Original Research

HIGHER MATERNAL EDUCATION AND NON-WORKING MOTHER AS A STRONG DETERMINANT OF HIGHER MATERNAL LEVEL OF KNOWLEDGE ON IRON SUPPLEMENTATION IN BANTUL DISTRICT, YOGYAKARTA, INDONESIA

Tingkat Pendidikan Ibu yang Lebih Tinggi dan Ibu Tidak Bekerja sebagai Faktor Determinan yang Kuat terhadap Tingkat Pengetahuan Ibu yang Lebih Tinggi tentang Tablet Tambah Darah di Kabupaten Bantul, Yogyakarta, Indonesia

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Abstract: *In Indonesia, maternal anemia, which affects nearly half of pregnant women, is still a growing nutritional issue. Several negative impacts of maternal anemia have been validated, including its effect on their offspring such as low birthweight and risk of being stunting. Maternal knowledge affects maternal compliance on iron supplementation consumption which significantly correlated with maternal anaemia status. This study aimed to investigate determinants of maternal knowledge on iron supplementation. A total of 121 pregnant women from Pajangan Sub-District in Bantul participated in this cross-sectional study. A bivariate and multivariate analysis conducted to investigate the correlations of each independent variable to the outcome. The crude and adjusted OR showed that higher mothers' education level (AOR=3.77, CI=1.184 – 11.98), unemployeed mothers (AOR =2.99, CI = 1.02 – 8.77) and non-anaemic mothers (AOR=5.14, CI=1.51 – 17.45) associated significantly with higher iron supplementation knowledge. Maternal pregnancy status (gravidity and age of pregancy) as well as family income were not associated with maternal knowledge. Information regarding iron supplementation enhancer, inhibition and side effects should be promoted more among mothers. Health practitionaires should also provide health promotion at the workspace to reach employeed mothers in improving healthy pregnancy literacy.*

Key word: maternal anemia, maternal knowledge, iron supplementation

1. INTRODUCTION

Anaemia during pregnancy remains remains the pivotal public health problem worldwide. The World Health Organization (WHO) reported that 37% of pregnant women is anaemic[1]. The latest national data from Indonesia Basic Health Survey showed that almost half of pregnant women in Indonesia (48,9%) is anaemic[2]. Pregnant women become anaemic if the haemoglobin level is <11 mg/dl, and iron deficieny accounts for half of the etiology of anaemia worldwide[3,4].

Several studies revealed the negative impact of iron deficiency anaemia (IDA) during pregnancy for both mothers and the offspring[4]. Women who were anaemic during pregnancy have been linked to increase the risk of infant low birth weight, pre-term birth and infant mortality[5] and associated with stunting, particularly in developing

coutries[6]. Maternal anaemia also contributed to the longterm effect on their offspring cognitive function, although this effect is modified with stunting status[7]. This indicates that the prevention of maternal anemia needs a long-term commitment[6,8] .Iron supplementation consumption program has been promoted to increase the maternal haemoglobin level[9]. However, based on Indonesia Basic Health Survey in 2017, the compliance of iron supplementation is lower (48,47%)[10] than the national target (98%). An intervention study showed that maternal knowledge significantly associated with higher iron supplementation compliance and lower anemia status[11].

Investigating the determinants of iron supplementation knowledge is important since multiple research indicate that iron supplementation knowledge associated with higher adherence to iron pills consumption in Indonesia[12,13]. A study coducted in Bantul District, Yogyakarta, Indonesia showed that mothers with high level of knowledge on anemia and iron supplementation were 6 times more likely on iron pills consumption[12]. Therefore, there is a need to investigate factors associated with maternal knowledge especially on iron supplementation.

