

Original Article

Factors associated with not using antenatal iron/folic acid supplements in Indonesia: the 2002/2003 and 2007 Indonesia Demographic and Health Survey

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Background: This analysis examined factors associated with non-use of antenatal iron/folic acid supplements in Indonesia. **Methods:** Data from the 2002/2003 and 2007 Indonesia Demographic and Health Surveys (IDHS) were used, providing survival information for 26,591 most recent deliveries over the five-year period prior to each survey. The main outcome variable was non-use of iron/folic acid supplements. Using logistic regression, we examined the role of external environment, predisposing, enabling, need factors, and previous utilization of other maternal care services in non-use of antenatal iron/folic acid supplements. **Results:** Mothers from outer Java-Bali Region and rural areas (OR=1.73, 95% CI: 1.48-2.03) had increased odds for not using antenatal iron/folic acid supplements. The likelihood for not using the supplements increased with the reduction of household wealth index and parental education. The odds increased amongst mothers with low autonomy on her own health care (OR=1.24, 95% CI: 1.04-1.49), high birth-rank infants, mothers with low knowledge of obstetric complications and low exposure to mass media. Enabling factors associated with increased odds for non-use of iron/folic acid supplements included mothers reporting money to pay health services (OR=1.28, 95% CI: 1.13-1.44) and distance to health services (OR=1.20, 95% CI: 1.02-1.40) were major problems. Our study demonstrated the importance of antenatal care as a distribution channel of the supplements. **Conclusions:** Increasing community awareness, coverage and access to health services along with strengthening counselling sessions during antenatal care and community participation in health programs are necessary to improve the uptake of iron/folic acid supplements, to increase infant survival in Indonesia.

Key Words: iron/folic acid supplements, antenatal, demographic and health survey, Indonesia

INTRODUCTION

Iron deficiency, the most common form of under-nutrition, affects approximately two billion people worldwide.^{1,2} Iron deficiency is also the major cause of anaemia in both developed and developing countries.³ Amongst the general population, children, pregnant and postpartum women are adversely affected by iron deficiency anaemia, as a result of the increased need of iron for infant growth and development.^{1,3}

Globally, approximately 42% of pregnant women suffer from anaemia³ and approximately 50% of the cases are due to iron deficiency.^{3,4} Previous reviews have reported the relationship between anaemia and an increased risk of maternal and perinatal mortality.^{5,6} Anaemia has also been reported to influence cognitive development amongst children.^{1,4}

As in other developing countries, the magnitude of anaemia in Indonesia remains a major concern. One of the interventions nationally recommended to prevent iron deficiency anaemia amongst pregnant women is through antenatal iron/folic acid supplementation. In Indonesia a pregnant woman is recommended to take at least 90 tablets of iron/folic acid supplements, consisting of 60 mg of iron (*ferrous sulphate*) and 0.25 mg of folic acid, during pregnancy. These supplements are provided free of

charge for all pregnant women throughout the country. Studies have reported the benefit of iron/folic acid supplementation in a reduced risk of neonatal deaths, low birth weight and preterm delivery.⁷⁻⁹ Folic acid deficiency during pregnancy, apart from the neural tube defects, has also been reported associated with increased risk of preterm delivery, low birth weight and foetal growth retardation.¹⁰ Some observational studies using Indonesia Demographic and Health Survey (IDHS) have also demonstrated the protective effect of this antenatal supplementation against neonatal and under five mortality.^{11,12}

Iron/folic acid supplementation for pregnant women in Indonesia has been implemented since 1970s; however, no specific changes of the promotional activities have been carried out to promote iron/folic acid supplementation in the past decade. Data from national surveys have

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shown various levels of utilization across provinces. The 2007 IDHS reported that 21% of women did not take any iron/folic supplements during pregnancy.¹³ This ranged from 5% in DI Yogyakarta to 44% in West Kalimantan Province. This survey also found that over 42% of women took less than 90 tablets (the minimum number of tablets recommended for pregnant women) ranging from 17% in DI Yogyakarta to 65% in South Sulawesi Province. As a result, the national prevalence of anaemia in Indonesia according to the data from the Indonesian Ministry of Health still remains above 20%, which indicates a public health problem.¹⁴

This evidence signifies the importance of identifying factors related to non-utilization of iron/folic acid supplements in Indonesia. These inhibiting factors should be addressed in public health interventions to increase the uptake of the supplements. Therefore, using recent nationally representative survey data, this analysis aimed at examining factors contributing to women not using antenatal iron/folic acid supplements in Indonesia. We also analyzed factors associated with the late start (after the 2nd trimester of pregnancy) and under-utilization (less than 90 tablets) of antenatal iron/folic supplements.

MATERIALS AND METHODS

Study population

This study used data from two nationally representative surveys, the 2002/2003 and 2007 IDHS, which are available in the public domain.^{13,15,16} The IDHS is a nationally representative survey collecting information on various demographic and health information including fertility and maternal and child health. Nonetheless, in the 2002/2003 IDHS, the province of Nanggroe Aceh Darussalam, Maluku, North Maluku and Papua provinces, were excluded due to internal security problems.¹⁵ In both surveys, three questionnaires were used to collect information, i.e. the Household, Women's, and Men's questionnaires.

The 2002/2003 IDHS included information from 33,088 households and 29,483 ever-married women of childbearing ages (15-49 years).¹⁵ The average response rate for households and women were 99% and 98%, respectively. The 2007 IDHS included information from 40,701 households, 32,895 ever married women aged 15-49 years, and 8,758 currently married men aged 15-54 years.¹³ The average response rate for households and women were 99% and 96%, respectively. The detailed sampling method of the IDHS has been reported elsewhere.¹⁷

Our study included information from 26,591 (48% from the IDHS 2002/2003 and 52% from the 2007 IDHS) most recent deliveries of mothers in the five year-period prior to each survey. The most recent delivery of a woman was selected since these deliveries had the most detailed health services information. This restriction was also intended to minimize recall bias of mothers about their history of pregnancy and delivery. Variables analysed in this study were derived from the Household and Women Questionnaire.

Variables and theoretical framework

Outcomes and study factors

The main outcome variable in this study was non-utilization of iron/folic acid supplements (non-utilization vs. any use of iron/folic acid supplements). This study also examined factors associated with two additional outcomes, i.e. late start (starting in the 3rd trimester vs. starting earlier) and under-utilization (<90 tablets) of iron/folic acid supplementation as reported by mothers.

Since the information when mothers started using iron/folic acid supplements was not available in both IDHS datasets, the variable of the delayed use of iron/folic acid supplements was constructed from two variables: (a) the time when mothers visited antenatal care services and (b) use of iron/folic acid supplements. Mothers were considered to have delayed use of iron/folic acid supplements (in the third semester of pregnancy) if they reported using the supplements but the first time mothers attended antenatal care services was in the third trimester.

