KNOWLEDGE AND ATTITUDE ON CONSUMPTION OF IRON SUPPLEMENT AMONG PREGNANT WOMEN IN KUALA TERENGGANU, TERENGGANU

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ABSTRACT

The high prevalence of iron deficiency anemia and low compliance of iron supplement was reported among pregnant women in Malaysia. This study aimed to determine the knowledge and attitude on consumption of iron supplement among pregnant women in Kuala Terengganu. A cross-sectional study was carried out in government clinics and hospital. Pregnant women aged from 15-49 (n=120) were interviewed using self-administered questionnaires. Descriptive statistics and non-parametric tests were used. Majority of pregnant women consumed iron supplement during the pregnancy (77.5%). Only 18.3% of pregnant women do not consumed iron supplement and another 4.2% not sure whether they consumed iron supplement. The prevalence of anemia in this study was low (19.2%). The level of knowledge and attitude on consumption of iron supplement was high, 58.3% and 54.2%, respectively. The level of knowledge on consumption of iron supplement was highly associated with the consumption of iron supplement (χ^2= 16.717, p< 0.001). Furthermore, level of attitude on consumption of iron supplement also showed an association with the consumption of iron supplement (χ^2= 8.449, p< 0.01). The data could serve as an early evidence related to the knowledge and attitude on consumption of iron supplement among pregnant women in Terengganu.

Key words: Knowledge, Attitude, Iron supplements, Anemia, Pregnant women

INTRODUCTION

During pregnancy, anemia constitutes a major public health problem in developing countries and a high morbidity among antenatal mothers (Rosmawati *et al.,* 2012). The average mortality attributed by anemia in Asia is estimated as 7.26% (Brabin *et al.,* 2001). Iron deficiency anemia (IDA) is the common problem during pregnancy which contributes a negative health risk to the fetus such as preterm delivery, subsequent low birth weight and inferior neonatal health (Rosmawati *et al.,* 2012). In Malaysia, the prevalence of iron deficiency was 35% and mostly of the mild type and more prevalent in the Indian and Malays communities (Haniff *et al.,* 2007).

Iron deficiency is a spectrum ranging from iron depletion to iron deficiency anemia. The amount of stored iron which is measured by serum ferritin concentration is reduced but the amount of transport and functional iron may not be affected in iron depletion. During pregnancy, low hemoglobin concentration indicative of moderate or severe anemia has been associated with an increased risk of premature delivery, maternal and child mortality and infectious disease. Iron deficiency anemia may affect growth and development both *in utero* and in the long term. Iron supplementation, fortification of staple foods with iron, health and nutrition education, control of parasitic infections and improvement in sanitation are aimed at preventing iron deficiency and iron deficiency anemia (WHO, 2012).

Prevention is always better than treatment for controlling the disease. People's health knowledge and attitude are necessary in order to plan for the prevention (Jalili *et al.,* 2007). The compliance rate for taking iron supplement increases when the consumers are informed. There is no doubt that supplementation is needed for pregnant women, however the challenges remains to improve the effectiveness of supplementation strategies in many

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developing countries (Yekta *et al.,* 2008). From the previous study done in Shkodra, Albania it was found that about 39.6% of insufficient level of knowledge on iron supplement and it has affected the health of the mother and child; 35.6% of the women stated that there were effects of iron taking on the health of the mother and baby. In similar study, the knowledge regarding the preventive role of iron supplement for anemia were low which is about 38.6% (Kraja *et al.,* 2013).

Attitude is defined as an intermediate variable between the situation and the response to the situation. It helps to explain the possible practices for a subject submitted to a stimulus that the subject adopt one practice and not another (Gumucio *et al.,* 2011). The fear of having a large fetus, forgetfulness and side effects were the important reasons for low consumption of iron supplement among pregnant women (Gumucio *et al.,* 2011). Side effects are an important cause of termination of iron supplementation. In addition, fear of having a large fetus could be potentially more problematic in the communities while child birth still occurs at home whether by tradition or inaccessibility to a health facility (Winichagoon, 2002). From a previous study, the respondents stated that they were not comfortable with iron supplement because they believed iron supplement may lead to miscarriage, a big baby or harm to their baby (Nagata *et al.,* 2012). Thus, several studies showed that low knowledge and attitude have been demonstrated in the low consumption of iron supplement (Yekta *et al.,* 2008; Nagata *et al.,* 2012).

