalence of 27.6% (7).

The report of the National Health Survey (2000) reveals the following results: 26% of the population had moderate anemia (Hb between 7-<11 mg/dl). The

percentage of anemia was predominant in 0-5 year's group (46.25%) and in over 60 year's group (32.05%). Two percent had symptoms of severe anemia (6).

2.7 Implementing programs to control Iron deficiencies

There are three types of programs (2):

a. Supplementation is a medical approach to treating and preventing iron deficiency and involves administration of iron tablets. Supplementation is the method of choice when the deficiency is severe and life threatening or when access to regular intake of iron from food limited and there is high likelihood of severe deficiency episodes.

b. Dietary diversification or modification aims to correct dietary behaviors that lead to iron deficiencies and to ensure that deficient populations have access to foods rich in micronutrients.

c. Fortification is the addition of iron to foods that are regularly consumed and as such, it can deliver iron to a large population through the daily diet.

About half of the countries in developing world reported adoption of a national policy for iron supplementation.

Pregnant women are the most common target group for iron supplementation programs, and it's mainly for this group that data on program coverage are available. program coverage for the 39 countries reporting such data varies widely, some countries reported up to 100%(e.g. Cuba and Nicaragua), whereas other, such as Tunisia, reported only 10% coverage(2)

In Lao P.D.R., supplementation is the strategy to correct iron/folate deficiency among pregnant women.

The first National Plan of Action for Nutrition (NPAN) in Laos (18) was finally adopted by the government decree in january1996 and a plan of action for its implementation was developed in November 1997 the NPAN was developed by the government in collaboration with WHO and UNICEF and the strategies outlined in it closely reflect these of UNICEF (as stated in the MPO for 1998-2002), A main NPAN goal is to reduce the prevalence of anemia in pregnant women to less than 10% by the year 2002 the NPAN strategy, devised in order to achieve the above target, is to:

1. Provide the iron to all pregnant women on a regular basis.

2. Conduct hemoglobin surveys to determine the prevalence of anemia in women of reproductive age. And the second NPAN was adopted by the government in 2001(48).

Following the announcement that the Micronutrient Initiative (MI), Netherland government would supply UNICEF with iron tablets for use in developing countries; The Laos Government through UNICEF Vientiane, made a request for 21,600.000 tablets, which will ensure that adequate supplies are available at all MCH facilities in the Laos for 2001-2002. The number of tablets required was based on providing tablets from the third month of pregnancy through to the third month postpartum for all pregnant women in the country who receive some type of antenatal care at MCH facilities each year (approximately 35% of total pregnant women, i.e. about 70.000 women). In addition, provision was made for supplementation of a further 10.000 women who may have contact with trained birth spacing volunteers and trained birth attendance (TBA). It is estimated 270 tablets for each pregnant woman.

2.8 Factors affecting compliance of iron tablets consumption

Daily iron supplementation for pregnant women has been shown to be efficacious in reducing the prevalence of anemia (49, 50). However, iron supplementation program for pregnancy has not been shown to be successful as a large-scale program (50).

Experiences on iron supplementation projects in Thailand (10,14,15) showed that a number of factors have to be taken into consideration. These include demographic socio-economic, number of attending ANC, knowledge of anemia, biological, knowledge on benefits of iron supplementation and availability of information & advices factors.

In the Laos reproductive health survey 2000 (RHS 2000)(8),questions were asked of all women who give birth during last 5 years prior to the survey, about their usage of iron tablets during the most recent pregnancy. Out of the women whose most recent-born child was born in the last 5 years before the survey, 93% of them this take no iron tablets, while only 6 % take less than 90% tablets and almost none take at least 90 tablets(table 4).The proportion of women who took iron tablets is large : at middle age group 25-34,at lower birth order (less than 3) , at secondary or higher education, in central region ,and in urban areas(table 4).

Table 4 Percent distribution of most recent live births in the last 5 years by iron tablets taken during pregnancy according to background characteristics, LRHS 2000

Background Characteristics	No of iron tablets taken					N of births
	None	< 90 tablets	> 90 tablets	DK*	Total	
Age at birth						
<20	94.3	4.8	0.0	0.9	100.0	738
20-34	92.3	6.1	0.0	1.6	100.0	4060
35+	94.9	4.1	0.0	1.0	100.0	1044
Birth order						
1	89.6	8.5	0.0	1.8	100.0	1094
2-3	91.5	6.5	0.0	1.9	100.0	2080
4-5	95.4	3.8	0.1	0.7	100.0	1374
6+	95.9	3.3	0.0	0.8	100.0	1294
Education						
None	98.2	1.5	0.0	0.3	100.0	2142
Primary school	93.1	5.5	0.0	1.3	100.0	2624
Lower secondary	83.8	12.6	0.0	3.6	100.0	916
Upper secondary	81.4	16.4	0.0	2.2	100.0	134
Higher Education	43.9	43.5	0.0	12.6	100.0	26
Region						
Central	90.3	7.8	0.1	1.9	100.0	2706
North	95.1	3.9	0.0	1.0	100.0	1861
South	96.0	3.2	0.0	0.8	100.0	1275
Residence						
Urban	75.7	19.5	0.0	4.7	100.0	763
Rural	95.6	3.5	0.0	0.9	100.0	5079
Total	93.0	5.6	0.0	1.4	100.0	5842

DK* = differential knowledge

2.9 Health Belief Model (figure 1)

The major outlines of what later came to be known as the Health Belief Model are understandable in the light of the historical perspective provided. The implicit conception following Lewin was of an individual existing in a life space composed of regions some of which were positively valued (positive valence), others of which were negatively valued (negative valence), and still others of which were relatively neutral. Diseases, if they were represented in the life space at all, would be regions of negative valence, which could be expected to exert a force moving the person away from that region, unless doing so would require him to enter the region of even greater negative valence. One's daily activities were thus conceived of as a process of being pulled by positive forces and repelled by negative forces. The earliest characteristics of the Model, as they were translated from the foregoing abstraction, were that in order for an individual to take action to avoid a disease he would need to believe that he was personally susceptible to it, That the occurrence of the disease would have at least moderate severity on some component of his life, and that taking a particular action would in fact be beneficial by reducing his susceptibility to the condition or, if the disease occurred, by reducing its severity, and that it would not entail overcoming important psychological barriers such as cost, convenience, pain, embarrassment. With respect to taking a test for the early detection of a disease, the same factors was deemed necessary, but in addition there was also the requirement that the individual believe he could have the disease even in the absence of symptoms (51,52,53)

Perceived susceptibility: individuals were believed to vary widely in their acceptance of personal susceptibility to a condition. At one extreme might be the individual who denies any possibility of his contracting a given condition. In a more moderate position is the person who may admit to the "statistical" possibility of a disease occurrence, but a possibility that is not likely to happen. Finally, a person may express a feeling that he is in real danger of contracting the condition. In short, as it has been measured, susceptibility refers to the subjective risks of contracting a condition.

Perceived Seriousness: Convictions concerning the seriousness of a given health problem may also vary from person-to-person. The degree of seriousness may be judged both by their degree of emotional arousal created by the thought of a disease as well as by the kinds of difficulties the individual believes a given health condition will create for him.

A person may, of course, see a health problem in terms of its medical or clinical consequence. He would thus be concerned with such questions as whether a disease could lead to his death. On the other hand, reduce his physical or mental functioning for long periods, or disable him permanently. However, the perceived seriousness of a condition may, for a given individual. Include such broader and more complex implications as the effects of the disease on his job, on his family life, and on his social relations. Thus, a person may not believe that tuberculosis is medically serious, but may believe that its occurrence would be serious if it created important psychological and economic tensions within his family.

Perceived susceptibility and severity having a strong cognitive component are at least partly dependent on knowledge.

Perceived Benefits of Taking Action and Barriers to Taking Action: The acceptance of one's susceptibility to a disease that is also believed to be serious was thought to provide a force leading to action, but not defining the particular course of action that was likely to be taken.

The direction that the action takes was thought to be influenced by beliefs regarding the relative effectiveness of known available alternatives in reducing the disease threat to which the individual feels subjected. His behavior was thus thought to depend on how beneficial he believed the various alternatives would be in his case. Of course, there must be available to him at least one action that is subjectively possible. An alternative is likely to be seen as beneficial if it relates subjectively to the reduction of one's susceptibility to or seriousness of an illness. Again, the person's beliefs about the availability and effectiveness of various courses of action, and not

the objective facts about the effectiveness of action, determine what course he will take. In turn, his beliefs in this area are undoubtedly influenced by the norms and pressures of his social group. The literature on delay in seeking diagnoses for cancer symptoms may reflect a conflict between a strong feeling of *susceptibility* to what is regarded as a most serious disease and a real conviction that there are no *efficacious* methods of prevention and/or control.

An individual may believe that a give action will be effective in reducing the threat of disease, but at the same time see that action itself as being inconvenient, expensive, unpleasant, painful or upsetting. These negative aspects of health action serve as *barriers* to action and arouse conflicting motives of avoidance. Several resolutions of the conflict were thought to be possible. If the readiness to act was high and the negative aspects were seen as relatively weak, the action in question was likely to be taken. If, on the other hand, the readiness to at was low while the potential negative aspects were seen as strong; the negative aspects functioned as barriers to prevent action. Where the readiness to act was great and the barriers to action were also great; the conflict was thought to be more difficult to resolve. The individual was highly oriented toward acting to reduce the likelihood or impact of the perceived health danger. He was equally highly motivated to avoid action since he saw it as highly unpleasant or even painful.

Sometimes, alternative actions of nearly equal efficacy might be available. For example, the person who feels threatened by tuberculosis but fears the potential hazards of x-rays may choose to obtain a tuberculin test for initial screening.

Nevertheless, what can he do if the situation dose not provides such alternative means to resolve his conflicts? Experimental evidence obtained outside the health area suggested that one of two reactions occur. First, the person might attempt to remove himself psychologically from the conflict situation by engaging in activities, which did not really reduce the threat. Vacillating (without decision) between choices may be an example. Consider the individual who feels threatened by lung cancer, who believes quitting cigarette smoking will reduce the risk but for whom smoking serves

important needs. He may constantly commit himself to give up smoking soon and thereby relieve, if only shortly, the pressure imposed by the discrepancy between the barriers and the perceived benefits.

A second possible reaction was a marked increase in fear or anxiety if the anxiety or fear became strong enough, the individual might be rendered incapable of thinking objectively and behaving rationally about the problem. Even if he were subsequently offered a more effective means of handing the situation, he might not accept it, simply because he could no longer think constructively about the matter.