To examine factors associated with the study outcomes, the Andersen's behavioural model framework¹⁸ for use of health care services was adapted to guide the analyses in this study. All variables that might potentially be associated with the study outcomes were identified from the datasets and grouped into the main groups of variables, (1) *external environment factors*; (2) *predisposing factors*, which were household and individual characteristics that existed before the onset of the need for iron/folic acid utilization; (3) *enabling factors*, which were factors that would allow mothers to receive the services; (4) *need factors*, which were factors associated with utilization of iron/folic acid supplements; and (5) *previous utilization of other maternal and care services*.

For the main outcome, 27 variables were identified. In the *external environment* group, two variables included were region and type of residence. Thirteen variables categorized into the *predisposing factors* were maternal age at childbirth, household wealth index, maternal highest educational attainment, paternal highest educational attainment, parental occupation, maternal marital status, maternal final say on her own health care, birth rank and interval, frequency of reading newspapers, frequency of listening to radio, frequency of watching television, knowledge on complications during delivery, knowledge on complications post delivery. For the *enabling factors*, seven variables were included, mothers' knowledge about where to seek health services, permission to visit health services, money to pay health services, distance of health services, transportation to health services, presence of companion, availability of care by female health workers. Two variables, desire for pregnancy, and presence of complications during pregnancy were categorized in the *need factors*; and two variables, time of first antenatal care visit and the quality of antenatal, were in the *use of health care services* group. The variables of the quality of antenatal care was used as a continuous variable and constructed from seven components, i.e. measurement of weight, height, and blood pressure, examination of stomach, urine and blood sample taken as well as the information provided on the signs of pregnancy complications. In each model, the year of survey variable was also included. For the late start of iron/folic acid supplements, only 26 variables were used. The time of first antenatal

care was omitted since this variable was a component used to construct the outcome.

To construct a new household wealth index across surveys, we employed the Principal Component Analysis method.¹⁹ It was based on an inventory of housing assets and facilities (source of drinking water, type of toilet, main material of floor, main material of wall, availability of electricity, radio, television, fridge, bicycle, motorcycle, and car), and when constructed this new variable was used to categorize households into five categories, poorest, poor, middle, wealthier and wealthiest and to rank all households by this wealth index.

Statistical analysis

This study used contingency table analyses and logistic regression analyses to determine factors associated with non-utilization, delayed and underutilization of iron/folic supplements in Indonesia. Univariable logistic regression analyses were performed to determine the crude odds ratio (OR) of each variable included in the analysis. This was then followed by the multivariable analyses to estimate the adjusted odds ratio (aOR).

In the multivariable analysis, we employed a hierarchical modelling strategy.²⁰ At the first step, more distal factors, i.e. year of survey and external environmental factors were entered simultaneously in the model. A backward elimination procedure was then applied to retain only factors significantly associated with the outcome ($p < 0.05$). The year of survey variable was selected a priori and retained in the models regardless of its significance level. The final model in this step was Model 1. In the second step, all predisposing factors were entered simultaneously to Model 1. Backward elimination procedure was conducted for these predisposing factors, until only factors significantly associated with the outcome were retained (Model 2). This procedure was repeated for enabling (Model 3), need factors (Model 4), and use of health care services (Model 5).

This backward elimination procedure was repeated for two additional outcomes (i.e. late start and underutilization of iron/folic acid supplements). Only factors associated with each outcome were retained in the final model in each hierarchical model as noted above.

All statistical analyses used the STATA/MP version 10.0 (2007) (Stata Corporation, College Station, TX, USA). The ORs, aORs and 95% confidence intervals (CI) were weighted for the sampling probabilities. Survey commands used in logistic regression models took into account the sampling weight and cluster sampling design.

No ethical approval required and the data are all available in the public domain.¹⁶

RESULTS

Our study found that of 26,591 most recent deliveries of mothers in the five year-period prior to each survey (live births), 20% ($n=5433$) of mothers reported not taking iron/folic acid supplements during pregnancy. The percentage increased slightly from 20.1% in the 2002/2003 IDHS to 20.7% in the 2007 IDHS. Of mothers who reported using iron/folic acid supplements during pregnancy, 66% ($n=11327$) used less than 90 tablets and approximately 7% ($n=1783$) started using iron/folic acid sup-

plements only when they reached the third trimester.

The frequency distribution of external environment, predisposing, enabling, need factors and use of health care services are shown in Table 1. Overall, the socio-economic status has improved across year of survey, as shown by the increased level of education amongst mothers and percentage of mothers from the richest category of household wealth index. The percentage of mothers not taking iron/folic acid supplements decreased along with the increased level of education (Figure 1) and household wealth index (Figure 2).

The odds ratio of variables included in our analysis for non-utilization of iron/folic acid supplements are shown in Table 2. The multivariable analysis showed that in the external environment group, mothers of infants from rural areas were more likely not to use iron/folic acid supplements during pregnancy compared with those from urban areas (aOR=1.73, $p < 0.001$). Highly significant associations were also found between non-utilization of iron/folic acid supplements and mothers from outside Java/Bali region.

Amongst predisposing factors household economic status and parental education emerged as a significant predictor for non-utilization of iron/folic acid supplements. Mothers with lower than secondary level education, from the poorest households, and with infants of high birth rank had a significantly increased odds for not using iron/folic acid supplements. Husbands with low education also emerged as a significant predictor for non-utilization of iron/folic acid supplements. Our study found that mothers who were less exposed to mass media, especially television, were more likely not to use iron/folic acid supplements. The knowledge on complications during pregnancy and childbirth were also found to influence utilization of iron/folic acid supplements. The odds for not using iron/folic acid supplements increased significantly when mothers did not know about complications during pregnancy (aOR=1.52, $p < 0.001$) or delivery (aOR=1.44, $p < 0.001$).

For the enabling factors, the risk for not using iron/folic acid supplements significantly increased amongst mothers who mentioned if any of the following was a major problem for them: money to pay for health services, distance to health services, and absence of a companion to accompany them when obtaining health services. Our study also confirmed the essential role of antenatal care as a distribution channel of iron/folic acid supplements. Mothers who did not attend antenatal care services were 16 times more likely not to use iron/folic acid supplements compared with those who attended antenatal care services in the first trimester (aOR=15.6, $p < 0.001$); whereas for mothers who attended antenatal care late (in the third trimester) the odds of not using iron/folic acid supplements doubled compared with those who attended antenatal care in the first trimester (aOR=1.66, $p < 0.001$). Furthermore, higher quality of antenatal care services was associated with lower odds of not using the supplements (aOR=0.67, $p < 0.001$).