To date, there is limited study has been done among the pregnant women in Asian countries on the knowledge and attitude on consumption of iron supplement, particularly in Terengganu, Malaysia. It is importance to carry out a study to determine the prevalence and factors associated with anemia amongst this vulnerable group of population, so that the magnitude of the problem and its epidemiology can be established. Hence, the present study has to be carried out to determine the knowledge and attitude on consumption of iron supplement among pregnant women in Terengganu. This study is different from the previous studies as it investigates the knowledge and attitude on consumption of iron supplement among pregnant women.

MATERIALS AND METHODS

This study was conducted in Kuala Terengganu, Terengganu. In this study, cross-sectional study was used. A convenience sampling was applied because the study was a single-centre pilot study intended for a general health information survey aiming for at least 30 students (Brown, 1995; Hertzog, 2008).

Inclusion criteria include pregnant women, aged 15 to 49 years old who were attending Hospital Sultanah Nur Zahirah, able to understand and communicate in Malay or English. Kuala Terengganu and gave their consent. This study has been conducted from Jun 2016 to August 2016. The candidate of respondents were introduced by the nurse.

Bilingual questionnaire in the form of English and Malay was also used for each of the questionnaire to ensure all of the respondents from different education levels can easily understand the questions. The questionnaire consists of 7 different parts.

In part A was about the socio-demographic details. Level of education was later categorized as lower (SPM or equivalent) and high (Diploma and above). In part B was about the obstetric and medical histories (13 questions) (Abdelhafez & El-Soadaa, 2012; Mirzoyan, 1999). Part C was about the health problem related to iron supplement with (5 questions) (Mirzoyan, 1999).

Part D was about the knowledge on the consumption of iron supplement (4 questions) (Mirzoyan, 1999; Sushila *et al.,* 2013). One point was given for a correct answer while zero for an incorrect or unsure answer. The maximum score of knowledge was 4 (100%) and the minimum score was 0 (0%). The knowledge was then categorized as "low" for score in the range of 0–33.6%, "moderate" for score 33.7–66.7% and "high" for score within 66.8–100% (Talebi *et al.,* 2012).

Part E was about the knowledge related to anemia (10 questions) (Kalimbira *et al.,* 2009; Sushila *et al.,* 2013; Cormack & Drolet, 2012). Again, one point was given for a correct answer while zero for an incorrect or unsure answer. The maximum score of knowledge was 10 (100%) and the minimum score was 0 (0%).

Part F was about the attitude on consumption of iron supplement (8 questions) using the 3-point Likert scale from agree to disagree was applied to all questions (Yekta *et al.,* 2008; Sushila *et al.,* 2013). It is about the personal norms on the consumption of iron supplement. One point was given for disagree answer, two point for neutral answer and 3 point for agree answer. The maximum score of attitude was 24 (100%) and the minimum score was 8 (33.3%).

Lastly, part G was about the attitude related to anemia (7 questions). 3-point Likert scale from agree to disagree was applied to all questions (Cormack & Drolet, 2012). It is about the personal norms on the anemia. One point was given for disagree answer, two point for neutral answer and 3 point for agree answer. The maximum score of attitude was 21 (100%) and the minimum score was 7 (33.3%).

For each part E, F, and G, the score for all items were then summed up to obtain the total score indicating the knowledge and attitude level of the respondents. The score was then categorized as "low" for score in the range of 0–49%, "moderate" for score 50–75% and "high" for score within 76–100% (Rezaei *et al.,* 2014).The overall result for part D, E and F had shown a Cronbach's Alpha of 0.702, 0.731 and 0.723, respectively which were more than 0.7 indicating that the measurement is reliable (Labbe, 2011). Thus, all questions were retained as all questions had Cronbach's Alpha more than 0.7.

Statistical analysis

Descriptive data were presented in frequency and percentage. Chi-square (χ^2) has been carried out to identify socio-demographic characteristics among the pregnant women with the consumption of iron supplement among pregnant women in order to determine the association. Meanwhile, Fisher's Exact Test have been carried out to identify socio-demographic characteristics among the pregnant women with the consumption of iron supplement among pregnant women in order to determine the association. All analysis has been carried out using SPSS.

RESULTS

The socio-demographic data of pregnant women are shown in Table 1. A total of 120 pregnant women involved in this study. Pregnant women with the age of 15 to 29 contributed the largest proportion (51.7%) with most of them were Malays (97.5%). The result showed that 74.2% of pregnant women did not experience iron deficiency anemia (IDA) during pregnancy while only 19.2% of pregnant women experience IDA during pregnancy. Most of the pregnant women in this study consumed iron supplement 77.5% while 22.5% of pregnant women did not intake of iron supplement during pregnancy.