Cues to Action: The variables which were originally described under the heading of perceived susceptibility and severity as well as the variables that defined perceived benefits and barriers to taking action have all been subjected to research which will be reviewed in subsequent chapters. However, one additional variable was believed to be necessary to complete the model, but it has not been subjected to careful study.

A factor that serves as cue, or a trigger, to appropriate action appeared to be necessary. The combined levels of susceptibility and severity provided the energy or force to act and the perception of benefits (less barriers) provided a preferred path of action. However, we believed the combination of these could reach quite considerable levels of intensity without resulting in overt action unless some instigating event occurred to set the process in motion. In the health area, such events or cues might be internal (e.g. perception of bodily states) or external (e.g. interpersonal interactions, the impact of media of communication, or receiving a postcard from the dentist).

The required intensity of a cue that was deemed sufficient to trigger behavior presumably varied with differences in the levels of susceptibility and severity. With relatively little acceptance of susceptibility to or severity of a disease, rather intense stimuli would be needed to trigger a response. On the other hand, with relatively high levels of perceived susceptibility and severity even slight stimuli may be adequate. For example, other things being equal, the person who barely accepts his

susceptibility to tuberculosis will be unlikely to check upon his health until he experiences rather intense cues. On the other hand, the person who readily accepts his constant susceptibility to the disease may be spurred into action by the mere sight of a mobile x-ray unit or a relevant poster.

Unfortunately, the settings for most of the research on the Model have precluded obtaining an adequate measure of the role of cues. Since the kinds of cues that have been hypothesized may be quite fleeting and of little intrinsic significance (e.g. a casual view of a poster urging chest x-ray), they may easily be forgotten with the passage of time. An interview taken months or years later could not adequately identify the cues. Since the kinds of little intrinsic significance (e.g. a casual view of a poster urging chest x-ray), they may easily be forgotten with the passage of time. An interview taken months or years later could not adequately identify the cues. Freidson has described the difficulties in attempting to assess interpersonal influences as cues. Furthermore, respondents who have taken a recommended action in the past will probably be more likely to remember preceding events as relevant than will respondents who were exposed to the same events but never took the action. These problems make testing the role of cues most difficult in any retrospective setting. A prospective design, perhaps a panel study, will probably be required to assess properly how various stimuli serve as cues to trigger action in an individual who is psychologically ready to act.

This study explored various factors related to compliance of taking iron tablets among pregnant women in Vientiane Municipality, Lao P.D.R. according to the Health Belief Model.

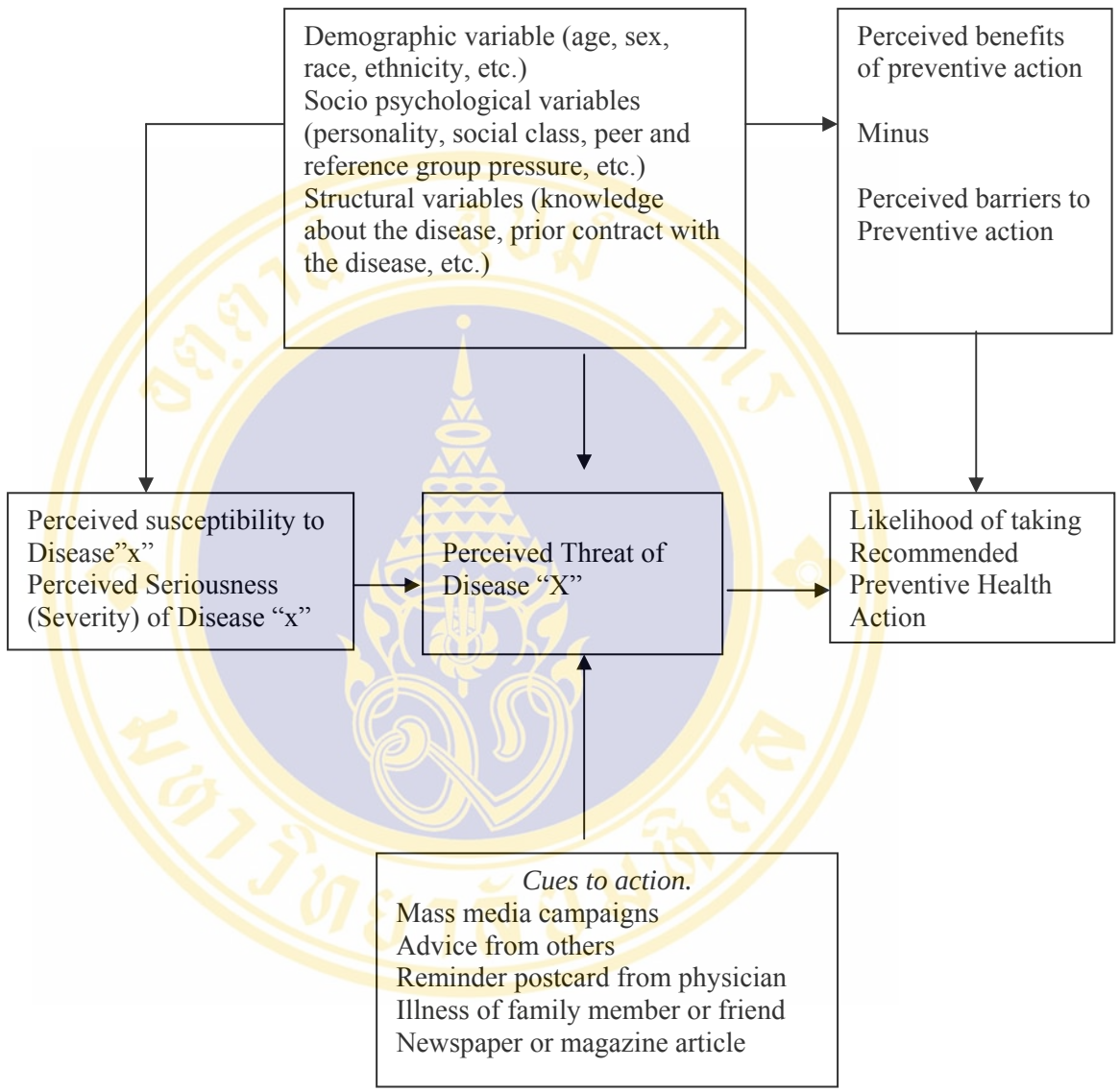

Figure 2 : the "Health Believed Model" as predictor of preventive health behavior (after Becker et al [9])

CHAPTER III
RESEARCH METHODOLOGY

3.1 Research design

The research design to be applied in the study was cross-sectional study design, since both the behavior of iron consumption and the related factors to be investigated were determined at the same time.

3.2 Study population

The target population for the study was" pregnant women age 15-49 years old", who received iron tablets in 4 hospitals of Vientiane Municipality: Mahosot Hospital, Mother and Child Hospital, Mitaphab Hospital and Sethathilat Hospital.

3.3 Sample size

The sample size was calculated based on following formula

$$n = \frac{Z^2_{\alpha/2}\, pq}{d^2}$$

n: the desired sample size

$Z_{\alpha/2}$: Level of statistical significance for two sided test =1.96.

d: absolute precision of the study = 0.05

p: the prevalence of anemia among pregnant women in Vientiane Municipality= 27.6%=0,276 (7)

q = 1-p = 0.724

$$n = \frac{(1.96)^2 (0.276)(0.724)}{(0.05)^2} = 307$$

n =307+10%. So the total sample size was340

3.4 Sampling frame

The research sample was selected from pregnant women in Vientiane Municipality Hospitals: Mahosot Hospital, Mother and Child Hospital, Mittaphab Hospital and Sethathilat Hospital.

3.5 Sampling technique (figure 2)

Using stratified sampling technique. Pregnant women in each hospital were collected proportionally to size. For reach the cases we will interview all pregnant women in the period of data collection until we got the needed number of sample.

Number of pregnant women of each study hospital was shown in table 5

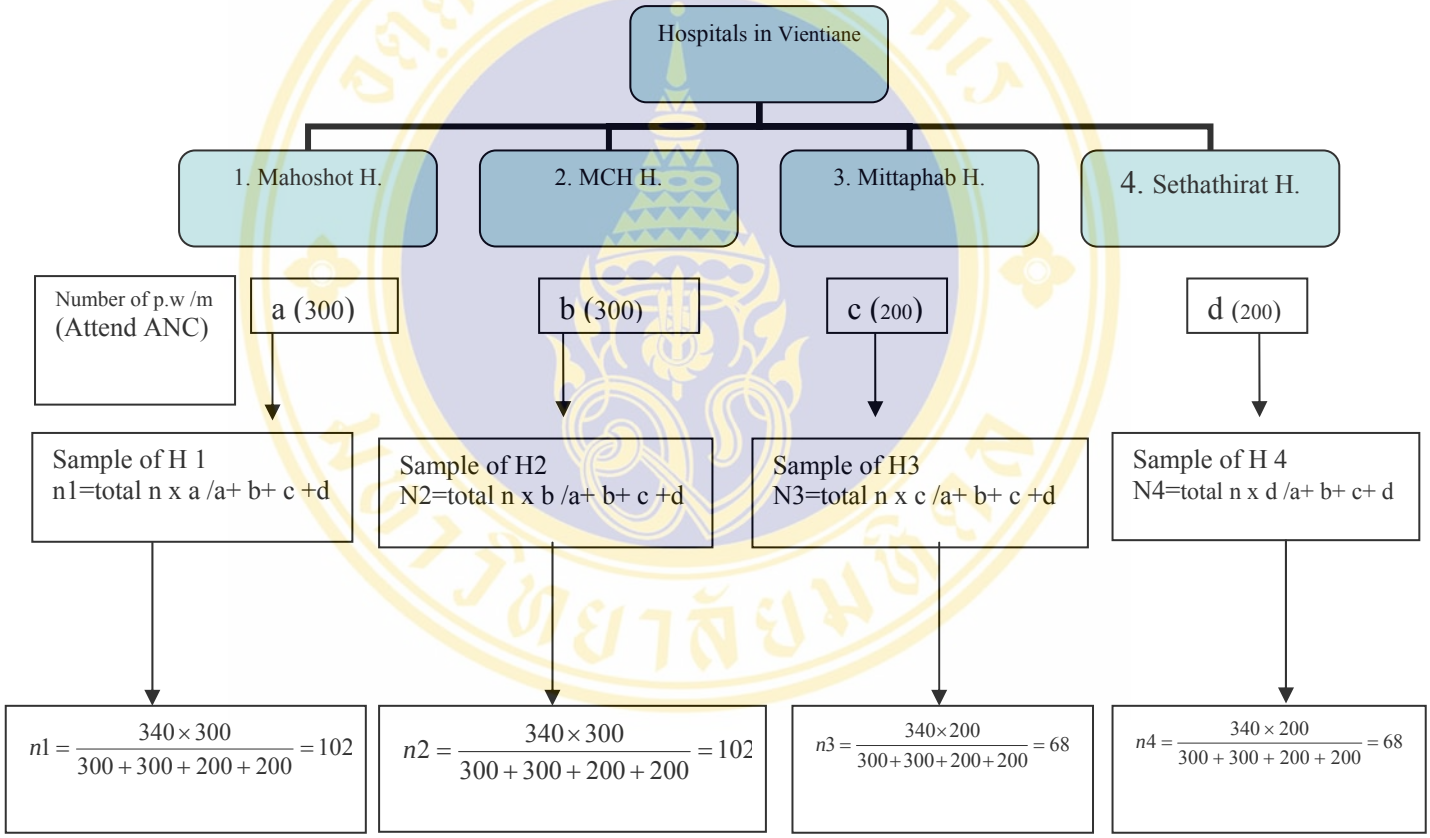

Figure 3: The sampling frame and technique

Note: a b c d = number of pregnant women attending ANC in one month at 4 hospitals

Table 5 Number of pregnant women selected from four Vientiane Municipality Hospitals.