Using the same baseline variables, our study examined actors associated with late start and underutilization of antenatal iron/folic acid supplementation. In both analyses we found very similar factors associated with these

Table 1. Prevalence of non-utilization of any iron/folic acid supplements and frequency distribution of potential predictors

Variable	N	Weighted N ¹ (weighted %)*	Prevalence of using IFA	
			Ever (%)	Never (%)
Year of IDHS				
2002/2003	13240	12646 (47.6)	72.3	20.1
2007	15207	13945 (52.4)	71.2	20.7
External environment				
Region				
Java/Bali	8168	15486 (58.2)	76.9	17.0
Sumatera	8364	5615 (21.1)	61.6	26.9
Eastern Indonesia	11915	5490 (20.7)	67.5	23.6
Type of residence				
Urban	11322	11776 (44.3)	77.0	15.1
Rural	17125	14815 (55.7)	67.5	24.7
Predisposing factors				
Demographic factors				
Maternal age at childbirth (mean±SE)	27.2±0.04	27.2±0.07	27.0±0.08	27.8±0.17
Household wealth index				
Richest	5708	5805 (21.8)	79.5	11.1
Rich	5673	6073 (22.8)	78.2	14.3
Middle	5550	5486 (20.6)	72.4	19.9
Poor	5380	4614 (17.4)	65.8	27.3
Poorest	5076	3743 (14.1)	54.5	38.2
Maternal education				
Secondary+	8631	7555 (28.4)	80.8	9.97
Completed Primary/Incomplete secondary	14623	14505 (54.6)	72.4	20.1
No education/incomplete primary	5191	4530 (17.0)	54.4	39.1
Husband's education				
Secondary+	10378	9081 (34.2)	80.0	11.2
Completed Primary/incomplete secondary	13321	13237 (49.8)	70.6	22.2
No education/incomplete primary	4652	4199 (15.8)	57.7	34.5
Parental occupation				
Unemployed mother and working father	14399	14100 (53.0)	73.1	19.5
Working mother and working father	13274	11820 (44.5)	70.6	21.3
Unemployed father	675	581 (2.2)	63.7	26.7
Maternal marital status				
Currently married	27734	25953 (97.6)	71.9	20.3
Formerly married	713	638 (2.4)	62.8	25.4
Maternal final say on her own health care				
Woman with partner/other	9763	8514 (32.0)	73.2	19.6
Woman alone	14586	14200 (53.4)	72.3	19.7
Partner alone/someone else/other	4053	3860 (14.5)	66.4	24.6
Birth rank and interval				
2nd/3rd birth rank, more than 2 years interval	11380	10751 (40.4)	74.5	17.3
1st birth rank	9119	9139 (34.4)	75.7	16.8
2nd/3rd birth rank, less than or equal to 2 years interval	1847	1570 (5.9)	71.1	20.8
4th birth rank, more than 2 years interval	5156	4443 (16.7)	59.8	32.7
4th birth rank, less than or equal to 2 years interval	945	687 (2.6)	53.7	38.4
Health knowledge				
Frequency of reading newspaper				
At least once a week	4687	3773 (14.2)	82.5	10.0
Less than once a week	10118	9402 (35.4)	75.6	15.9
Never	13562	13376 (50.3)	66.0	26.5
Frequency of listening to radio				
At least once a week	9295	8668 (32.6)	76.8	16.1
Less than once a week	9698	9369 (35.2)	72.9	19.0
Never	9382	8509 (32.0)	65.4	26.3
Frequency of watching television				
At least once a week	20906	20634 (77.6)	75.5	16.8
Less than once a week	4517	3715 (14.0)	61.9	29.3
Never	2952	2205 (8.3)	53.0	39.7
Knowledge on complications during pregnancy				
Yes	12745	11867 (44.6)	78.8	12.3
None	15690	14717 (55.3)	66.0	27.0

IDHS: Indonesia Demographic and Health Survey; IFA: iron folic acid supplements.

* Weighted for the sampling probability.

Table 1. Prevalence of non-utilization of any iron/folic acid supplements and frequency distribution of potential predictors (cont.)

Variable	N	Weighted N ¹ (weighted %)*	Prevalence of using IFA	
			Ever (%)	Never (%)
Knowledge on complications during delivery				
Yes	14512	13133 (49.4)	78.4	13.3
None	13930	13454 (50.6)	65.2	27.4
Knowledge on complications post delivery				
Yes	10440	8518 (32.0)	78.7	13.2
None	17996	18063 (67.9)	68.5	23.8
Enabling factors				
Know where to go to seek health services				
Small problem	26441	25166 (94.6)	72.6	19.5
Big problem	1962	1403 (5.3)	57.1	36.2
Permission to visit health services				
Small problem	26694	25352 (95.3)	72.3	19.8
Big problem	1703	1215 (4.6)	60.0	33.4
Money to pay health services				
Small problem	19826	19662 (73.9)	75.3	17.1
Big problem	8574	6909 (26.0)	61.6	29.9
Distance to health services				
Small problem	23091	22580 (84.9)	73.9	18.2
Big problem	5306	3989 (15.0)	59.6	33.1
Transportation to health services				
Small problem	23382	22975 (86.4)	73.9	18.3
Big problem	5014	3593 (13.5)	57.8	34.3
Presence of companion				
Small problem	25113	23688 (89.1)	72.8	19.3
Big problem	3283	2878 (10.8)	63.2	29.5
Availability of care by female health workers				
Small problem	26097	24338 (91.5)	72.2	19.9
Big problem	2276	2210 (8.3)	67.1	25.6
Need factors				
Desire for pregnancy				
Wanted then	23132	21560 (81.1)	72.6	19.8
Wanted later	3284	2907 (10.9)	72.2	20.1
Wanted no more	1934	2044 (7.7)	63.7	27.8
Pregnancy complications				
Any complications	2541	2349 (8.8)	77.1	16.3
None	25857	24201 (91.0)	71.3	20.9
Health care services use				
Time of first antenatal care				
First trimester	19696	19663 (74.0)	77.5	14.5
Second trimester	3030	2727 (10.3)	73.2	20.00
Third trimester	3977	2923 (11.0)	61.0	31.8
None	1692	1245 (4.7)	4.71	88.8
Quality of antenatal care (mean±SE)	3.9±0.01	3.9±0.03	3.8±0.04	4.0±0.03

Note: IDHS = Indonesia Demographic and Health Survey; IFA= iron folic acid supplements.

* Weighted for the sampling probability.

two outcomes (See Webtable 1 and 2). However, there were also some differences shown in these models. Webtable 1 shows that there was a significant reduction in the odds of late start of antenatal iron/folic acid supplementation in the 2007 IDHS compared with the 2002/2003 IDHS. Our analysis also found no significant association between all enabling factors and late start of iron/folic acid supplements.

The analyses of factors associated with underutilization of iron/folic acid supplements showed the importance of parental occupation in utilization of less than 90 tablets of antenatal iron/folic acid supplements (Webtable 2). Mothers from households in which both parents worked outside the house were less likely to underutilize iron/folic acid supplements (OR=0.88, 95% CI: 0.78-1.00, $p=0.05$); whereas mothers with an unemployed spouse

were more likely to underutilize the supplements (OR=1.65, 95% CI: 1.11-2.47, $p=0.01$). Our analysis also showed that there was no significant association between exposure to mass media and under-utilization of iron/folic acid supplements during pregnancy. The odds of underutilizing iron/folic acid supplements reduced significantly amongst mothers who received high quality antenatal care services (aOR=0.87, $p<0.001$).