Table 2 shows overall knowledge and attitude score on consumption of iron supplement among pregnant women. The highest overall knowledge score was between 75–100% which indicated that the overall level of knowledge on consumption of iron supplement among the respondents was high. Meanwhile, the highest overall attitude score was 79.2–100% with the median score for attitude on consumption of iron supplement was 79.2% indicating that the overall level of attitude on consumption of iron supplement among the respondents was also high.

Table 3 shows factors influencing the consumption of iron supplement among pregnant women. The table indicated that that only education of the pregnant women was associated (χ^2=4.689, p<

Table 1. Socio-demographic Characteristics of the Respondents (n=120)

Characteristics	Frequency (n)	Percentage (%)
Age (Median age= 29)		
15–29	62	51.7
30–44	58	48.3
Race		
Malay	117	97.5
Chinese	2	1.7
Indian	1	0.8
Education		
PMR or equivalent	3	2.5
SPM or equivalent	55	45.8
Diploma / Degree	58	48.3
Master / PhD	4	3.3
Monthly income		
Less than RM 1000	46	38.3
RM 1000 – RM 2999	55	45.8
RM 3000 – RM 4999	14	11.7
RM 5000 and above	5	4.2
Parity		
Primiparous	36	30.0
Multiparous	84	70.0
Current pregnancy trimester		
First trimester	14	11.7
Second trimester	46	38.3
Third trimester	60	50.0
Husband's education		
No formal education	1	0.8
PMR or equivalent	4	3.3
SPM or equivalent	63	52.5
Diploma / Degree	50	41.7
Master / PhD	2	1.7
Husband's monthly income		
Less than RM 1000	17	14.2
RM 1000 – RM 2999	76	63.3
RM 3000 – RM 4999	20	16.7
RM 5000 and above	7	5.8
IDA during pregnancy		
Yes	23	19.2
No	89	74.2
Not sure	8	6.7
Iron supplement Intake		
Yes	93	77.5
No / Not sure	27	22.5

0.05) with the consumption of iron supplement. There was no association between age, parity, husband's education and husband's monthly income on the consumption of iron supplement among pregnant women.

There was an association (χ^2=16.717, p< 0.0001) between the knowledge level with the consumption of iron supplement among pregnant women (Table 4). Meanwhile, the level of attitude

Table 2. Overall Score for Knowledge and Attitude on Consumption of Iron Supplement among Pregnant Women in HSNZ

	Score (%)	Frequency (n)	Percentage (%)
Knowledge Level			
Low	0 – 49	23	19.2
Moderate	50 – 75	27	22.5
High	76 – 100	70	58.3
Attitude Level			
Low	41.7 – 45.8	2	1.7
Moderate	50.0 – 75.0	53	44.2
High	79.2 – 100.0	65	54.2

Table 3. Association between the Socio-demographic Characteristics and the Consumption of Iron Supplement among Pregnant Women

Variables	Consumption of Iron Supplementsn (%)		Pearson Chi-Square
	Yes	No	
Age			
Below 29 years old	49 (79.0)	13 (21.0)	χ^2 = 0.173
Above 30 years old	44 (75.9)	14 (24.1)	p-value = 0.678
Education			
Lower	40 (69.0)	18 (31.0)	χ^2 = 4.689
Upper	53 (85.5)	9 (14.5)	p-value = 0.030*
Parity			
Priparity	27 (75.0)	9 (25.0)	χ^2 = 0.184
Multiparity	66 (78.6)	18 (21.4)	p-value = 0.668
Husband's education			
Lower	50 (73.5)	18 (26.5)	χ^2 = 1.419
Upper	43 (82.7)	9 (17.3)	p-value = 0.234
Husband's monthly income			
Lower	73 (78.5)	20 (21.5)	χ^2 = 0.234
Upper	20 (74.1)	7 (25.9)	p-value = 0.628
Monthly Income			
Lower	77 (76.2)	24 (23.8)	[a]p-value=0.560
Upper	16 (84.2)	3 (15.8)	

*Significant level, p < 0.05 by Chi-square as indicated. [a]Fisher's Exact Test

Table 4. Association between the Knowledge Level and Attitude Level on Consumption of Iron Supplement with the Consumption of Iron Supplement among Pregnant Women

Variables	Consumption of Iron Supplementsn (%)		Pearson Chi-Square
	Yes	No	
Knowledge Level			
Low	11 (47.8)	12 (52.2)	χ^2 = 16.717
Moderate	20 (74.1)	7 (25.9)	p-value = <0.001**
High	62 (88.6)	8 (11.4)	
Attitude Level			
Moderate	36 (65.5)	19 (34.5)	χ^2 = 8.449
High	57 (87.7)	18 (12.3)	p-value = 0.004*

**p < 0.001; *p<0.01

on consumption of iron supplement showed an association (χ^2=8.449, p< 0.01) on consumption of iron supplement.