Name of the Hospital	Number of sample
1. Mahosot	102
2. Mother and child	102
3. Mittaphab	68
4. Sethathirat	68

3.6 Research instruments for data collection

The questionnaire was developed for data collection. It was finalized and standardized among data collectors

Questionnaire was divided into 5 parts:

Part I: Demographic, Socio-economic and knowledge of anemia factors: 4 questions on the personal characteristics, such as age, occupation, education level, family income and 12 questions on the knowledge of iron deficiency anemia were close- ended, with 3 choices to choose from.

Part II: 12 questions on Perceived benefits of preventive action. (Benefits, Obstacle) The questions were close-ended, with 3 choices to choose from.

Part III: 12 questions on Perceived susceptibility & seriousness of anemia. The questions were close-ended, with 3 choices to choose from.

Part IV: 7 questions on cues to action, with 2 choices to choose from.

Part V: 3 questions on compliance of pregnant women regarding iron tablets consumption. The questions were both close-ended and open-ended.

3.7 Validity and Reliability test

The research questionnaire was translated from English to Lao language. Before the pre-test, the questionnaire was checked and recommended in terms of content-validity by three research consultants (thesis advisors).

The questionnaire was pre-tested with thirty pregnant women who met the criteria of the study. After the pre-test, the questionnaire related to knowledge of anemia, perceived benefits and obstacles of preventive action, perceived threat of anemia were computerize analyzed for reliability test with the result scale (alpha) = 0.6394, 0.7900 , 0.7001, respectively.

3.8 Data collection procedure

Data collectors were trained to ensure that they understand the entire questionnaire very well and mark the answer on the questionnaire form correctly.
The pregnant women were interviewed in 4 Vientiane Municipality Hospitals.

3.9 Data analysis procedure and statistics used

The process of data was screened by quality control, then coding. In this study, the program computer was used for all data analysis.

Descriptive statistic:

Descriptive statistics, namely, mean, median, standard deviation, frequency was reported for characteristics of socio-economic demographic, knowledge of anemia, perceived benefits, perceived susceptibility and seriousness of anemia, cues to action and compliance of pregnant women.

Analysis statistics:

Chi-Square test was used to see the association between independent variables and compliance of iron tablets consumption

CHAPTER IV
RESULTS

This research was the study on factors affecting compliance of pregnant women regarding iron supplementation in Vientiane Municipality; Lao P.D.R. research samples were pregnant women who attended ante natal care at 4 hospitals in Vientiane Municipality from January 6, 2004 to January 30, 2004, number of pregnant women was 340. The research results would be presented in the following 3 parts:

Part 1: The personal characteristics

Part 2: Knowledge of iron deficiency anemia, perceived benefits, perceived susceptibility and seriousness of anemia, cues to action and compliance of pregnant women

Part 3: Relationship between socio-economic demographic factors, knowledge of anemia, perceived benefits, perceived susceptibility -seriousness of anemia, cues to action and compliance of pregnant women.

4.1 The personal characteristics

4.1.1 Age of pregnant women

The average age of pregnant women was 25 years old. The youngest and the oldest were 15 and 43 years old, respectively. A majority of pregnant women (72.1%) were 20-30 years old. About 9.1 percent of subjects were under 20 years old and 18.8 percent were over 30 years old.

4.1.2 Occupation

Half of the pregnant women (54.4 %) were housewife Thirteen percent were private staff, the same as business. While government staffs were 12.6 %. Other occupations (factory workers, weaver, dressmaker, and hairdresser) were about 6.5 %.

4.1.3 Education level

Sixty six point two percent of pregnant women had secondary school level; twenty four percent had primary school level. The percentage of pregnant women who completed university level was 9.7 %, while illiterate = 1.2 %.

4.1.4 Family income

There was the big difference of family income among the pregnant women with the range from 80.000 Lao Kip to 10.000.000 Lao Kip per month (1 US$ = 10.000 kip). The mean of family income was 1.198.436 Lao Kip. Four point seven percent of the pregnant women earned less than 300.000 Kip for their family income, 47.9 % earned 300.000 to 900.000 Kip and 43.2 % of them earned more then 900.000 Kip per month. Four point one percent of pregnant women could not tell about their family income.

4.1.5 Ethnic group

The majority of pregnant women were Lao loum (93.8 %), while Lao Soung, Lao Theung was only 6.2 %.

Table 6 Number and percentage of pregnant women classified by their socio-economic demographic characteristics

Characteristics	Number	Percentage
Age groups (Years) (n= 340)		
< 20	31	9.1
20-30	245	72.1
> 30	64	18.8
Mean= 25.45 SD= 4.95 Min = 16 Max =43		
Occupation (n=340)		
Housewife & Farmer	185	54.4
Private staff	45	13.2
Business	45	13.2
Government staff	43	12.6
Others	22	6.5
Educational level (n =340)		
Illiterate	4	1.2
Primary level	82	24.1
Secondary level	225	66.2
University level	33	9.7
Family income (n = 340)		
Low (< 300.000 kip /month)	16	4.7
Medium (300,000- 900,000 kip/month	163	47.9
High (> 900,000 kip/month)	147	43.2
Missing	14	4.1
Mean = 1,189.436 SD = 1,278.003 Min = 80,000 Max = 10,000,000		
Ethnic group (340)		
Lao Loum and foreigners	319	93.8
Lao Soung and Lao Theung	21	6.2

4.2 Knowledge of iron deficiency anemia, perceived benefits, perceived susceptibility and seriousness of anemia, cues to action and compliance of pregnant women

4.2.1 Knowledge of iron deficiency anemia

It was found that nearly 70 % of pregnant women had middle level of knowledge on anemia. Eleven point two percent had high level; and 19.1 % of pregnant women had low level (Table 7).

It was found that about 53.2 % of pregnant women known the causes of iron deficiency anemia (see appendix B, Table 18). Almost pregnant women had a good knowledge about symptoms of anemia (85.3 %), but they had a poor knowledge about the effect of anemia, for example: for the question. Iron deficiency anemia is the risk factor of premature birth, the incorrect and uncertain answers were 73.2% and for the question: the negative effect of anemia on mother after delivery is the risk of post partum bleeding; the incorrect and uncertain answers were 87.1%.

Majority of pregnant women known about benefits of taking iron tablets for treatment and prevention of iron deficiency anemia (85 %)

Table 7 Number and percentage of pregnant women classified by their knowledge on iron deficiency anemia

Level of knowledge on anemia	Number	Percentage
High level	38	11.2
Middle level	237	69.7
Low level	65	19.1
Mean = 5.9647 SD = 1.9352	min= 0	max = 12

4.2.2 Perceived benefits and obstacles of preventive action (taking iron tablets).

The questionnaire form with 12 questions was developed to measure the perceived benefits and obstacles. The positive perception gets three score, uncertain perception = two scores and negative perception = one score.

Table 8 shows that 71.2 % of the pregnant women had high level of perceived benefits and obstacles of preventive action, while 28.8 % of them had low level

Table 8 Frequency and percentage of pregnant women classified by level of perceived benefits and obstacles taking action

Level of perceived benefits and obstacles		Number	percentage
High level		242	71.2
Low level		98	28.8
Mean = 26.7412	S.D = 3.46036	Min = 18	Max = 36

About the mean score of each question of perceiving benefits and obstacles, (see appendix B, table 19). The highest average scores (2.73) were the question on taking iron tablets making good brest milk. Then the scores of 2.63 were the question on regular iron supply of pregnant women could result in increase of red blood cells. While the question of regular iron supply of pregnant women could result positively in development of newborn babies had 2.63 scores. The lowest scores (1.79) were the Question on long term taking iron tablets is too boring

4.2.3 Perceived susceptibility and seriousness of anemia

Questionnaire form with 12 questions was developed to measure the perceived susceptibility and seriousness of anemia. Positive perception gets three score, uncertain perception = two scores and negative perception = one score.

Table 9 shows that 84.4 % of the pregnant women had high level of perceived susceptibility and seriousness of anemia. While 15.6% of them had low level

Table 9 Frequency and percentage of pregnant women classified by level of perceived susceptibility and seriousness of anemia

Level of perceived susceptibility and seriousness of anemia				**Number**	**percentage**
High level				287	84.4
Low level				53	15.6
Mean =27.9147	SD = 3.18669	Min= 19	Max = 36		

About the mean score of each question (see appendix B Table 20). The highest average scores (2.65) were the question that pregnant women are more likely to have iron deficiency anemia than non-pregnant women. The score of 2.57 were the question that iron deficiency anemia is incurable. The lowest score (1.94) were the question that risk of the development of iron deficiency anemia depends on body weight of pregnant women.

4.2.4 Cues to action

The questionnaire form with 7 questions was developed to measure the cues to action. The positive answer from the questions number two and three (active action) gets 2 score, while another positive answer (passive action) gets one score. Total = nine scores.