DISCUSSION

Main findings and their significance

Using data from two nationally representative surveys in Indonesia, our study demonstrated the role of external environment, predisposing, enabling, need as well as previous experience with maternal health care factors in non-utilization of iron/folic acid supplements amongst

Table 2. Prevalence of non-utilization of any iron/folic acid supplements and frequency distribution of potential predictors

Variable	Non-utilization of antenatal iron/folic acid supplements*					
	Unadjusted			Adjusted		
	OR	(95% CI)	<i>p</i>	aOR	(95% CI)	<i>p</i>
Year of IDHS						
2002	1.00			1.00		
2007	1.05	(0.91-1.21)	0.50	1.02	(0.88-1.17)	0.80
External environment						
Region			(<0.001)			(<0.001)
Java/Bali	1.00			1.00		
Sumatera	1.97	(1.70-2.30)	<0.001	1.81	(1.56-2.11)	<0.001
Eastern Indonesia	1.56	(1.34-1.82)	<0.001	1.39	(1.18-1.65)	<0.001
Type of residence						
Urban	1.00			1.00		
Rural	1.88	(1.61-2.19)	<0.001	1.73	(1.48-2.03)	<0.001
Predisposing factors						
Demographic factor						
Maternal age at childbirth	1.02	(1.01-1.03)	<0.001			
Household wealth index			(<0.001)			(<0.001)
Richest	1.00			1.00		
Rich	1.31	(1.09-1.56)	<0.01	0.88	(0.73-1.07)	0.20
Middle	1.96	(1.65-2.34)	<0.001	1.03	(0.85-1.26)	0.75
Poor	2.95	(2.46-3.54)	<0.001	1.25	(1.00-1.56)	0.05
Poorest	4.98	(4.09-6.08)	<0.001	1.58	(1.24-2.02)	<0.001
Maternal education			(<0.001)			(<0.001)
Secondary+	1.00			1.00		
Completed Primary/incomplete Secondary	2.20	(1.91-2.54)	<0.001	1.29	(1.10-1.52)	<0.01
No education/incomplete primary	5.71	(4.79-6.80)	<0.001	2.07	(1.66-2.57)	<0.001
Husband's education			(<0.001)			(<0.001)
Secondary+	1.00			1.00		
Completed Primary/incomplete secondary	2.21	(1.95-2.50)	<0.001	1.30	(1.12-1.51)	<0.001
No education/incomplete primary	4.21	(3.58-4.95)	<0.001	1.39	(1.14-1.69)	<0.01
Parental occupation			<0.01			
Unemployed mother and working father	1.00					
Working mother and working father	1.14	(1.02-1.28)	0.02			
Unemployed father	1.61	(1.13-2.28)	0.01			
Maternal marital status						
Currently married	1.00					
Formerly married	1.42	(1.10-1.83)	0.01			
Maternal final say on her own health care			<0.01			(0.03)
Woman with partner/other	1.00			1.00		
Woman alone	1.03	(0.92-1.16)	0.64	1.12	(0.99-1.26)	0.06
Partner alone/someone else/other	1.37	(1.16-1.61)	<0.001	1.24	(1.04-1.48)	0.02
Birth rank and interval			(<0.001)			(<0.001)
2nd/3rd birth rank, more than 2 years interval	1.00			1.00		
1st birth rank	0.95	(0.85-1.07)	0.40	1.07	(0.94-1.21)	0.31
2nd/3rd birth rank, less than or equal	1.25	(1.03-1.53)	0.02	1.21	(0.98-1.49)	0.07
4th birth rank, more than 2 years interval	2.30	(2.01-2.63)	<0.001	1.52	(1.32-1.74)	<0.001
4th birth rank, less than or equal to 2 years interval	3.06	(2.42-3.87)	<0.001	2.02	(1.55-2.64)	<0.001
Health knowledge						
Frequency of reading newspaper			(<0.001)			(0.11)
At least once a week	1.00			1.00		
Less than once a week	1.74	(1.47-2.07)	<0.001	1.19	(0.99-1.43)	0.07
Never	3.30	(2.75-3.96)	<0.001	1.23	(1.01-1.51)	0.04
Frequency of listening to radio			(<0.001)			(0.05)
At least once a week	1.00			1.00		
Less than once a week	1.24	(1.07-1.43)	<0.01	1.12	(0.96-1.30)	0.14
Never	1.88	(1.64-2.16)	<0.001	1.19	(1.03-1.37)	0.02
Frequency of watching television			(<0.001)			(<0.001)
At least once a week	1.00			1.00		
Less than once a week	2.11	(1.85-2.41)	<0.001	1.28	(1.12-1.46)	<0.001
Never	3.43	(2.90-4.07)	<0.001	1.41	(1.19-1.68)	<0.001

IDHS: Indonesia Demographic and Health Survey; aOR: adjusted Odds Ratio.

*All figures were weighted for the sampling probability and were obtained from the logistic regression analysis. With the hierarchical approach, estimates were recorded from the final model of each stage of the analysis. Data on 3172 cases were missing and they were excluded from the analyses.

Table 2. Prevalence of non-utilization of any iron/folic acid supplements and frequency distribution of potential predictors (cont.)

Variable	Non-utilization of antenatal iron/folic acid supplements*					
	Unadjusted			Adjusted		
	OR	(95% CI)	<i>p</i>	aOR	(95% CI)	<i>p</i>
Knowledge on complications during pregnancy						
Yes	1.00			1.00		
None	2.63	(2.34-2.95)	<0.001	1.52	(1.31-1.75)	<0.001
Knowledge on complications during delivery						
Yes	1.00			1.00		
None	2.48	(2.22-2.76)	<0.001	1.44	(1.26-1.64)	<0.001
Knowledge on complications post delivery						
Yes	1.00					
None	2.07	(1.84-2.33)	<0.001			
Enabling factors						
Know where to go to seek health services						
Small problem	1.00					
Big problem	2.34	(1.88-2.91)	<0.001			
Permission to visit health services						
Small problem	1.00					
Big problem	2.03	(1.63-2.52)	<0.001			
Money to pay health services						
Small problem	1.00			1.00		
Big problem	2.12	(1.89-2.39)	<0.001	1.28	(1.13-1.44)	<0.001
Distance to health services						
Small problem	1.00			1.00		
Big problem	2.24	(1.95-2.58)	<0.001	1.20	(1.02-1.40)	0.03
Transportation to health services						
Small problem	1.00					
Big problem	2.39	(2.07-2.77)	<0.001			
Presence of companion						
Small problem	1.00			1.00		
Big problem	1.71	(1.46-2.01)	<0.001	1.27	(1.06-1.51)	0.01
Availability of care by female health workers						
Small problem	1.00					
Big problem	1.36	(1.14-1.63)	<0.01			
Need factors						
Desire for pregnancy						
Wanted then	1.00					
Wanted later	1.02	(0.88-1.19)	0.76			
Wanted no more	1.58	(1.30-1.93)	<0.001			
Pregnancy complications						
Any complications						
None	1.40	(1.18-1.68)	<0.001			
Health care services use						
Time of first antenatal care						
First trimester				1.00		
Second trimester	1.43	(1.23-1.68)	<0.001	1.04	(0.89-1.22)	0.62
Third trimester	2.75	(2.39-3.18)	<0.001	1.66	(1.40-1.98)	<0.001
None	103.6	(70.1-153.3)	<0.001	15.6	(10.1-24.1)	<0.001
Quality of antenatal care	0.51	(0.49-0.54)	<0.001	0.67	(0.64-0.71)	<0.001

IDHS: Indonesia Demographic and Health Survey; aOR: adjusted Odds Ratio.