2. METHODS

This is an observational, cross-sectional study conducted in Pajangan Sub-District, which appointed as one of stunting locus area in Bantul District, Yogyakarta. The inclusion participants were registered pregnant women who are on the second and third trimester in Pajangan Sub-district, with a permanent address in Pajangan sub-District. The data on pregnant women was gathered first from the Pajangan *Puskesmas* (public health center), the researcher and team subsequently followed up on this information by conducting interviews with mothers. A total of 37 participants were excluded due to some reasons (refused to participate, abortus and partus), ended with 121 selected participants, figure 1 depicted the flow on participants selection.
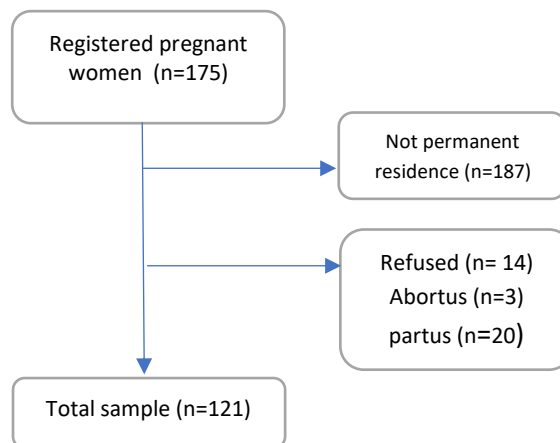

Figure 1. The participants selection process

The questionnaire on maternal knowledge of iron supplementation was validated with an Alpha-Cronbach score of 0,678. This study had 15 questions, with a score of 1 for each correct response and a score of 0 for the opposite answer. As a results, the overall score range is 0 to 15. The iron supplementation knowledge divided into five sections: the definition of iron supplementation, iron supplementation benefits, mothers' requirement of iron supplement during pregnancy, iron pill consumption guidelines and the iron supplementation side effects. Anemia status was based on the recent haemoglobin result taken from the mothers maternal logbook (*buku KIA*).

To examine the differences between each maternal trait and level of knowledge, the Chi-square was performed. The percentage of accurate answers separated into low and high levels of knowledge. If the total score is ≥80%, mothers are considered to have a good level of knowledge. A multivariate analysis conducted with logistic regression analysis with all variables in bivariate analysis which have p≤0.25, represent as adjusted odd ratio (AOR) to eliminate the possibility of confounding effect.

3. RESULTS

A total of 121 pregnant women with mean of age is 29,7 years participated on this study, 59.5% of whom are on the second pregnancy or more (multigravida). Most of family income was below the standardized minimum salary of Bantul District (50.4%). The majority of the participants was graduated from senior high school or higher (85.1%) and working either at the private or public organization and self-employed (57.4%). The current haemoglobin test showed that only 14.9% mothers were anaemic and most of the mothers (78.5%) had a good level of knowledge on iron supplementation.

Table 2 showed the distribution of each questions regarding maternal level of knowledge on different topics. Three questions which had the lowest correct answer were the iron requirements during pregnancy (78,51%), vitamin C and iron supplementation (75,21%) and the side effect of iron supplementation on defecation (61,98%).

A bivariate and multivariate analysis in table 3 showed that only education level correlated with maternal knowledge significantly (COR 5.06, CI 1.75 – 14.61; AOR 3.77, CI 1.184 – 11.98). Maternal pregnancy status (age of pregancy, gravidy, and mothers age) and family income were not associated with mothers level of knowledge. Unemployeed mothers or being a housewife significantly associated with 2.99 times higher level of knowledge compared with working mothers (CI 1.02 – 8.77). Mothers who were not-anaemic also had higher higher level of knowledge compared to the anaemic mothers (AOR 5.14, CI 1.51 – 17.45).

Table 1. Socio-demographic and pregnancy characteristics of pregnant women in Pajangan Sub-District

Characteristics	Frequency	Percentage (%)
Age	29,66 ± 4,83	
- 20 – 25 years	26	21.5
- 26 – 30 years	47	38.8
- 31 – 35 years	27	22.3
- >35 years	21	17.4
Education level		
- Primary and Junior High School	18	14.9
- Senior High School	76	62.8
- Higher education	27	22.3
Income (IDR)		
- < 2.000.000	61	50.4
- 2.000.000- 4.000.000	48	39.7
- >4.000.000	12	9.9
Occupation		
- Housewife	54	44.6

Characteristics	Frequency	Percentage (%)
- Self-employed	28	23.1
- Private and Govt employee	23	20.7
- Labor	14	11.6
Gravidy		
- Primigravida	49	40.5
- Multigravida	72	59.5
Pregnancy period		
- Trimester 2	69	57.0
- Trimester 3	52	43.0
Level of knowledge		
- High	95	78.5
- Poor	26	21.5
Recent anemia status		
- Anemia	18	14,9
- Non-anemia	103	85,1