Table 10 shows that 3.2 % of the pregnant women had high level of cues to action, while 28.2 % of them had middle level and low level = 68.5 %

Table 10 Frequency and percentage of pregnant women classified by level of cues to action

Level of cues to action	Number	Percentage
High level	11	3.2
Middle level	96	28.2
Low level	233	68.5
Mean = 2.7059 SD = 1.7936	Min = 0	Max = 7

Table 11 Frequency and percentage of cues to action of pregnant women classified by Information and advice sources

Information and advice sources	Number	Percentage
1. You received information about anemia from television, radio	100	29.4
2. You received information about anemia from posters, leaflet…	17	5.0
3. You received information about anemia from newspapers, journals….	51	15.0
4. You received information about anemia from doctors	285	83.8
5. You received information about anemia from other medical personnel (Volunteer, nurses…..)	187	55.0
6. You received information about anemia from close friend	103	30.3
7 You received information about anemia from your husband / relatives.	126	37.1

Table 11 shows that the majority of pregnant women received information about anemia from doctors was (83.8%) and from other medical personnel(55%) only few of pregnant women received information from posters leaflet and newspaper (5% and 15 % respectively)

4.2.5 Compliance of pregnant women

The questionnaire form whit 3 questions: question number one will ask the pregnant women that do you take iron tablets after distribution if yes will go to question number three How many day this week do you take iron tablets . the question number two is an open-ended question to get information from the pregnant women that why you don't take iron tablets irregularly

Table 12 show that 34.4% of the pregnant women had high level of compliance, while 65.6 % of them had low compliance

Table 12 Frequency and percentage of pregnant women classified by level of compliance

Level of compliance	Number	Percentage
High level (4-7 days/week)	117	34.4
Low level (0-3 days/week)	223	65.6

Table 13 shows that the main reason of low compliance of pregnant women regarding iron supplementation was forgetfulness (47.98 %), another reasons were long term taking of iron tablets is to boring, fear of big fetus, nausea and vomiting, gastric pain, fear of obesity, take another vitamin (47.89 %, 16.14 % 13.00 % ,10.76 %, 7.62 %, 4.48 % and 2.69 % respectively).

Table 13 Frequency and percentage of reasons of low compliance of pregnant women regarding iron supplementation.

Causes	Number	Percentage
Forgetfulness	107	47.98
Long term taking of iron tablets	36	16.14
Could result in overweight of fetus	29	13.00
Nausea and vomiting	24	10.76
Gastric pain	17	7.62
Could provoke obesity and lose body shape	10	4.48
Take another vitamin	6	2.69
Is too boring		
Total	**223**	**100**

4.3 Relationship between socio-economic demographic, knowledge of anemia, perceived benefits, perceived susceptibility -seriousness of anemia, cues to action and compliance of pregnant women.

4.3.1. Relationship between socio-economic demographic factors and compliance of pregnant women regarding iron tablets consumption

Age

The relationship between age and compliance of pregnant women was examined by using Chi-square test , it was found that age was not associated with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p > 0.05$), indicating the age of the pregnant women was not related with the compliance of pregnant women (Table 14) .

Occupation

When the relationship between occupation and compliance of pregnant women was examined by using Chi-square test , it was found that occupation was not associated with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p > 0.05$), indicating the occupation of pregnant women was not related with the compliance of pregnant women . (Table 14)

Education level

The relationship between education level and compliance of pregnant women was examined by using Chi-square test, it was found that education level was not associated with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p > 0.05$), indicating the education level was not related with the compliance of pregnant women. (Table 14)

Family income

The relationship between family income and compliance of pregnant women was examined by using Chi-square test, it was found that family income was not associated with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p > 0.05$), indicating the family income was not related with compliance of pregnant women. (Table 14)

Ethnic group

When the relationship between ethnic group and compliance of pregnant women was examined by using Chi-square test, it was found that ethnic group was not associated with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p > 0.05$), indicating the ethnic group was not related with compliance of pregnant women. (Table 14)

4.3.2 Knowledge of iron deficiency anemia

The relationship between knowledge of iron deficiency anemia and compliance of pregnant women was examined by using Chi-square test; it was found that knowledge of iron deficiency anemia had association with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p< 0.05$). The pregnant women with good knowledge had high proportion of good compliance. (Table 15)

4.3.3 Perceived benefits and obstacle of preventive action:

The relationship between perceived benefits and obstacle of preventive action and compliance of pregnant women was examined by using Chi-square test, it was found that perceived benefits and obstacle of preventive action had a positive association with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p< 0.05$), the pregnant women with good perception had high proportion of good compliance. (Table 16)

4.3.4 Perceived susceptibility and seriousness of anemia:

The relationship between perceived susceptibility and seriousness of anemia and compliance of pregnant women was examined by using Chi-square test, it was found that perceived susceptibility and seriousness of anemia had a positive association with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p< 0.05$), the pregnant women with good perception had high proportion of good compliance. (Table 16)

4.3.5 Cues to action:

The relationship between cues to action and compliance of pregnant women was examined by using Chi-square test, it was found that cues to action had a positive association with the compliance of pregnant women regarding iron

supplementation, with statistical significance ($p < 0.05$), the pregnant women with good level of cues to action had high proportion of good compliance (Table 17)

Table 14 Association between demographic socio-economic characteristics and compliance of the pregnant women

Characteristics of pregnant women	Compliance of pregnant women				Total	
	High level		Low level			
	N	%	N	%	N	%
Age (years)						
< 20	10	32.3	21	67.7	31	100
20 – 30	83	33.9	162	66.1	245	100
> 30	24	37.5	40	62.5	64	100
Chi-square = 0.365 df = 2	p-value = 0.833					
Occupation						
Housewife	53	28.6	132	71.4	185	100
Private staff	19	42.2	26	57.8	45	100
Business	16	35.6	29	64.4	45	100
Government staff	20	46.5	23	53.3	43	100
Other	9	40.9	13	59.1	22	100
Chi-square =7.166 df = 4	p-value = 0.127					
Education level						
Primary school	21	25.6	61	74.4	82	100
Secondary school	81	36.0	144	64.0	225	100
University	15	45.5	18	54.5	33	100
Chi-square =4.849 df = 2	p-value = 0.089					
Family income						
< 300.000	5	31.3	11	68.8	16	100
300.000 – 900.000	47	28.8	116	71.2	163	100
> 900.000	61	41.5	86	58.5	147	100
Chi-square =5.558 df = 2	p-value = 0.062					
Ethnic group						
Lao Lum	113	35.4	206	64.6	319	100
Lao Soung	4	19.0	17	81.0	21	100
Chi-square =2.341 df = 1	p-value = 0.126					

Table 15 Association between knowledge of anemia and compliance of pregnant woman

Characteristics	Compliance of pregnant women				Total	
	High level		Low level			
	N	%	N	%	N	%
Knowledge of Anemia						
High level	22	57.9	16	42.1	38	100
Middle level	80	33.8	157	66.7	273	100
Low level	15	13.1	50	76.7	65	100
Chi-square =13.030, df = 2, p-value =0.001						

Table 16 Association between perceived benefits of preventive action, perceived threat of anemia and compliance of pregnant women

Characteristics of Perceived	Compliance of pregnant women				Total	
	High level		Low level			
	N	%	N	%	N	%
Perceived benefits of preventive action						
High level	98	40.5	144	59.5	242	100
Low level	19	19.4	79	80.6	98	100
Chi-square =13.770	df = 1		p-value <0.001			
Perceived threat of anemia						
High level	109	38.0	178	62.0	287	100
Low level	8	15.1	45	84.9	53	100
Chi-square =10.381 df =1,		p-value =0.001				

Table 17 Association between cues to action and compliance of pregnant women

Characteristics Cues to action	Compliance of pregnant women				Total	
	High level		Low level			
	N	%	N	%	N	%
High level	4	36.4	7	63.6	11	100
Middle level	61	63.5	35	36.5	96	100
Low level	52	22.3	181	77.7	233	100
Chi-square = 51.211	df = 2		p-value < 0.001			

CHAPTER V
DISCUSSION

The assessment on compliance of pregnant women regarding iron supplementation in Vientiane Municipality, Lao P.D.R. had been performed in order to use the out come of the study as a guideline in revising and improving the performance and quality of the iron supplementation program in Lao P.D.R. the population in this study were 340 pregnant women who had received iron tablets 60 mg per days at 4 hospitals in Vientiane Municipality. Personal interviewers collected the data. The data was gathered by using a questionnaire form. As for the result discussion this chapter, the researcher had revealed the following important issues.

Part 1: Compliance of pregnant women regarding iron supplementation

Part 2: the relationship between demographic socio-economic factors and the compliance of pregnant women regarding iron supplementation.

Part 3: The relationship between knowledge of iron deficiency anemia and compliance of pregnant women regarding iron supplementation

Part 4: The relationship between perceived benefits of preventive action and compliance of pregnant women regarding iron supplementation

Part 5: The relationship between perceived threat of anemia and compliance of pregnant women regarding iron supplementation

Part 6: The relationship between cues to action and compliance of pregnant women regarding iron supplementation

5.1 Compliance of pregnant women regarding iron supplementation

It was found that 65.6 % of pregnant women had low level, while only 34.4% of them had high level of compliance (table12). Result of this research shows that the level of compliance of pregnant women regarding iron supplementation in Vientiane Municipality, Laos is higher than the data from Laos's national health survey years 2000, which reported that only 13.6 % of 1126 pregnant women take iron tablets after distribution (6). However the level of compliance among pregnant women in Vientiane Municipality from this study still low compare with the result of the study conducted by Lertmulligaporn N (54) which found that the compliance was about 75%.

This study found that the causes of low compliance of taking iron tablets among pregnant women were forgetfulness (47.98 %), side effects (18.38 %), long term taking of iron tablets (16.14%), and fear of having big fetus (13 %) (table 13). This finding correlated with the study by Winichagoon P. (14).In the Thai study, good compliance was retained when pregnant women were assured of the benefits and were prepared to cope with the side effects, close follow-ups and motivation by health personnel were critical to encourage continued supplementation (10).

5.2 The relationship between demographic socio-economic factors and the compliance of pregnant women regarding iron supplementation

5.2.1 Relationship between age and compliance of pregnant women regarding iron supplementation

It was found that there was no association between age of pregnant women and the compliance of iron supplementation, with statistical significance (p-value >0.05) which rejects to hypothesis 1. It could be explain that a majority of pregnant women (72.1 %) were 20-30 years old; therefore, they would have similar opportunities to have knowledge of anemia, perception of benefits and obstacles of preventive action, perception of threat of anemia and cues to action. These factors

were related to compliance of pregnant women regarding iron consumption. This study showed that age of pregnant women was not associated with knowledge (p-value = 0.062) (see appendix B, table 21, 22, 23, 24), perceived benefits and obstacles of taking action (p-value = 0.947), perceived threat of anemia (p-value = 0.477), cues to action (p-value = 0.516) once again, this reason could modify the fact that age of pregnant women was not associated with compliance in taking iron tablets. Results of this study were controversial to previous study of Boonserm K. (55) which revealed that pregnant women with older age had better behaviors in prevention and treatment than pregnant women with younger one.