*All figures were weighted for the sampling probability and were obtained from the logistic regression analysis. With the hierarchical approach, estimates were recorded from the final model of each stage of the analysis. Data on 3172 cases were missing and they were excluded from the analyses.

pregnant women. For external environmental factors, pregnant mothers from rural areas and outer Java-Bali region had an increased likelihood for not using iron/folic acid supplements. For predisposing factors, high birth rank infants as well as low household economic status, parental education, maternal autonomy, exposure to mass media and knowledge of obstetric complications emerged as significant predictors of non-utilization of the supplements. For enabling factors, the odds for not using antenatal iron/folic acid supplements increased amongst mothers who reported that any of the following were ma-

ajor problems for them: the money to pay for health services, the distance to health services, or the absence of a companion to accompany them to the health services. The results confirmed the importance of antenatal care as the major distribution channel for iron/folic acid supplements. We found similar significant predictors for both late start and underutilization to non-utilization of iron/folic acid supplements. These significant predictors of antenatal iron/folic acid supplements should be addressed by public health programs to achieve the optimal use of iron/folic acid supplements amongst pregnant women in Indonesia.

Strengths and limitations

The strength of this study included the use of data from nationally representative surveys (IDHS) with high individual and household response rates.^{13,15} The large sample size provided enough power to examine factors associated with the study outcomes examined in this study. The standardized and robust methodology used in Demographic Health Survey also allowed for comparisons across time.^{16,17} With the large sample size, we could also

examine different potential predictors from the external environment, predisposing, enabling, need and previous utilization of maternal health services for non-utilization of iron/folic acid supplements. In addition, the potential of recall bias has been minimised in this analysis since the samples have been restricted only to the most recent birth of mothers in the last five-year period of each IDHS.

Several limitations should also be noted. Information obtained in this survey was based on the ability of moth-

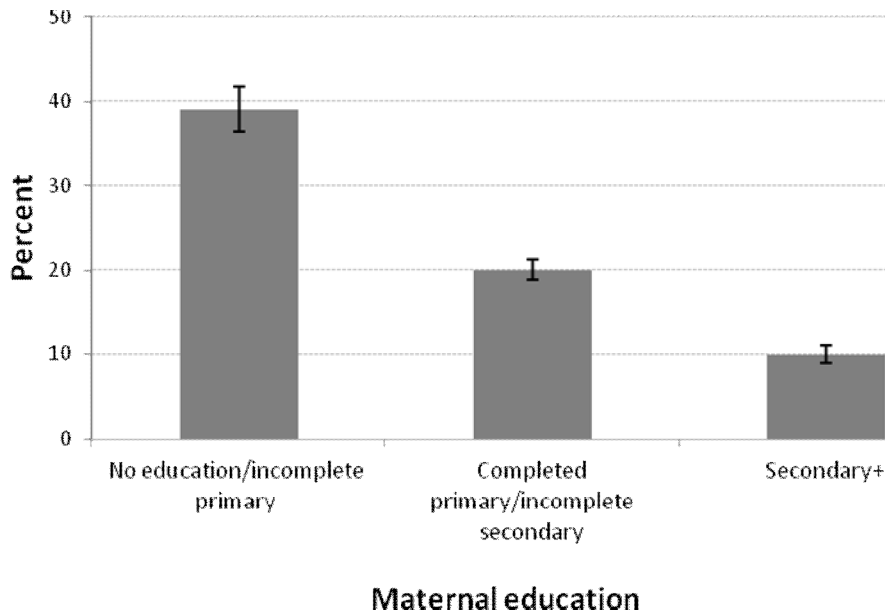


Figure 1. Proportion of women reporting not using iron/folic acid supplements during pregnancy by maternal education, IDHS 2002/2003-2007.

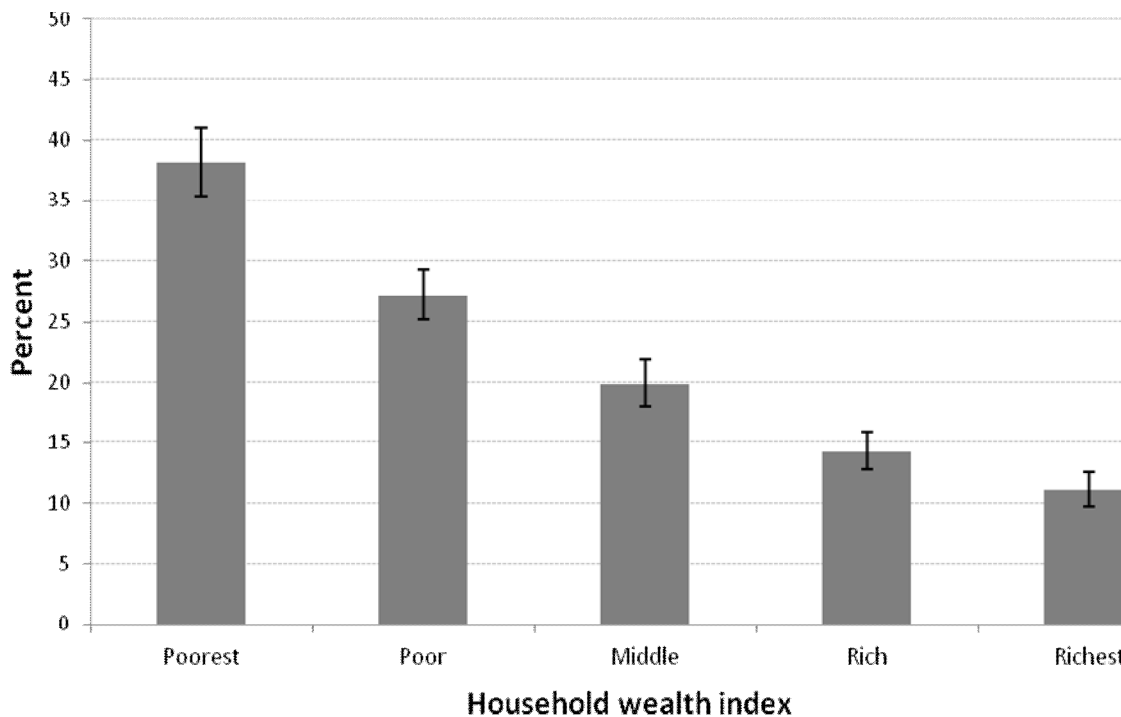


Figure 2. Proportion of women reporting not using iron/folic acid supplements during pregnancy by household wealth index, IDHS 2002/2003-2007.

ers to recall events in their last pregnancy which could be up to five years prior to the survey, and no validation of this information is possible. Some potential predictors not available in the survey questionnaires could not be incorporated in the analyses including: maternal knowledge about the importance of iron/folic acid supplements, the adverse effects experienced by mothers when taking the supplements, or the influence of other family members in encouraging mothers to take the supplements. However, these limitations are unlikely to have impacted on the validity of our results.