DISCUSSION

The prevalence of IDA among pregnant women in this study (19.2%) was inconsistent with the findings that had been carried out in Jerteh (57.4%) with a difference of 38.2% (Rosmawati et al., 2012). Similarly, the finding of anemia was also substantially lower as compared to the previous study done in Kelantan where the prevalence was 47.5% (Ahmad et al., 1997). The prevalence of anemia in Malaysia in year 2007 was 35% (Haniff et al., 2007) which is much higher than this study. The difference in prevalence rate might be cause by different study location. A study reported prevalence of anemia among pregnant women is different in different parts of Iran (Emam et al., 2003; Khademi et al., 2004). Furthermore, the difference in prevalence rate also might be due to the fact that 6.7% of pregnant women not sure that whether they experience iron deficiency anemia during pregnancy as they have not been tested for the iron deficiency anemia by the health clinics.

The low prevalence of iron deficiency anemia among pregnant women was influenced by the education of the pregnant women which the highest education of pregnant women in the present study was Diploma or Degree level (48.3%), compared with the previous study in Malaysia which was 39% (Haniff et al., 2007). From the previous study, it has been shown that percentage of low level of education which included no formal education or education up to primary school in Saudi Arabia (Abdelhafez & El-Soadaa, 2012) was 29% and in Jerteh was 17% (Rosmawati et al., 2012) was one of the determinants of anemia. It was also reported that the majority of mothers with higher education (39%) could be more concerned about their health and the health of their fetus (Soh et al., 2015). This result may indicate less awareness regarding health problems associated with decreased educational level.

Besides, most of the pregnant women in this study consumed iron supplement (77.5%) might be one of the factors that caused the low prevalence of iron deficiency anemia (Table 1). The prevalence of anemia was 19.2% in this present study might be caused by 18.3% of pregnant women did not consume iron supplement during pregnancy. Daily iron supplementation reduced 70% on risk of maternal anemia and 57% iron deficiency (WHO, 2012). According to Saxena (2014), the use of iron supplements helps in improving the iron status of the mother during pregnancy and during postpartum

period even in women who enter pregnancy with reasonable iron stores.

The high level of knowledge on consumption of iron supplement among pregnant women in Kuala Terengganu was because mostly of pregnant women had the highest education up to Diploma or Degree level which contributed 48.3%. Mostly, 70.8% of the pregnant women in this study answered correctly that iron needs of pregnant women are different from non-pregnant women. Thus, most of the pregnant women believed that iron supplement can be avoided if they have balanced diet. Stolzfus & Dreyfuss (2012) stated that in many populations, the amount of iron absorbed from the diet is insufficient to meet many individuals' requirements especially during infancy and pregnancy when physiological iron requirement are the highest. The iron absorption has been observed from the oral iron supplements with an average of about 25% (Goodman & Gilman, 1970). According to Galloway & McGuire (1994), iron is an essential nutrient which is required for hemoglobin synthesis other than the normal well-being whose demand increases highly during pregnancy and many times does not get enough supply through the regular diet. This can be worsened by the loss of appetite during pregnancy. Iron requirements rise to between 4 and 6 mg in the second and third trimester respectively, due to major changes in the red blood cell mass start occurring only in the middle of the second trimester, iron requirements may reach as much as 10 mg/d during the last 6 to 8 week of pregnancy. Irrespectively of the exact value, it is apparent that daily iron requirements cannot be met from dietary absorption along in the latter part of pregnancy even from the most optimal diet. In the diets containing large quantities of bioavailable iron and food containing high amounts of ascorbic acid, the overall iron absorption is usually 3 to 4 mg/d or at most 5 mg/d. The amount of iron absorbed is much lower when the diet contains only small amounts of bioavailable iron as it is often in many developing countries where the staple food is cereal and the intake of meat and ascorbic acid is limited (Bothwell, 2000). Therefore, iron supplementation cannot be avoided although the pregnant women have a balanced diet.

In this present study, 25% of the pregnant women in Kuala Terengganu would stop taking iron supplement because of their relatives' recommendation similar to study by Yekta et al. (2008) which had recorded 13% of pregnant women stopped using iron supplement because of similar reason. Besides, 88.3% of the pregnant women agreed that they will consume iron supplement if they were anemic.Information necessary to implement a behavior change is provided by the individual knowledge, while attitude may determine whether the individual is motivated to implement

the change (Guthrie *et al.,* 1999). Therefore, it is an intermediate variable between the situation and the responses to the situation. Attitudes are not directly observable as are practices, thus it is good idea to assess them (Gumucio *et al.,* 2011). From the present study, result showed that the pregnant women had positive attitude towards consumption of iron supplement.