5.2.2 Relationship between occupation and compliance of pregnant women regarding iron supplementation

The relation between occupation and compliance of pregnant women regarding iron supplementation was not a significant association (p- value = 0.127) which rejected to hypothesis 2 of the study. Result of this study indicated that occupation was not associated with knowledge of anemia (p-value = 0.088) (see appendix B, table 21), perceived benefits and obstacles of taking iron tablets (p-value = 0.896), perceived threat of anemia (p-value = 0.710). It means that occupation pregnant women were not associated with factors related to compliance. Thus, the study could indicate that occupation of pregnant women was not associated with compliance in taking iron tablets. However, a study conducted by Boonserm K (55) reported that occupation was correlated with behaviors of pregnant women in preventing and treatment of anemia. More over, this study also reported that pregnant women with agricultural occupation had worse behaviors in preventing and treatment of anemia than pregnant women whose occupations were government staff and business. This explained that different occupation might affect opportunities in receiving knowledge and information. However, this study could not find any differences of pregnant women with different occupation in receiving knowledge or information of anemia. Thus, this study could conclude that occupation was not associated with compliance of taking iron tablets among pregnant women.

5.2.3 Relationship between Education level and compliance of pregnant women regarding iron supplementation

It was found that the compliance of pregnant women regarding iron supplementation were not associated with their educational level (p- value = 0.089) and this result rejected to the hypothesis 3. This study indicated that knowledge of anemia, perceived benefits and obstacles of taking iron tablets, perceived threat of anemia and received information and advices of pregnant women were not dependent on the education level. Pregnant women with low education level could follow advices of health personnel indifferently from pregnant women with high education level. As a result, their compliance in taking iron tablets would not be different. The result of this study indicated that education level was not associated with knowledge of anemia (p-value = 0.632), perceived benefits and obstacle of taking iron tablets (p-value = 0.191), perceived threat of anemia (p-value = 0.154), cues to action (p-value =0.433)(see appendix B,table 29, 30, 31, 32). Thus, even though education level of pregnant women was different, it was not associated with their compliance. Low education level did not mean pregnant women could not be able to have the knowledge of anemia, perception of benefits in taking iron tablets, perception threat of anemia and access information about anemia from different sources. However a study conducted by Boonserm K. (7) reported that education level was associated with health behaviors in preventing and treatment of iron deficiency anemia in pregnant women.

5.2.4 Relationship between family income and compliance of pregnant women regarding iron supplementation

The study found that family income did not associate with the compliance of pregnant women regarding iron supplementation that rejected to the hypothesis 4. (P-value = 0.062). This study indicated that the factors related to compliance were knowledge of anemia, perceived benefits and obstacle of taking iron tablets, perceived threat of anemia and cues to action (table 15, 16, 17). Pregnant women with low income could follow advices of health personnel and could have the

same level as well as the pregnant women with high income about knowledge of anemia, perception benefits of taking iron tablets, perception threat of anemia and accessibility to information from different sources. Thus, this study could conclude that family income was not significantly related with compliance. This finding contrasts with the result of the study conducted by Boonserm K. (55) which found that family income associated with health behaviors in preventing and treatment of iron deficiency anemia in pregnant women.

5.2.5 Relationship between ethnic group and compliance of pregnant women regarding iron supplementation

There was not a significant relationship between these two variables at p-value=0.126 and this result rejected to the hypothesis 5. It could be explain that a majority of pregnant women (93.8 %) were Lao Loum, therefore they would have similar opportunities to have knowledge of anemia, perception of benefits and obstacles of preventive action, perception of threat of anemia and cues to action. These factors were related to compliance of pregnant women regarding iron consumption (table 15, 16, 17).This study also indicated that pregnant women with different ethnic group could follow advices of health personnel and could also have the same level of knowledge about anemia, perception benefits of taking iron tablets, perception threat of anemia and accessibility to information from different sources. Thus, this study could conclude that ethnic group was not related with compliance. Contrarily to the result of the study conducted by Sananikhom P. (7) which reported that the minority group of people (Lao soung) had higher risk of anemia than the people of Lao loum group of pregnant women.

5.3 The relationship between knowledge of iron deficiency anemia and compliance of pregnant women regarding iron supplementation

The study found that there was a significant association between knowledge on anemia and compliance of pregnant women regarding iron supplementation (p-value= 0.001) which was accepted the hypothesis 6. This could be due to reason that knowledge of pregnant women about anemia in respect of causes, symptoms, effects, treatment and preventive might affect their compliance of iron tablets consumption. And that could explain good level of knowledge about anemia was a factor which could promote individuals in preventing iron deficiency anemia and following recommendation of taking iron tablets. This study reported that 53.2 % of pregnant women known the causes of iron deficiency anemia. Al most pregnant women had a good knowledge about symptoms of anemia (85.3%), but they had a poor knowledge about the effect of anemia: 73.2 % of them misunderstood that iron deficiency anemia is the risk factor of premature birth and 85 % of them did not know correctly that the negative effect of anemia on mother after delivery is the risk of post partum bleeding. the study indicated knowledge of anemia of pregnant women could influence their compliance of taking iron tablets. Good level of knowledge helps pregnant women to have a good perception of benefits and obstacles of taking iron tablets, perception threat of anemia, and accessibility to information and advices from different sources. The better knowledge of pregnant women resulted in better behaviors in preventing and treatment of iron deficiency anemia than pregnant women with lower one. The result of this study was similar to the statement of Boonserm k. (55) that knowledge about iron deficiency anemia associated with health behaviors in preventing and treatment of iron deficiency anemia in pregnant women.

5.4 The relationship between perceived benefits of preventive action and compliance of pregnant women regarding iron supplementation

It was found that perceived benefits of preventive action had an association with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p < 0.001$) which was accepted the hypothesis 7. This explained that perceived benefits of taking iron tablets as necessary for pregnant women result in increase of red blood cells, making good brest milk, could result positively in development of new born babies, safe from postpartum bleeding. All which enable them to have a good compliance of taking iron tablets for preventing and treatment of iron deficiency anemia. At the same time perceived obstacles of taking iron tablets such as fear of big fetus, result difficult delivery, fear of obesity, boring of long term taking iron tablets, side effects of iron tablets, these factors affected also compliance of pregnant women regarding iron supplementation. This study reported that 71.2 % of pregnant women had high level of perceived benefits and obstacles of taking iron tablets, while 28.8 % of them had low level.

This result correlated with the study by Boonserm K. (55), who found that perceived benefits and obstacles of preventive action associated with health behaviors in preventing and treatment of iron deficiency anemia in pregnant women.

5.5 The relationship between perceived threat of anemia and compliance of pregnant women regarding iron supplementation

It was found that there was a significant association between perceived threat of anemia and compliance of pregnant women regarding iron supplementation at p-value < 0.001 which was accepted the hypothesis 8 of the study. This explained that perceived susceptibility to anemia such as pregnant women are more likely to have anemia than non pregnant women, anemia of mother make anemia in new born babies , the higher gestational age is more likely to develop iron deficiency anemia. All which enable pregnant women to understand that taking iron tablets is necessary for preventing and treatment iron deficiency anemia. At the same time perceived severity of anemia such as dangerous of anemia, anemia affects the development of fetus,

anemia affect cognitive development of the child, anemia cause death by postpartum bleeding; these perceptions affected also compliance of pregnant women regarding iron supplementation. This study reported that 84.4 % of pregnant women had high level of perceived threat of anemia, while 15.6 % of them had low level. This result also correlated with the study by Boonserm K. (55), who found that perceived susceptibility, seriousness of anemia associated with health behaviors in preventing and treatment of iron deficiency anemia in pregnant women.

5. 6 The relationship between cues to action and compliance of pregnant women regarding iron supplementation

It was found that cues to action had a significant association with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p < 0.001$) which was accepted the hypothesis 9. and that could explain good level of cues to action (received information and advices about anemia from different sources) were factors which could promote pregnant women in preventing, treatment of iron deficiency anemia and following recommendation of taking iron tablets. This study reported that 83.9 % of pregnant women received information about anemia from doctors and 55% of them received information from other health personnel. Good level of cues to action promoted pregnant women to have a good knowledge of anemia, perception of benefits and obstacles of taking iron tablets, perception threat of anemia. These factors were related to compliance of pregnant women regarding iron supplementation. Thus, this study could conclude that cues to action were associated with compliance. This result correlated with the study by Opaseereevith S. (56) who found that cues to action like received information and advices from different sources had a positive association with the competency of pregnant women to take care themselves.

CHAPTER VI
CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The research on compliance of the pregnant women regarding iron supplementation in Vientiane Municipality, Lao P.D.R., had the objective to determine the factors related to iron tablets consumption behavior among pregnant women in Vientiane Municipality.

6.1.1 Methodology

It was a cross- sectional research, in which the data collection tools were questionnaires, collected within January 2004. The target population for the study is pregnant women age 15-49 years old; the sample group was the 340 pregnant women who received iron tablets. Data collection was done in 4 hospitals of Vientiane Municipality: Mahosot Hospital, Mother and Child Hospital, Mitaphab Hospital and Sethathilat Hospital.

From these four hospitals, eight health personnel in mother and child health department were selected as research assistants/ interviewers. These interviewers after receiving training on data collection technique they divided into four groups and conducted face to face interview with sample pregnant women in four hospitals.

Method of sampling was stratified random sampling.

The statistics used were frequencies, percentages, means, standard deviation, and chi-square test. The level of statistical significance was determined at 0.05.

6.1.2 Descriptive part

Personal characteristics

In the personal characteristics of the pregnant women, it was found that the average age of pregnant women was 25 years old. The youngest and the oldest were 16 and 43 years old, respectively. A majority of pregnant women (72.1%) were 20-30 years old. About 9.1 percent of subjects were under 20 years old and 18.8 percent were over 30 years old.

About half of the pregnant women (54.4 %) were housewife. Thirteen percent were private staff, the same as business. While government staffs were 12.6 %. Other occupations (factory workers, weaver, dress maker, hair dresser) were about 6.5 %.

The majority of pregnant women had secondary school level (66.2 %).Twenty four percent had primary school level. The percentage of pregnant women who completed university level was 9.7 %.

There was the big difference of family income among the pregnant women with the range from 80.000 Lao Kip to 10.000.000 Lao Kip (1US$ to 10.000 kip) per month. The mean of family income was 1.198.436 Lao Kip. Four point seven percent of the pregnant women earned less than 300.000 Kip for their family income, 47.9 % earned 300.000 to 900.000 Kip and 43.2 % of them earned more than 900.000 Kip per month. Four point one percent of pregnant women could not tell about their family income.

The majority of pregnant women were Lao loum (93.8 %), while Lao Soung, Lao Theung was only 6.2 %.

Compliance of pregnant women regarding iron supplementation

It was found that 65.6 % of pregnant women had low level, while only 34.4% of them had high level of compliance.

This study found that the reasons of low compliance of taking iron tablets among pregnant women were forgetfulness (47.98 %), side effects (18.38 %), long term taking of iron tablets (16.14%), and fear of having big fetus (13 %).