Factors associated with utilization of antenatal iron/folic acid supplements

Our analyses have demonstrated the increased likelihood of women from rural and outside Java/Bali areas for not using, having a late start or under-utilizing iron/folic acid supplements during pregnancy. These might be the result of the limited availability and access to health care services for women living in these areas, as found in other studies from Indonesia.^{21,22} Data from the Ministry of Health, Indonesia (2010) showed a generally lower ratio of *Posyandu* (outreach basic maternal and child health service) in outer Java/Bali than in Java/Bali region.²³ Furthermore, the role of access to health services in utilization of iron/folic acid supplements was also reflected in our study through low utilization of the supplements amongst women who reported distance to health services was a major problem. This finding is supported by the results of a qualitative study conducted in rural areas of Indonesia, which showed that travel time and poor road infrastructure prevented women from using health services during pregnancy.^{24,25} This demonstrates the need to improve the coverage and distribution of health services for women living in rural and remote areas, for example by strengthening outreach services, and better planning of their location and management of the timing of services.

Our finding shows the role of low socio-economic conditions, including household wealth index and parental education in not using, having a late start or under-utilizing iron/folic acid supplements. Similar findings have also been reported in previous literature.²⁶⁻²⁸ This could be related to the lack of knowledge of maternal health amongst women from low socio-economic groups. These women might be more likely to perceive their pregnancy as a normal event needing no specific attention until medical problems related to the pregnancy occurred.^{28,29} This perception would have contributed to late attendance at antenatal care services, and eventually late utilization of iron/folic acid supplements. We also found an association between high parity and non- or under-optimal utilization of iron/folic acid supplements. Similarly, various studies have demonstrated low utilization of antenatal care services amongst mothers of high birth rank infants.³⁰ Mothers from this group might feel that they were experienced with their pregnancy and therefore no additional care or attention was required.

This evidence suggests the urgent need for health promotion programs targeting mothers from low socio-economic status and with high parity, to increase their awareness about the importance of iron/folic acid supplements. This might be conducted through the counsel-

ling sessions provided by health workers during antenatal care visits. Such counselling sessions would be a valuable opportunity for health workers to address various health issues, including the importance of taking at least 90 tablets of iron/folic acid supplements starting early in pregnancy, potential side effects that might occur as a result of taking the supplements and how mothers can prevent or deal with the side effects. A study from India reported that a continuous counselling session could improve the compliance with taking iron/folic acid supplements amongst pregnant women.³¹

A qualitative study about iron/folic acid utilization from West Java Province, Indonesia, has also reported a shortage of health counselling including counselling on iron/folic acid supplementation, by midwives during antenatal care services.³² This study also found a lack of promotional activities through printed material in health facilities such as leaflets or posters; or through mass media to encourage women using iron/folic acid supplements during pregnancy. Consequently, misconceptions about the benefits and consequences of taking iron/folic acid supplements were still found in the community. Most women in this qualitative study stated that they have discontinued taking the supplements, mainly due to side effects about which they had no information.

All of this evidence highlights the urgency of improving and strengthening health promotion programs in the community including through health counselling to improve their knowledge about the benefits of iron/folic acid supplements, to change their behaviours related to number and timing of use of iron and folic acid supplementation in pregnancy, and to increase their compliance in taking the supplements. Moreover, this program should target not only mothers, but also other family members, since the association between low utilization of iron/folic acid supplements and low maternal autonomy has also been reported in this study. This finding is supported by previous studies showing that women were more likely to take iron/folic acid supplements regularly when their family members, particularly their husband, actively encouraged them to take the tablets.^{31,32} The participation of other community members, such as cadres and traditional birth attendants in health promotion programs is essential. In some communities, traditional birth attendants still have an influential role during pregnancy.²⁴ Some women even followed the advice of their traditional birth attendant for not taking iron/folic acid supplements because they were afraid of having large babies.³² The importance of attending antenatal care services in utilization of iron/folic acid supplements is confirmed in our study. In Indonesia, the main distribution channel of iron/folic acid supplements is through antenatal care services. As a consequence, women who did not attend antenatal services had an increased likelihood for not getting any iron/folic acid supplements. Thus, in addition to efforts to improve the utilization of antenatal care services, expanding the distribution channel of iron/folic acid supplements is important in areas with low coverage of health services or personnel. Local cadres and traditional birth attendants could be utilized to support midwives in the distribution of iron/folic acid supplements, particularly to pregnant

Webtable 1. Unadjusted and adjusted Odds Ratio (OR) of potential predictors for delayed initiation of utilization of iron/folic acid supplements in Indonesia

Variable	Late utilization of IFA*					
	Unadjusted			Adjusted		
	OR	95% CI	<i>p</i>	aOR	95% CI	<i>p</i>
Year of IDHS						
2002	1.00			1.00		
2007	0.85	0.71-1.01	0.06	0.81	0.68-0.96	0.02
External environment						
Region			(<0.001)			(<0.001)
Java/Bali	1.00			1.00		
Sumatera	1.77	1.44-2.18	<0.001	1.67	1.36-2.05	<0.001
Eastern Indonesia	3.46	2.85-4.21	<0.001	3.21	2.60-3.97	<0.001
Type of residence						
Urban	1.00			1.00		
Rural	1.78	1.45-2.17	<0.001	1.50	1.23-1.83	<0.001
Predisposing factors						
Demographic factor						
Maternal age at childbirth	1.02	1.01-1.04	<0.01			
Household wealth index			(<0.001)			(0.08)
Richest	1.00			1.00		
Rich	2.06	1.52-2.79	<0.001	1.46	1.06-2.01	0.02
Middle	2.70	2.01-3.62	<0.001	1.44	1.03-2.01	0.03
Poor	3.65	2.72-4.91	<0.001	1.56	1.09-2.24	0.02
Poorest	5.33	3.94-7.20	<0.001	1.74	1.19-2.55	<0.01
Maternal education			(<0.001)			(0.02)
Secondary+	1.00			1.00		
Completed Primary/incomplete Secondary	1.91	1.57-2.33	<0.001	1.12	0.91-1.40	0.29
No education/incomplete primary	4.28	3.44-5.33	<0.001	1.52	1.12-2.05	0.01
Husband's education			(<0.001)			(<0.01)
Secondary+	1.00			1.00		
Completed Primary/incomplete secondary	2.12	1.76-2.56	<0.001	1.51	1.20-1.89	<0.001
No education/incomplete primary	4.05	3.22-5.11	<0.001	1.78	1.33-2.37	<0.001
Parental occupation			(0.08)			
Unemployed mother and working father	1.00					
Working mother and working father	0.99	0.83-1.17	0.91			
Unemployed father	1.61	1.04-2.50	0.03			
Maternal marital status						
Currently married	1.00					
Formerly married	1.29	0.79-2.11	0.31			
Maternal final say on her own health care			(0.14)			(0.06)
Woman with partner/other	1.00			1.00		
Woman alone	1.09	0.91-1.29	0.35	1.20	1.01-1.42	0.03
Partner alone/someone else/other	1.31	1.00-1.70	0.05	1.30	0.99-1.72	0.06
Birth rank and interval			(<0.001)			(<0.001)
2nd/3rd birth rank, more than 2 years interval	1.00			1.00		
1st birth rank	0.81	0.67-0.97	0.03	0.88	0.73-1.07	0.22
2nd/3rd birth rank, less than or equal	2.46	1.82-3.32	<0.001	2.33	1.69-3.21	<0.001
4th birth rank, more than 2 yrs interval	2.30	1.88-2.81	<0.001	1.67	1.36-2.05	<0.001
4th birth rank, less than or equal to 2 yrs interval	4.17	2.83-6.16	<0.001	3.10	1.98-4.86	<0.001
Health knowledge						
Frequency of reading newspaper			(<0.001)			(0.01)
At least once a week	1.00			1.00		
Less than once a week	1.72	1.34-2.20	<0.001	1.31	1.02-1.70	0.04
Never	2.86	2.25-3.63	<0.001	1.52	1.15-2.00	<0.01
Frequency of listening to radio			(<0.001)			
At least once a week	1.00					
Less than once a week	0.93	0.78-1.12	0.46			
Never	1.39	1.16-1.68	<0.001			
Frequency of watching television			(<0.001)			
At least once a week	1.00					
Less than once a week	1.43	1.15-1.76	<0.01			
Never	2.78	2.24-3.44	<0.001			
Knowledge on complications during pregnancy						
Yes	1.00			1.00		
None	1.70	1.46-1.98	<0.001	1.21	1.02-1.44	0.03