Table 2. Percentage of correct answer by mothers for each question

Question	Correct answer n (%)
1. Iron supplementation definition	107 (88,43)
2. Iron supplementation containing iron and folic acid	112 (92,56)
3. Benefit of iron supplementation on low birth weight and premature birth	109 (90,08)
4. Benefit of iron supplementation on maternal anemia	107 (88,43)
5. Benefit of iron supplementation on stunting prevention	107 (88,43)
6. Iron requirement for pregnant women compared to non-pregnant women	95 (78,51)
7. The minimum amount of iron supplementation recommendation is 90 pills	98 (80,99)
8. Iron supplemetation started at second trimester of pregnancy	98 (80,99)
9. The iron supplementation side effect prevention	105 (86,78)
10. Iron supplementation and tea or coffee consumption	109 (90,08)
11. Pregnant women should consume iron supplementation once a day	106 (87,60)
12. Best time for iron supplementation consumption is on empthy stomach	104 (85,95)
13. Iron supplementation consumption and fruits high in vitamin-C	91 (75,21)
14. Iron suplementation and appetite	105 (86,78)
15. Side effect of iron supplementation on defecation	75 (61,98)

Table 3. Factors associated of iron supplementation knowledge among pregnant women in Pajangan Sub-District

Variables	Knowledge		COR (95% CI)	AOR (95% CI)
	Good n (%)	Poor n (%)		
Age risk of pregnancy				
- Low (20 – 35 years)	77 (73.0)	23 (23.0)	0.56 (0.15 – 2.06)	-
- High (> 35 years)	18 (85.7)	3 (14,3)	1	
Education level*				
- High	86 (83.5)	17 (16.5)	5.06 (1.75 – 14.61)[a]	3.77 (1.184 – 11.98)
- Low	9 (50.0)	9 (50.0)	1	1
Income**				
- Low	50 (82.0)	11 (18.0)	1.52 (0.63 – 3.64)	-
- High	45 (75.0)	15 (25.0)	1	
Occupation				

Variables	Knowledge		COR (95% CI)	AOR (95% CI)
	Good n (%)	Poor n (%)		
- Unemployeed	45 (84.9)	8 (15.1)	2.03 (0.80 – 5.11)[b]	2.99 (1.02 – 8.77)
- Employeed	50 (73.5)	18 (26.5)	1	
Gravidy				
- Primigravida	37 (75.5)	12 (24.5)	0.74 (0.31 – 1.78)	-
- Multigravida	58 (80.6)	14 (19.4)	1	
Pregnancy period				
- Trimester 2	55 (79.7)	14 (20.3)	1.18 (0.49 – 2.82)	-
- Trimester 3	40 (76.9)	12 (23.1)	1	
Current anemia status				
- Non-anemia	86 (83.5)	17 (16.5)	5.06 (1.75 – 14.61)[b]	5.14 (1.51 – 17.45)
- Anemia	9 (50.0)	9 (50.0)	1	

[a] $p<0.05$; [b] $p≤0.25$; 1= reference

*low educational level considered as graduated at junior high school or below

** low income level categorized as family monthly income below the minimum wage standard of Bantul district (IDR < 2.000.000)

4. DISCUSSION

The current study obejctive is to investigate the maternal determinant of level of knowledge on iron supplementation. Maternal knowledge is crucial in determining their compliance on taking the iron supplementation, which aims to prevent IDA during pregnancy. The current haemoglobin level showed that the majority of pregnant women in this study were not anaemic (85,1%). It demonstrate that the prevalence of anemia in Pajangan subdistrict is substantially lower than the prevalence of maternal anemia in Indonesia (37,9%)[2]. The low prevalence of maternal anaemia could be the result of high coverage of iron supplementation program for pregnant women in Pajangan subdistrict (96,6%)[14]. However the prevalence of maternal anemia in this study is slightly higher compared with anemia prevalence in Bantul District (14,27%)[14] and Yogyakarta province (12,1%)[15]. Maternal education level could also contributed to the low anemia prevalence as most of the participants in this current study had high education level. An Indonesia Family Life Survey (IFLS) wave 5 showed that maternal education had a significant relationship with the incidence of anemia during pregnancy. Lower maternal education level increased 1.4 times the incidence of maternal anemia[16].