Knowledge of iron deficiency anemia, perceived benefits and obstacles of preventive action, perceived susceptibility and seriousness of anemia, cues to action

It was found that nearly 70 % of pregnant women had middle level of knowledge on anemia. Eleven point two percent had high level; and 19.1 % of pregnant women had low level

This study found that 71.2 % of the pregnant women had high level of perceived benefits and obstacles of preventive action, while 28.8 % of them had low level.

It was found that 84.4 % of the pregnant women had high level of perceived susceptibility and seriousness of anemia, while 15.6 % of them had low level.

This study found that 3.2 % of the pregnant women had high level of cues to action, while 28.2 % of them had middle level and low level = 68.5 %.

6.1.3 Analytic part

It was found that age was not associated with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p > 0.05$),

indicating the age of the pregnant women was not related with the compliance of pregnant women.

This study found that occupation was not associated with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p > 0.05$), indicating the occupation of pregnant women was not related with the compliance of pregnant women .

It was found that education level was not associated with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p > 0.05$), indicating the education level was not related with the compliance of pregnant women.

This study indicated that family income was not associated with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p > 0.05$), indicating the family income was not related with compliance of pregnant women.

It was found that ethnic group was not associated with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p > 0.05$), indicating the ethnic group was not related with compliance of pregnant women.

This study found that knowledge of iron deficiency anemia had association with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p < 0.05$). The pregnant women with good knowledge had high proportion of good compliance.

It was found that perceived benefits and obstacle of preventive action had a positive association with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p < 0.05$); the pregnant women with good perception had high proportion of good compliance.

This study found that perceived susceptibility and seriousness of anemia had a positive association with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p < 0.05$); the pregnant women with good perception had high proportion of good compliance.

It was found that cues to action had a positive association with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p < 0.05$); the pregnant women with good level of cues to action had high proportion of good compliance.

This study could conclude that: Factors significantly related to the compliance of pregnant women ($p<0.05$) was knowledge of anemia, perceived benefits, perceived threat (susceptibility and seriousness) of anemia and cues to action. While the characteristic of demographic socio-economic of the pregnant women in terms of age, occupations, education levels, family incomes, were not significant associated with the compliance regarding iron supplementation.

6.2 Recommendation for program implication

As mention above, knowledge of anemia, perceived benefits of preventive action, perceived threat of anemia and cues to action were significantly associated with compliance of pregnant women regarding iron supplementation, thus for promoting good compliance of pregnant women emphasis should be done as following:

1. Knowledge about iron deficiency anemia of pregnant women in respect of causes, symptoms, effects, treatment and prevention should be promoted, especially the knowledge about causes and effects of iron deficiency anemia. First of all the administrators of the iron supplementation program should conduct training courses about knowledge of anemia for health personnel who work at antenatal care units, then these personnel will be the trainer for another including pregnant women.

2. Perceived benefits and obstacles of taking action need to be improved especially perceived of long term taking of iron tablets. Pregnant women should be continually encourage and supported to take iron tablets regularly and for along time. These perceptions could be improved by conducting health education program through mass media, health promotion activities of health personnel.

3. Perceived susceptibility and seriousness of anemia need to be improved among pregnant women .This issues should be considered in the process of developing and managing of iron supplementation program. The managers of this program should attach health education and training courses for health personnel and another including pregnant women.

4. Cues to action such as mass media campaign (T.V. radio, posters, leaflets, newspapers, journals), advices from doctors. And others need to be considered in the process of implementing iron supplementation and health education program.

5. Health personnel at all levels especially at antenatal care units should inform people including pregnant women and their husbands about: Knowledge of anemia, perception of susceptibility and seriousness of anemia, perception of benefits and obstacles of taking iron tablets for treatment and prevention of iron deficiency anemia.

6. For improving compliance of pregnant women regarding iron supplementation, other factors have to be also taken into consideration. These include forgetfulness of taking iron tablets, gastro intestinal side effects.

To reduce forgetfulness, it would be helpful to suggest that each pregnant women will received one packet of iron tablets for one month from health personnel with calendar to check compliance of taking iron tablets by health personnel and then by them self. Support from other persons, especially from family members, from local Lao women union organization is also very important.

6.3 Suggestion for further research

1. Further research on compliance of pregnant women regarding iron supplementation in Laos at the health center levels and on the community based should be undertaken to ensure the factors related to compliance.

2. Further study should be conducted on intervention programs for improving the compliance of pregnant women regarding iron supplementation by improving their knowledge and correcting their perceptions.

3. Study other factors that may have an effect on compliance of pregnant women regarding iron supplementation, such as organizational setting, health personal behavior, and communication, the participation of the hospitals, health centers, communities or local organizations

REFERENCES

1. World Health Organization. Prevalence of anemia among different populations based on national data. Geneva: The Organization; 1997. MDIS Working Paper No.3.
2. Mason J, Mahshid L, Nita D, Kavita S, Megan D. The Micronutrient report: current progress and trends in the control of vitamin A, iodine, and iron deficiencies. Ottawa: International Development Research Centre; 2001.
3. Murphy JF, O'Riodan J, Newcombe RG, Coles EC, Pearson JF. Relation of hemoglobin levels in first and second trimesters to outcome of pregnancy. Lancet 1986; 1: 992-5.
4. Garn SM, Keating MT, Falkner F. Hematologic status and pregnancy outcomes. AM J Clin Nutr. 1981; 34: 115-7.
5. Worthindton R, Vermeersch W. Nutrition in pregnancy and lactation. 3rd ed. Time Mirror: St. Louis; 1985.
6. National Institute of Public Health. Report of the national health survey 2000. Vientiane: The Institute; 2001.
7. Sananikhom B, Pholsena K, Savatry B, Ouipulikeune S, Chanthalansy T, Vongvichit P, Phouluxa K. Anemia among pregnant women between 15-49 years in Vientiane Municipality. Vientiane: MOH, CMS and MCH; 1997.
8. National Statistical. Report of the Lao reproductive health survey 2000, Vientiane; The Center. 2001.
9. World Health Organization. Report of a WHO group of experts on nutritional anemia. Geneva: The Organization; 1972. Technical report series no. 503.
10. Charoenlarp P, Dhanamitta S, Kaewvichai RA. WHO collaborative study on iron supplementation in Burma and Thailand. Am J Clin Nutr 1988; 47: 280-97.

11. Thomson I, Prien-Larsen J, Devantier A. Low dose iron supplementation does not cover the need for iron during pregnancy. Acta Obstet Gynecol Scand 1993; 72: 93-8.
12. Schultink W, Van De ReeM, Matulessi P, Gross R. Low compliance with an iron supplementation program: A study among pregnant women in Jakata, Indonesia. Am J Clin Nutr 1993; 70: 9-12.
13. Inger S, Guldholt, Trolle BG, Hvidman LE. Iron supplementation during pregnancy. Acta Obstet Gynecol Scand 1991; 70: 9-12.
14. Winichagoon P. A conceptual framework and application for evaluating prenatal iron supplementation within primary health care in rural northeast Thailand [Ph.D.Thesis]. USA: Cornell University; 1991.
15. Thongnopakhun W. Delivery of iron supplementation to rural pregnant women through primary health care [D.Sc Thesis in Nutrition]. Bangkok: Faculty of Graduate Studies, Mahidol University; 1993.
16. Hallberg L, Ryttinger L, Solvell L. Side effects of oral iron therapy: A double blind study of different iron compounds in tablet form. Acta Med Scand 1966; 459(Suppl): 3-10.
17. Hallberg L. Search for substances promoting the absorption of iron: Studies on absorption and side effects. Acta Med Scand 1966; 459(Suppl): 11-21.
18. Laos. Ministry of Health. The First National Action Plan for nutrition 1995-2000. Report meeting of 23 November-17 December 2005. Vientiane: The Ministry; 1995.
19. State Planning Committee. Report of national statistic center. Vientiane: The Committee; 1995.
20. Yip R, Dallman R. Iron. In: Zieger EE, Filer LJ, editors. Present knowledge in nutrition. 7th ed. Washington, DC: I LSI Press; 1996. 277-92.
21. Guthrie HA, Piccino MF. Human nutrition. St. Louise Mo: Mosby; 1995.
22. Hendler SS. The doctors' vitamin and mineral encyclopedia. New York: Simon & Shuster; 1990.
23. Lozaff B, Jimenez E, Wolf AW. Long-term developmental outcome of infants with iron deficiency. N Engl J Med 1991; 325: 687-94.

24. Soemantri AG, Pollitt E, Kim I. Iron deficiency anemia and educational achievement. Am J Clin Nutr 1985; 42: 1221-8.
25. Aukett MA. Parks YA, Scott PH, Wharton BA. Treatment with iron increases weight gain and psychomotor development. Arch Dis Child 1986; 61: 849-57.
26. Walker WRP. Iron deficiency, development, and cognitive function. Am J Clin Nutr 1996; 64: 120-1.
27. Walter T, Olivares M, Pizarro F, Muoz C. Iron, anemia, and infection. Nutr Rev 1997; 55(4); 111-24.
28. Scholl TO, Hediger ML, Fisher R L, Sherner J W. Anemia versus iron deficiency: Increased risk of preterm delivery in prospective study. Am J Clin Nutr 1992; 55: 985-8.
29. Scholl T O, Hedigrer ML. Anemia and iron-deficiency anemia: complication of data on pregnancy outcome Am J Clin Nutr 1994; 59(Suppl) : 492 S-501S.
30. Sagevi N, Nilsen ST, Kim HC, Bergy P, Koller O. Maternal hemoglob in concentration is closely related to birth weight in normal pregnancies. Acta Obstet gynecol Scand 1984; 63: 245-8.
31. Halberg L. Biovailability of dietary iron in man. Aunu Rev Nutr 1981; 1: 123-47.
32. Beard JL, Dawson H, Pirano D J. Iron metabolism: A comprehensive review. Nutr Rev 1996; 54(10): 295-317.
33. World Health Organization. Report of international nutrition anemia Consultative group (INACG). Iron deficiency in women, second printing. Geneva: The Organization 1984.
34. Hytten, F. Blood volume changes in normal pregnancy. Clin Hematol, 1985; 14(3): 601-12.
35. Bothwell TH. Overview and mechanisms of iron regulation. Nutr Rew 1995; 53(9): 237-45.
36. Halberg L. Iron balance in pregnancy. In. Berger H, editor. Vitamins and minerals in pregnancy and lactation. New York: Raven Press 1988; 115-27.