IDHS: Indonesia Demographic and Health Survey; aOR: adjusted Odds Ratio.

* All figures were weighted for the sampling probability and were obtained from the logistic regression analysis. With the hierarchical approach, estimates were recorded from the final model of each stage of the analysis.

Webtable 1. Unadjusted and adjusted Odds Ratio (OR) of potential predictors for delayed initiation of utilization of iron/folic acid supplements in Indonesia (cont.)

Variable	Late utilization of IFA*					
	Unadjusted			Adjusted		
	OR	95% CI	<i>p</i>	aOR	95% CI	<i>p</i>
Knowledge on complications during delivery						
Yes	1.00					
None	1.51	1.31-1.75	<0.001			
Knowledge on complications post delivery						
Yes	1.00					
None	1.23	1.05-1.44	0.01			
Enabling factors						
Know where to go to seek health services						
Small problem	1.00					
Big problem	1.47	1.10-1.97	0.01			
Permission to visit health services						
Small problem	1.00					
Big problem	1.62	1.21-2.15	<0.01			
Money to pay health services						
Small problem	1.00					
Big problem	1.64	1.41-1.91	<0.001			
Distance to health services						
Small problem	1.00					
Big problem	1.59	1.32-1.92	<0.001			
Transportation to health services						
Small problem	1.00					
Big problem	1.69	1.40-2.05	<0.001			
Presence of companion						
Small problem	1.00					
Big problem	1.37	1.10-1.71	0.01			
Availability of care by female health workers						
Small problem	1.00					
Big problem	1.15	0.85-1.56	0.37			
Need factors						
Desire for pregnancy			(<0.001)			(0.01)
Wanted later	1.00			1.00		
Wanted then	1.53	1.21-1.95	<0.001	1.34	1.04-1.71	0.02
Wanted no more	1.85	1.44-2.39	<0.001	1.43	1.06-1.92	0.02
Pregnancy complications						
Any complications	1.00					
None	1.42	1.10-1.83				

Note: IDHS = Indonesia Demographic and Health Survey; aOR=adjusted Odds Ratio.

* All figures were weighted for the sampling probability and were obtained from the logistic regression analysis. With the hierarchical approach, estimates were recorded from the final model of each stage of the analysis.

Webtable 2. Unadjusted and adjusted Odds Ratio (OR) of potential predictors for under-utilization of iron/folic acid supplements in Indonesia

Variable	Under utilization of IFA*					
	Unadjusted			ADJUSTED		
	OR	95% CI	<i>p</i>	aOR	95% CI	<i>p</i>
Year of IDHS						
2002	1.00			1.00		
2007	1.07	0.93-1.23	0.34	1.06	0.92-1.23	0.41
External environment						
Region			(<0.001)			(<0.001)
Java/Bali	1.00					
Sumatera	2.76	2.38-3.20	<0.001	2.70	2.32-3.15	<0.001
Eastern Indonesia	2.32	2.02-2.66	<0.001	2.24	1.94-2.59	<0.001
Type of residence						
Urban	1.00			1.00		
Rural	1.34	1.16-1.56	<0.001	1.17	1.00-1.36	0.05
Predisposing factors						
Demographic factor						

IDHS: Indonesia Demographic and Health Survey; aOR: adjusted Odds Ratio.

* All figures were weighted for the sampling probability and were obtained from the logistic regression analysis. With the hierarchical approach, estimates were recorded from the final model of each stage of the analysis.

Webtable 2. Unadjusted and adjusted Odds Ratio (OR) of potential predictors for under-utilization of iron/folic acid supplements in Indonesia (cont.)

Variable	Under utilization of IFA*					
	Unadjusted			ADJUSTED		
	OR	95% CI	<i>p</i>	aOR	95% CI	<i>p</i>
Maternal age at childbirth	1.00	0.99-1.01	0.95	0.99	0.97-1.00	0.05
Household wealth index			(<0.001)			(0.01)
Richest	1.00			1.00		
Rich	1.46	1.24-1.72	<0.001	1.20	1.01-1.43	0.04
Middle	1.63	1.38-1.92	<0.001	1.14	0.96-1.37	0.14
Poor	2.30	1.92-2.76	<0.001	1.48	1.20-1.82	<0.001
Poorest	2.21	1.80-2.72	<0.001	1.25	0.97-1.61	0.08
Maternal education			(<0.001)			(0.01)
Secondary+	1.00			1.00		
Completed Primary/incomplete Secondary	1.51	1.33-1.70	<0.001	1.26	1.08-1.47	<0.01
No education/incomplete primary	1.85	1.54-2.21	<0.001	1.20	0.95-1.51	0.12
Husband's education			(<0.001)			(0.08)
Secondary+	1.00			1.00		
Completed Primary/incomplete secondary	1.38	1.22-1.55	<0.001	1.12	0.97-1.28	0.11
No education/incomplete primary	1.86	1.55-2.23	<0.001	1.26	1.02-1.56	0.03
Parental occupation			(0.01)			(<0.01)
Unemployed mother and working father	1.00			1.00		
Working mother and working father	0.94	0.83-1.06	0.30	0.88	0.78-1.00	0.05
Unemployed father	1.81	1.22-2.67	<0.01	1.65	1.11-2.47	0.01
Maternal marital status			(0.56)			
Currently married	1.00					
Formerly married	1.56	1.04-2.33	0.03			
Maternal final say on her own health care			(0.56)			
Woman with partner/other	1.00					
Woman alone	0.96	0.85-1.09	0.55			
Partner alone/someone else/other	1.05	0.88-1.26	0.57			
Birth rank and interval			(<0.001)			(<0.01)
2nd/3rd birth rank, more than 2 years interval	1.00			1.00		
1st birth rank	0.89	0.79-1.00	0.04	0.86	0.74-0.99	0.04
2nd/3rd birth rank, less than or equal	1.39	1.10-1.78	0.01	1.22	0.95-1.56	0.12
4th birth rank, more than 2 yrs interval	1.53	1.29-1.82	<0.001	1.37	1.13-1.65	<0.01
4th birth rank, less than or equal to 2 yrs interval	1.69	1.15-2.48	0.01	1.36	0.93-1.98	0.11
Health knowledge			(<0.001)			
Frequency of reading newspaper			(<0.001)			
At least once a week	1.00					
Less than once a week	1.34	1.16-1.56	<0.001			
Never	1.48	1.27-1.74	<0.001			
Frequency of listening to radio			(0.01)			
At least once a week	1.00					
Less than once a week	1.09	0.96-1.25	0.18			
Never	1.25	1.08-1.44	<0.01			
Frequency of watching television			(<0.001)			
At least once a week	1.00					
Less than once a week	1.32	1.12-1.56	<0.01			
Never	1.51	1.22-1.87	<0.001			
Knowledge on complications during pregnancy						
Yes	1.00			1.00		
None	1.59	1.41-1.78	<0.001	1.41	1.24-1.60	<0.001
Knowledge on complications during delivery						
Yes	1.00					
None	1.48	1.32-1.66	<0.001			
Knowledge on complications post delivery						
Yes	1.00					
None	1.26	1.12-1.42	<0.001			
Enabling factors						
Know where to go to seek health services						
Small problem	1.00					
Big problem	2.05	1.46-2.88	<0.001			