The majority of the mothers had a good level of knowledge (78,5%). This findings was consistent with a study conducted in Jetis subdistrict, Bantul (71,7%)[12]. However this result is much higher compared to four different district in West Java, Indonesia (Pandeglang, Lebak, Purwakarta, and Subang) where only 10% of mothers had high level of knowledge on iron supplementation[13]. This difference could be attributed to the differences in socio-demographic characteristics, particularly maternal education level. The majority of mothers in this study had completed senior high school or higher (85,1%) whereas most participants (65,43%) in the study conducted in West Java had a low education level (incomplete primary school, primary school and junior high school)[13]. Mothers with higher education level have a better knowledge on anemia[17]. Although most of the participants had a good level of knowledge on iron supplementation, there was no question answered 100% correctly. Unlike previous studies conducted in Malaysia and Ehiopia[18,19], the current study showed that 90,08%

mothers understand that coffee and tea could hamper the iron supplementation benefits. Tea consumption more than once in a day significantly as an independent risk factor for maternal anemia[20]. Knowledge on foods which reduce the iron absoption is crucial, since the higher consumption of tea is related to the lower knowledge on negative impact of tea and iron supplementation[19].

The low awareness of iron supplementation side effects can influence the mothers compliance[13]. Low consumption of fruits is significantly associated with maternal anemia[20]. Another study conducted in Saudi Arabia also revealed that only 7.7% mothers agreed that citrus juice consumption will increase iron absorption[21]. Information on the benefits of fruits high vitamin C should be promoted more often since the comsumption of natural sources of vitamin C with iron supplementation increased haemoglobin level[22]. This result suggest that information regarding these topics should be prioritized. Mothers who had higher education level were four times likely to had a good level of knowledge on iron supplementation. Several studies across the world have shown consistenly that maternal education as a significant factor which influence maternal knowledge on iron supplementation[13,18,23]. Higher education level might influence mothers awareness on healthy pregnancy which contributes to the better literacy on healthy pregnancy including the information regarding iron supplementation.

The obstetric characteristics (maternal age, gravidity, age of pregnancy) consistently not associated with maternal knowledge in bivariate and multivariate analysis. This results were different compared to previous study conducted in Malaysia, where gravidity significantly associated with maternal knowledge [18]. However, the fact that mothers who were not anaemic had a higher knowledge of iron supplementation was also in line with numerous previous studies[24,25]. Maternal obstetric characteristics in this study could not be seen as an determinant of level of knowledge. This result also emphasis the importance of health literacy and health promotion to all pregnanct women regardless their pregnancy experience. In this study, we found that unemployed mothers had better level of knowledge three times higher compared to employed mothers. This could be due to the fact that housewife mothers have enough time regarding the adherence of antenatal follow up[21]. Previous studies conducted also revealed that mothers occupation status correlated with the compliance of the completion of antenatal care (ANC). However, a longitudinal study conducted in the USA showed that unskilled workers, trainee and housewives who had insufficient ANC access[26]. In Indonesia, health cadres in conjunction with midwive and nutritionist from *Puskesmas* (public health center) to promote preganancy-related health. The health promotion might be done during the working hours, which could not reach the working mothers. Thus, the health promotion should also be conducted by the health providers at a working space in order to increase the health promotion coverage.

5. CONCLUSION

Maternal education level, current anemia and working status is the main significant determinant of maternal level of knowledge on iron supplementation. Higher maternal education level contributes to the mothers awareness on healthy pregnancy. Being a housewife also as a strong determinant of higher knowledge on iron supplementation. Non-working mother might have more time on receiving health information from the health workers. Thus, pregnancy-related information should be promoted more for

working mothers, such as by giving a pregnancy class in a working space. Although most of pregnant women had high level of knowledge, there were several important topics regarding iron supplementation inhibition, enhancer and side effects which should be promoted more. While the mothers pregnancy status and family income were not correlated with maternal knowledge. Finally, this study showed that maternal education is pivotal in determining knowledge of iron supplementation. Moreoever, there is still a need in providing health literacy regarding iron supplementation especially for non-working mothers.

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