37. Hytten FE, Leitch I. The physiology of human pregnancy. New York: Blackwell; 1971.
38. Widdowson EM, Spare CM. Chemical development in utero. Arch Dis Child 1951; 26: 205-14.
39. Newton M. Pospartum hemorrage. Am J Obst Gynecol. 1966; 194: 711-7.
40. Rosso P. Nutrition and metabolism in pregnancy. New York: Oxford University Press; 1990.
41. Barbara L, Johnson TRB, Petric RH. Clinical maternal–fetal nutrition. London: Little Brown. n. d.
42. DeMaeyer EM. Preventing and controlling iron deficiency anemia through primary health care: A guide for administrators and program managers. Geneva: WHO; 1989.
43. Viteri, FE. Prevention of iron deficiency. In: Howson CP, Kennedy E T, Horwitz A. editors. Prevention of micronutrient deficiencies: Tools for policymakers and public health workers. Washington, DC: National Academy of Sciences 1998. 102-45.
44. United Nations. Administrative Committee on Coordination-Subcommittee on Nutrition. Second report on the world nutrition situation, vol. 1: Global and regional results. Geneva: ACC/SNS, UN; 1992.
45. De.Maeyer E, Adiels-Tegman M. The prevalence of anemia in the world: World Health Stat Q 1985. 38(3): 302-16.
46. World Health Organization. Prevention and management of severe anemia in pregnant women report of a Technical Working Group on maternal health and safe motherhood program MED. Geneva: The Organization; 1991.
47. National Institute of Public Health. Child health and nutrition research: An assessment of research priorities and research institutions in Lao P.D.R. Vientiane: The Institute; 2003.
48. Laos. Ministry of Health. The second National Action Plan for nutrition 2001-2005. Report meeting of 7 December 2001. Vientiane: The Ministry;

49. Yip R. Iron deficiency: contemporary scientific issues and international programmic approachs. J Nutr 1994; 124(Suppl): 1479S-90S.

50. Gillespic S, Kevany J, Mason J. Controlling iron deficiency: a report base on ACC/SCN workshop. ACC/SCN. Stat of the Art Series. Geneva: United Nations; 1991. Nutrition policy discussion paper No 9.

51. Rosenstock IM. Historical origin of the Health Belief Model. Health Educ Monogr 1974; 2(4): 328-35.

52. Becker MH. The health belief model and personal health behavior. Health Educ Monogr 1974; 2(4): 336.

53. Kasl SV, Cobb S. Health and illness behaviors. Achieves of Environmental Health 12 Feb; 1966: 146-266.

54. Lertmulligaporn N. Effect of daily versus weekly iron supplementation in rural northeastern pregnant women, Thailand [M.S. Thesis in Nutrition Bangkok: Faculty of Graduate Studies, Mahidol University; 2000.

55. Boonserm K. Factors affecting compliance with the prevention and treatment measure of iron deficiency anemia in pregnant women: a case study Chainat province [M.P.H.M Thesis in Family Health]. Bangkok: Faculty of Graduate Studies, Mahidol University; 1996.

56. Opaseereevith S. Association between perception and competency of pregnant women to take care themselves [M.P.H.M. Thesis in Nursing Health Administration].

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APPENDIX

Laos

APPENDIX A

QUESTIONNAIRE

COMPLIANCE OF PREGNANT WOMEN REGARDING IRON SUPPLEMENTATION IN VIENTIANE MUNICIPALITY, LAOP.D.R

Name of pregnant woman: _____ Age: _____

Interview date: _____/____/_____

Interviewee's address: District: _____

Village: _____

Part I: Demographic, Socio-economic and knowledge of anemia factors
Demographic, Social-economic factors:

1. Occupation:

1. Housewife
2. Private staff
3. Business
4. Government staff
5. Others : _____

2. Education:

1. Primary school
2. Secondary school
3. University

3. Family income/month:

……

4. Ethnic group:

1. Lao loum
2. Lao soung, Lao theung

- **Knowledge of iron deficiency anemia**

5. Iron deficiency anemia in pregnant women cause by increasing demand for fetal development. 1. True 2.False 3. Uncertain

6. The anemia symptoms are Pale/ anorexia. 1. True 2 False. 3. Uncertain

7. The anemia symptoms are fatigue and fainting. 1. True 2 False. 3. Uncertain

8. The negative effect of anemia for the fetus development is Premature birth 1. True 2. False 3. Uncertain

9. The anemia condition of mother does not affect the birth weight of baby. 1. True 2.False 3. Uncertain

10. The negative effect of anemia on mothers after delivery is post partum bleeding. 1. True 2.False 3. Uncertain

11. Iron deficiency in pregnant women could not affect cognitive development of infants. 1. True 2.False 3. Uncertain

12. Effective method of prevention and treatment iron deficiency anemia in pregnant women is taking iron tablets 1. True 2.False 3. Uncertain

13. Iron deficiency anemia could reduce the immune system of infection and increase risks of infection 1. True 2.False 3. Uncertain

14. Iron deficiency anemia could not prevented because it is an inherited disease. 1. True2.False 3. Uncertain

15. The negative effect of anemia is heart failure. 1. True 2.False 3. Uncertain

16. Iron supply could be provided by taking oil and rice. 1. True 2.False 3. Uncertain

Part II: Perceived benefits of preventive action. (Benefits, Obstacle)

17. I perceived that daily iron supply is not necessary for pregnant women 1. Agree 2. Disagree 3. Not sure

18. I perceived that iron supply could result in overweight of fetus 1. Agree 2. Disagree 3. Not sure

19. I perceived that iron supply could result difficult delivery 1. Agree 2. Disagree 3. Not sure

20. I perceived that regular iron supply of pregnant women could result in increase of red blood cells. 1. Agree 2. Disagree 3. Not sure

21. I perceived that taking iron tablets making good Brest milk for baby. 1. Agree 2. Disagree 3. Not sure

22. I perceived that pregnant women should take iron tablets regardless they are pale, tire. 1. Agree 2. Disagree 3. Not sure

23. I perceived that Long term taking of iron tablets is too boring 1. Agree 2. Disagree 3. Not sure

24. I perceived that taking iron tablets making your gastric Pain. 1. Agree 2. Disagree 3. Not sure

25. I perceived that long term taking of iron tablets is difficult compliance 1. Agree 2. Disagree 3. Not sure

26. I perceived that long term taking of iron tablets could provoke obesity and lose body shape 1. Agree 2. Disagree 3. Not sure

27. I perceived that regular iron supply of pregnant women could result positively in development of newborn babies. 1. Agree 2. Disagree 3. Not sure

28. I perceived non anemia pregnant women will be safe from post-partum hemorrhage . 1. Agree 2. Disagree 3. Not sure

Part III: Perceived susceptibility & seriousness of anemia

29. I perceived that pregnant women are more likely to have iron deficiency anemia than non-pregnant women 1. Agree 2. Disagree 3. Not sure

30. I perceived that iron deficiency anemia of mother make anemia in newborn. 1. Agree 2. Disagree 3. Not sure

31. I perceived that the higher gestational age is more likely to develop iron deficiency anemia 1. Agree 2. Disagree 3. Not sure

32. I perceived that iron deficiency anemia in pregnant women will be not dangerous. 1. Agree 2. Disagree 3. Not sure

33. I perceived that iron deficiency anemia could also develop in healthy pregnant women. 1. Agree 2. Disagree 3. Not sure

34. I perceived that iron deficiency anemia could reoccur in any next pregnancies. 1. Agree 2. Disagree 3. Not sure

35. I perceived that risks of the development of iron deficiency anemia depend on body weight of pregnant women. 1. Agree 2. Disagree 3. Not sure

36. I perceived that healthy pregnant women are not necessary to take iron supply. 1. Agree 2. Disagree 3. Not sure

37. I perceived that iron deficiency anemia does not affect the development of fetus 1. Agree 2. Disagree 3. Not sure

38. Iron deficiency anemia does not affect cognitive development of the child in the later life. 1. Agree 2. Disagree 3. Not sure

39. Iron deficiency anemia is incurable 1. Agree 2. Disagree 3. Not sure

40. Iron deficiency anemia is more likely to cause death by post partum bleeding in anemia than non anemia women 1. Agree 2. Disagree 3. Not sure

Part IV. Cues to Action

41. You received information about anemia from television, radio	1. Yes	2. No
42. You received information about anemia from posters, leaflet…	1. Yes	2. No
43. You received information about anemia from newspapers, journals….	1. Yes	2. No
44. You received information about anemia from doctors	1. Yes	2. No
45. You received information about anemia from other medical personnel (Volunteer, nurses…..)	1. Yes	2. No
46. You received information about anemia from close friends.	1. Yes	2. No
47. You received information about anemia from your husband/ relatives .	1. Yes	2. No

Part V: Compliance of pregnant women (Iron tablets consumption behavior)

48. Do you take iron tablets after distribution?

- 1. Yes (go to Qu.No:50).
- 2. No (go to Qu.No:49)

49. If you don't take or take iron tablets irregular, why?

…….

50. If yes, how many days this week do you take iron tablets.

1. Every day.
2. 4-5 days, a week.
3. 1-3 days, a week.
4. others.

APPENDIX B

Table 18 frequency and percentage of pregnant women classified by their score of correct answers on knowledge of anemia

Questions of knowledge	correct answers	
	N	(%)
1. Iron deficiency anemia in pregnant women cause by increasing demand for fetal development.	181	53.2
2. The anemia symptoms are Pale/ anorexia.	290	85.3
3. The anemia symptoms are fatigue and fainting.	293	86.2
4. The negative effect of anemia for the fetus development is Premature birth	91	26.8
5. The anemia condition of mother does not affect the birth weight of baby.	143	42.1
6. The negative effect of anemia on mothers after delivery is post partum bleeding.	44	12.9
7. Iron deficiency in pregnant women could not affect cognitive development of infants.	136	40.0
8. Effective method of prevention and treatment iron deficiency anemia in pregnant women is taking iron tablets	289	85.0
9. Iron deficiency anemia could reduce the immune system of infection and increase risks of infection	185	54.4
10. Iron deficiency anemia could not prevent because it is an inherited disease.	142	41.8
11. The negative effect of anemia is heart failure.	73	21.5
12. Iron supply could be provided by taking oil and rice.	161	47.4

Table 19 Average score and standard deviation classified by each question of perceived benefits and obstacles