The test indicated that there was no association between age, parity, husband's education, husband's monthly income and pregnant women's income monthly income on the consumption of iron supplement among pregnant women. These results are inconsistent with the previous study that age (Popa *et al.,* 2013), maternal age and primiparity (Knudsen *et al.,* 2007) as well as hemoglobin level and income (Haniff *et al.,* 2007) was positively associated with the use of iron supplement. Low family income increased the chances of anemia in pregnant women (Soh *et al.,* 2015). The opposite finding can be due to couple of reason which the well-off mothers might consider themselves less susceptible to anemia as a result they might have poor compliance on iron supplement. Besides, the opposite finding can be due to the different study location and the time gap between studies.

The test also indicated that only education of the pregnant women was associated (χ^2=4.689, p< 0.05) with the consumption of iron supplement. Similar result also obtained from previous study done in Romania (Popa *et al.,* 2013) and Danish (Knudsen *et al.,* 2007). Popa *et al.* (2013) found that women with more than 9 years of education were significantly more likely to use iron supplements. This was also in agreement with the previous study in Indonesia, the percentage of mothers not compliance of iron supplements decreased along with the increased in level of education (Titaley & Dibley, 2015). It is expected that the educated pregnant women are more likely to appreciate the benefits of iron supplementation in pregnancy and hence more likely to comply with the prescriptions.

The result showed there was an association (χ^2=16.717, p<0.0001) between the level of knowledge with the consumption of iron supplement among pregnant women. This was supported by the previous study that when the consumers are informed, the compliance rate for taking iron tablets increase (Emamghorashi & Heidari, 2004). The average duration of taking iron was significantly higher among subjects who receive training (Yekta *et al.,* 2008). There was no similar related previous study have been conducted in Malaysia. Therefore, educating women on significance of iron supplementation in pregnancy may improve their compliance to iron supplementation in pregnancy.

The result was supported by the previous study in Southeastern Nigeria which reported that women with good knowledge of iron supplementation were 6 times more likely to comply with iron supplementation than those with poor knowledge (Ugwu *et al.,* 2014). This result was also supported by the previous study in Mecha district that the knowledge on consumption of iron supplement was significantly associated with compliance to iron supplement. Belief about the health and treatment may have also interfered with iron compliance. Women who had higher knowledge of iron supplement were 5.4 times more likely to compliant compared to those who had low knowledge. The reason could be knowledge helps women to have a good perception of benefits of taking iron supplement (Taye *et al.,* 2015). Maternal knowledge on consumption of iron supplement is important because it has the potential to encourage women to take iron supplement during pregnancy. Therefore, level of nutritional knowledge has a strong independent association with the use of iron supplement during pregnancy (Popa *et al.,* 2013). The level of nutritional knowledge will cause the maternal more concerned about their health and the health of their fetus. It was supported by the previous study that antenatal mothers with higher education level might have more awareness about the dangers of anemia to their pregnancy and therefore they will made conscious effort to maintain their hemoglobin levels at acceptable levels and hence increase the consumption of iron supplement (Soh *et al.,* 2015). Therefore, better knowledge on iron supplement is important so that their practice could be improved and sustained.

The level of attitude on consumption of iron supplement showed an association (χ^2=8.449, p<0.01) on consumption of iron supplement. The importance of attitude particularly in relation to consumption of iron supplement is important in affecting the acceptance and utilization of iron supplement. Awareness is an important step that is expected to influence change, cognizant of the fact that not all knowledge leads to appropriate behavioural changes. Based on a study in Saudi Arabia, 10% of the women with low compliance of the iron supplement believed that they had adequate diet (Habib *et al.,* 2009). Therefore, enhancing the level of attitude on consumption of iron supplement can improve the consumption of iron supplement among pregnant women. Some limitation of the study was that, the haemoglobin level of the respondent was not recorded. It could be more informative if we had gathered this biochemical information. Nevertheless we have provided the early finding on the knowledge and attitude level of the respondents.

CONCLUSION

The current study revealed that the level of knowledge and attitude on consumption of iron supplement among pregnant women was high. The level of knowledge and attitude on consumption of iron supplement was found to be associated with the consumption of iron supplement among pregnant women. Education levels, nutritional knowledge and positive attitude were associated with the consumption of iron supplement among pregnant women. This study's results provide an early evidence on the real condition of the iron supplement consumption among pregnant women hence providing valuable information for public education in a practical manner that can help optimize health benefits and sustain overall community well-being.

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