Note: IDHS = Indonesia Demographic and Health Survey; aOR=adjusted Odds Ratio.

* All figures were weighted for the sampling probability and were obtained from the logistic regression analysis. With the hierarchical approach, estimates were recorded from the final model of each stage of the analysis.

Webtable 2. Unadjusted and adjusted Odds Ratio (OR) of potential predictors for under-utilization of iron/folic acid supplements in Indonesia (cont.)

Variable	Under utilization of IFA*					
	Unadjusted			ADJUSTED		
	OR	95% CI	<i>p</i>	aOR	95% CI	<i>p</i>
Permission to visit health services						
Small problem	1.00			1.00		
Big problem	1.99	1.49-2.65	<0.001	1.43	1.06-1.94	0.02
Money to pay health services						
Small problem	1.00					
Big problem	1.48	1.29-1.70	<0.001			
Distance to health services						
Small problem	1.00			1.00		
Big problem	1.63	1.37-1.93	<0.001	1.21	1.01-1.46	0.04
Transportation to health services						
Small problem	1.00					
Big problem	1.56	1.31-1.87	<0.001			
Presence of companion						
Small problem	1.00					
Big problem	1.32	1.08-1.60	0.01			
Availability of care by female health workers						
Small problem	1.00					
Big problem	1.16	0.94-1.43	0.18			
Need factors						
Desire for pregnancy			(0.02)			(0.01)
Wanted later	1.00			1.00		
Wanted then	1.29	1.07-1.55	0.01	1.19	0.98-1.45	0.08
Wanted no more	0.92	0.74-1.14	0.44	0.77	0.60-0.97	0.03
Pregnancy complications						
Any complications	1.00					
None	1.12	0.94-1.33	0.19			
Health care services use						
Time of first antenatal care			(<0.001)			(0.20)
First trimester	1.00			1.00		
Second trimester	1.29	(1.08-1.53)	0.01	1.05	(0.87-1.26)	0.62
Third trimester	1.85	(1.50-2.27)	<0.001	1.24	(1.00-1.54)	0.05
None	3.72	(1.59-8.72)	<0.01	1.39	(0.62-3.11)	0.42
Quality of antenatal care	0.80	(0.77-0.83)	<0.001	0.87	(0.83-0.91)	<0.001

Note: IDHS = Indonesia Demographic and Health Survey; aOR=adjusted Odds Ratio.

* All figures were weighted for the sampling probability and were obtained from the logistic regression analysis. With the hierarchical approach, estimates were recorded from the final model of each stage of the analysis.

women who live in remote areas and who could not easily access health care services.

Conclusions

Strategies to increase optimal utilization of iron/folic acid supplements in Indonesia should take into account various factors, including the external environment, predisposing factors, enabling factors and previous utilization of maternal health services. It is also essential to conduct health promotion strategies targeting pregnant women, their family members and community. This will help to improve their awareness of the importance of iron/folic acid supplements and increase the adherence of pregnant women to the supplements. Public health interventions should also target mothers from rural areas and remote areas, low socio-economic status, mothers of high rank infants, and mothers who were not exposed to antenatal care services. Efforts to improve the coverage of and access to health services, particularly in rural and outer Java/Bali areas are important to improve utilization of iron/folic acid supplements. Furthermore, expanding the distribution of the supplements, for example through local cadres and traditional birth attendants in addition to

strengthen interpersonal counselling on iron/folic acid supplementation during antenatal care services could increase coverage and utilization of iron/folic acid supplements that potentially would reduce low birth weight and improve neonatal and infant survival in Indonesia.

AUTHOR DISCLOSURE

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Original Article

Factors associated with not using antenatal iron/folic acid supplements in Indonesia: the 2002/2003 and 2007 Indonesia Demographic and Health Survey

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在印度尼西亚产前未补充铁/叶酸的相关因素：2002、2003 和 2007 印度尼西亚人口与健康普查

背景：本研究分析了印度尼西亚产前未补充铁/叶酸的相关因素。**方法：**本研究使用了 2002、2003 和 2007 年印度尼西亚人口与健康普查 (IDHS) 数据，采集了每次普查前近 5 年 26591 位妇女生育资料，其中主要的相关变量就是没有补充铁/叶酸。我们使用 Logistic 回归分析，研究一些外部环境的作用、诱发、启用、需要因素，以及使用其他孕产妇保健服务对产前未补充铁/叶酸的人群的影响。**结果：**Java-巴厘地区以外以及农村地区有更多未补充铁/叶酸的母亲 (OR=1.73, 95% CI: 1.48-2.03)。不服用这些补充剂的可能性随着家庭财富指数和父母受教育程度降低而增高。对于那些很少主动关注自身健康 (OR=1.24, 95% CI: 1.04-1.49)、生产过多胎经产妇、对产科并发症知识低以及很少接触大众媒体的母亲，其不服用补充剂的几率升高。影响产前不补充铁/叶酸的主观因素主要有去做产前检查的费用 (OR=1.28, 95% CI: 1.13-1.44) 和与产前检查机构的距离 (OR=1.20, 95% CI: 1.02-1.40)。我们的研究说明产前护理作为一个非常重要的补充剂的分配渠道。**结论：**提高社区意识，增加健康服务的覆盖率、在孕期护理期间加强宣传指导、组织社区参与健康计划，对提高铁/叶酸补充剂的摄入、增加印度尼西亚婴儿存活率将是非常必要的。

关键词：铁/叶酸补充剂、产前、人口和健康调查、印度尼西亚