Questions of perceived benefits and obstacles	Mean	S.D
1. I perceived that daily iron supply is not necessary for pregnant women	1.88	0.94
2. I perceived that iron supply could result in overweight of fetus	2.12	0.87
3. I perceived that iron supply could result difficult delivery	2.42	0.73
4. I perceived that regular iron supply of pregnant women could result in increase of red blood cells.	2.64	0.61
5. I perceived that taking iron tablets making good Brest milk for baby.	2.73	0.55
6. I perceived that pregnant women should take iron tablets regardless they are pale, tire.	1.96	0.90
7. I perceived that Long term taking of iron tablets is too boring	1.79	0.92
8. I perceived that taking iron tablets making your gastric Pain.	2.41	0.78
9. I perceived that long term taking of iron tablets is difficult compliance	1.82	0.91
10. I perceived that long term taking of iron tablets could provoke obesity and lose body shape	2.22	0.81
11. I perceived that regular iron supply of pregnant women could result positively in development of newborn babies.	2.63	0.69
12. I perceived non-anemia pregnant women would be safe from post-partum hemorrhage.	2.08	0.64

Table 20 Average score and standard deviation classified by each question of perceived susceptibility and seriousness of anemia

Questions of perceived susceptibility and seriousness of anemia	**Mean**	**S.D**
1. I perceived that pregnant women are more likely to have iron deficiency anemia than non-pregnant women	2.65	0.57
2. I perceived that iron deficiency anemia of mother make anemia in newborn.	2.51	0.67
3. I perceived that the higher gestational age is more likely to develop iron deficiency anemia	2.25	0.62
4. I perceived that iron deficiency anemia in pregnant women will be not dangerous.	2.44	0.79
5. I perceived that iron deficiency anemia could also develop in healthy pregnant women.	2.13	0,81
6. I perceived that iron deficiency anemia could reoccur in any next pregnancies.	2.52	0.68
7. I perceived that risks of the development of iron deficiency anemia depend on body weight of pregnant women.	1.94	0.80
8. I perceived that healthy pregnant women are not necessary to take iron supply	2.07	0.93
9. I perceived that iron deficiency anemia does not affect the development of fetus	2.44	0.74
10. Iron deficiency anemia does not affect cognitive development of the child in the later life	2.25	0.70
11. Iron deficiency anemia is incurable	2.57	0.70
12. Iron deficiency anemia is more likely to cause death by post partum bleeding in anemia an non anemia women	2.13	0.56

Table 21 Association between age and knowledge of anemia of pregnant women

Age	High level		Middle level		Low level		Total	
	n	%	n	%	N	%	n	%
< 20	2	6.5	24	77.4	5	16.1	31	100
20-	45	18.4	179	73.4	21	8.6	245	100
30	19	29.7	42	65.6	3	4.7	64	100
> 30								
Chi-square = 35.474 , d f = 24 p-value = 0.062								

Table 22 Association between age and perceived benefits and obstacles of preventive action of pregnant women

Age	Perceived benefits and obstacles of preventive action					
	High level		Low level		Total	
	N	%	N	%	N	%
< 20	22	71.0	9	29.0	31	100
20-30	172	70.2	73	29.8	245	100
> 30	48	78.0	16	25.0	64	100
Chi-square = 0.570, d f =2 , p-value = 0.752						

Table 23 Association between age and perceived threat of anemia of pregnant women

Age	Perceived threat of anemia					
	High level		Low level		Total	
	N	%	N	%	N	%
< 20	26	83.9	5	16.1	31	100
20-30	205	83.7	40	16.3	245	100
> 30	56	87.5	8	12.5	64	100
Chi-square = 0.572, d f = 2 , p-value = 0.751						

Table 24 Association between age and cues to action of pregnant women

Age	Cues to action							
	High level		Middle level		Low level		Total	
	n	%	n	%	n	%	n	%
< 20	24	77.4	6	19.4	1	3.2	31	100
20-	170	69.4	68	27.8	7	2.9	245	100
30	39	60.9	22	34.4	3	4.7	64	100
> 30								

Chi-square = 3.188 , df = 4, p-value = 0.527

Table 25 Association between occupation and knowledge of anemia of pregnant women

Occupation	knowledge of anemia							
	High level		Middle level		Low level		Total	
	n	%	n	%	n	%	n	%
1. Housewife & farmer	17	9.2	126	68.1	42	22.7	185	100
2. Private staff	3	6.7	36	80.0	6	13.3	45	100
3.Business	4	8.9	33	73.3	8	17.8	45	100
4. Government staff	10	23.3	29	67.4	4	9.3	43	100
5. Other	4	18.2	13	59.1	5	22.7	22	100

Chi-square =13.877 , d f = 8 , p-value = 0.085

Table 26 Association between occupation and perceived benefits and obstacles of preventive action of pregnant women

Occupation	perceived benefits and obstacles of preventive action				Total	
	High level		Low level			
	n	%	n	%	n	%
1. Housewife & farmer	128	69.2	57	30.8	185	100
2. Private staff	35	77.8	10	22.2	45	100
3.Business	33	73.3	12	26.7	45	100
4. Government staff	30	69.8	13	30.2	43	100
5. Other	16	72.7	6	27.3	22	100

Chi-square = 1.481, d f = 4 , p-value = 0.830

Table 27 Association between occupation and perceived threat of anemia of pregnant women

Occupation	Perceived threat of anemia				Total	
	High level		Low level			
	n	%	n	%	n	%
1. Housewife & farmer	151	81.0	34	18.4	185	100
. Private staff	40	88.9	5	11.1	45	100
3.Business	38	84.4	7	15.6	45	100
4. Government staff	39	90.7	4	9.3	43	100
5. Other	19	86.4	3	13.6	22	100

Chi-square = 3.135 , d f = 4 , p-value = 0.535

Table 28 Association between occupation and cues to action of pregnant women

Occupation	Cues to action							
	High level		Middle level		Low level		Total	
	n	%	n	%	n	%	n	%
1.Housewife & farmer	4	2.2	42	22.7	139	75.1	185	100
2.Private staff	2	4.4	21	46.7	22	48.9	45	100
3.Business	1	2.2	7	15.6	37	82.2	45	100
4. Government staff	4	9.3	22	51.2	17	39.5	43	100
5. Other	0	0.0	4	18.2	18	81.8	22	100

Chi-square = 36.168, d f = 8 , p-value < 0.005

Table 29 Association between education level and knowledge of anemia of pregnant women

Education level	Knowledge of anemia							
	High level		Middle level		Low level		Total	
	n	%	n	%	n	%	n	%
1. illiterate & primary school	12	14.6	56	68.3	14	17.1	84	100
2. Secondary school	22	9.8	159	70.7	44	19.6	225	100
3. University	4	12.1	22	66.7	7	21.2	33	100

Chi-square = 1.672 , df = 4 , p-value = 0.796

Table 30 Association between education level and perceived benefits and obstacles of preventive action

perceived benefits and obstacles of preventive action						
Education level	High level		Low level		Total	
	n	%	n	%	n	%
1. illiterate & primary school	56	68.3	26	31.7	82	100
2. Secondary school	159	70.7	66	29.3	225	100
3. University	27	81.8	6	18.2	33	100

Chi-square = 2.183 , d f = 2 ,p-value = 0.336

Table31 Association between education level and perceived threat of anemia

perceived threat of anemia						
Education level	High level		Low level		Total	
	n	%	n	%	n	%
1. illiterate & primary school	68	82.9	14	17.1	82	100
2. Secondary school	188	83.6	37	16.4	225	100
3. University	31	93.9	2	61.0	33	100

Chi-square =2.539, d f = 2 ,p-value = 0.281

Table 32 Association between education level and cues to action

Education level	perceived threat of anemia					
	High level		Low level		Total	
	n	%	n	%	n	%
1. illiterate & primary school	0	0.0	18	22.0	66	100
2. Secondary school	10	4.4	65	28.9	150	100
3. University	1	3.0	13	39.4	19	100

Chi-square = 8.086 , d f = 4, p-value = 0.088

Table 33 percentage of pregnant women classified by their score of the correct, uncertain and incorrect answers on perception of benefits and obstacles of taking iron tablets

Questions of perception of benefits & obstacle	correct		uncertain		incorrect	
	N	%	N	%	N	%
1. I perceived that daily iron supply is not necessary for pregnant women	132	38.8	34	10.0	174	51.2
2. I perceived that iron supply could result in overweight of fetus	151	44.4	78	22.9	111	32.6
3. I perceived that iron supply could result difficult delivery	208	61.2	84	24.7	48	14.1
4. I perceived that regular iron supply of pregnant women could result in increase of red blood cells.	244	71.8	71	20.9	25	7.4
5. I perceived that taking iron tablets making good Brest milk for baby	267	78.5	55	16.2	18	5.3
6. I perceived that pregnant women should take iron tablets regardless they are pale, tire.	130	38.2	65	19.1	145	42.6
7. I perceived that Long term taking of iron tablets is too boring	117	34.4	34	10.0	189	55.6
8. I perceived that taking iron tablets making your gastric Pain	203	59.7	74	21.8	63	18.5
9. I perceived that long-term taking of iron tablets is difficult compliance	118	34.7	43	12.6	179	52.6
10. I perceived that long term taking of irontablets could provoke obesity and lose body shape	158	46.5	98	28.8	84	24.7
11. I perceived that regular iron supply of pregnant women could result positively in development of newborn babies.	254	74.7	45	13.2	41	12.1
12. I perceived non anemia pregnant women will be safe from post-partum hemorrhage	84	24.7	199	58.5	57	16.8

Table 34 Percentage of pregnant women classified by their score of the correct, uncertain and incorrect answers on perception of threat on anemia

Questions of perception of threat	correct		uncertain		incorrect	
On anemia	N	%	N	%	N	%
1. I perceived that pregnant women are more likely to have iron deficiency anemia than non-pregnant women	237	69.7	86	25.3	17	5.0
2. I perceived that iron deficiency anemia of mother make anemia in newborn.	210	61.8	95	27.9	35	10.3
3. I perceived that the higher gestational age is more likely to develop iron deficiency anemia	120	35.3	185	54.4	35	10.3
4. I perceived that iron deficiency anemia in pregnant women will be not dangerous	217	63.8	57	16.8	66	19.4
5. I perceived that iron deficiency anemia could also develop in healthy pregnant women.	137	40.3	111	32.6	92	27.1
6. I perceived that iron deficiency anemia could reoccur in any next pregnancies	212	62.4	92	27.1	36	10.6
7. I perceived that risks of the development of iron deficiency anemia depend on body weight of pregnant women.	101	29.7	119	35.0	120	35.3
8. I perceived that healthy pregnant women are not necessary to take iron supply	160	47.1	45	13.2	135	39.7
9. I perceived that iron deficiency anemia does not affect the development of fetus	202	59.4	85	25.0	53	15.6
10. Iron deficiency anemia does not affect cognitive development of the child in the later life.	137	40.3	152	44.7	51	15.0
11. Iron deficiency anemia is incurable	237	69.7	16	17.9	42	12.4
12. Iron deficiency anemia is more likely to cause death by post partum bleeding	79	23.2	225	66.2	36	10.6

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