Original article

SOCIO-ECONOMIC DETERMINANTS OF ADHERENCE TO IRON AND FOLIC ACID TABLETS AMONG RURAL ANTE-NATAL MOTHERS IN LUCKNOW, INDIA

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ABSTRACT

Introduction: Anemia is a great challenge for maternal health in India, affecting more than half of the pregnant mothers. For combating this, iron supplementation during pregnancy has long been recognized as a way. Recent document indicates that only 23% women consumed iron tablets for at least 90 days during pregnancy. In this perspective, the present study aimed to find out the socio-economic determinants of 100 iron and folic acid tablets consumption in rural Lucknow, India.

Methods: The cross-sectional study, conducted in 2009-10, used a structured questionnaire to collect data from 352 recently delivered women, following systematic random sampling. Variables of interest included age, religion, education, socio economic status, family type, parity, timing of ante-natal registration and number of ante-natal care visits. Predictors were found out using univariate and multivariate logistic regressions.

Results: Overall, 83.5% of the women received 100 iron and folic acid tablets during their pregnancy but, only 36.9% consumed them. Factors significantly associated with consumption of 100 tablets, after simple logistic regression, were education, parity, timing of ante-natal registration and number of ante-natal care visits to any facility. On multiple logistic regression, applying enter method and considering all variables, only primiparity (OR= 2.212, 95% CI= 1.186 – 4.125) and elder age (OR= 1.836, 95% CI= 1.020 – 3.305) were found to be the predictors for 100 iron and folic acid tablet consumption.

Conclusion: Consumption of sufficient number of iron and folic acid tablets was very low. Primipara and elderly mothers were more likely to consume 100 iron tablets. This poor status of iron tablets consumption warrants specific approach to improvise maternal health outcome.

Key Words: Anemia, Ante natal care, Iron and folic acid, Maternal health, Rural India.

INTRODUCTION

Maternal health has long been a matter of concern in developing countries. After 25 years of launching Safe Motherhood program in 1987, India is staggering with a high maternal mortality ratio (MMR) of 230/100,000 live births.[1] With

only few years left until the deadlines to achieve Millennium Development Goal (MDG) 5 i.e. to bring down MMR to 109/100,000 live births by 2015, India's run so far has not been impressive.[2,3]

One of the indirect causes of these maternal deaths is anemia, mostly due to iron-deficiency. World Health Organization (WHO) estimation says that 32% pregnant women in South-East Asia region are anemic.[4] In India, anemia is estimated to cause 13% of the maternal deaths, apart from affecting 58.7% pregnancy.[5,6] Precipitated by multiple factors including nutrition and worm infestation, anemia may lead to pre-eclampsia, preterm delivery, less ability to withstand blood loss and so many other deadly catastrophes.[7]

For preventing as well as treating anemia, iron supplementation is given in many parts of the world. In India, 100 iron and folic acid (IFA) tablets are routinely prescribed to the ante-natal mothers as a part of Safe Motherhood program to combat this threat. Private clinics have also been included in the program in order to get better coverage. A new venture, "12 by 12 initiative", was launched in 2007, addressing adolescent girls with the long term goals of increasing iron body stores and reducing anemia in pregnant mothers. In spite of all the efforts, the available literatures suggest a gloomy scenario of maternal health care in the country, in terms of IFA tablet consumption.[6,8] Only 23% women consumed iron tablets for at least 90 days during pregnancy, says a report.[6] Limited adherence to the therapy is denying the success of the supplementation program, a scenario common in other developing countries, mostly due to side-effects and lack of motivation.[9-12] Considering adherence as a vital issue in the success of iron supplementation program, the study aimed to find out the socio-economic determinants of consumption of 100 IFA tablets in rural areas of Lucknow, a district in north India.

MATERIAL AND METHODS

The cross-sectional study was conducted among Recently Delivered Women (RDWs) of rural Lucknow from August 2009 to July 2010. Rural Lucknow, with 33.3% of the population of the district, is having a literacy rate of 52.3% among the females and 79.3% of its population are leading a low standard of living.[13]

A RDW was defined as a post natal woman who had delivered a baby during the period from January 2009 till June 2010. As a part of a larger study which addresses the whole spectrum of pregnancy and its outcome, the article focused on IFA tablet consumption. So, sample size was determined using the formula $4PQ/d^2$ and estimating the prevalence of rural women attending ante-natal care to be 64.2% in rural Uttar Pradesh (UP), based on the findings of NFHS-3.[14] A sample size of 352 was calculated with a relative precision of 10% and a design effect of 1.5. This sample was taken from 32 villages, selected by multistage random sampling.

From every village, list of RDWs was collected from Accredited Social Health Activists (ASHAs) and Anganwadi workers (AWWs), two baseline health workers at the rural community level. Systematic random sampling was followed to pick up the required number of beneficiaries.

The criterion for inclusion was a RDW present in the villages under study on the day of survey. The guests were excluded. Those who refused for interview were excluded.

Tools of data collection: The study was conducted after getting clearance from the Institutional Ethical Committee of the university. Permission was also taken from the superintendents of the concerned CHCs. Verbal consent was obtained from participants. A structured interview schedule was used to collect required information regarding socio-economic status and consumption of IFA tablets. After pretesting, necessary modifications were done for bringing clarity. For calculating socio-economic status, modified Pareek's classification for rural area was used.[15] The main outcome variable was consumption of 100 IFA tablets. Among different independent variables, age, religion, education, socio-economic status (SES), family type, parity, timing of ante-natal registration and number of ante-natal care (ANC) visits to health facility were included.

Statistical analysis: Data entry and analysis were done using SPSS for Windows software (Version 19.0; SPSS Inc, IL, Chicago, US). The chi-square test was used to compare the RDWs who had consumed 100 IFA tablets and who had not. A p value of < 0.05 was considered statistically significant. Simple and multiple logistic regressions were applied to find out the predictors. Results were expressed in terms of odd's ratio (OR) and confidence interval (CI). All variables were included in multivariate model. En-

ter method was used to find predictors for consumption of 100 IFA tablets. Hosmer-Lemeshow goodness-of-fit test was used to assess the fit of final model.

RESULTS

More than half (54.5%) of the RDWs were above the age of 25 years. Most of them (91.2%) were Hindu and illiterate/ educated till primary standard (63.6%). Considering socio-economic status, 89.8% belonged to class IV or V. Approximate half of the RDWs (53.7%) were registered in the first trimester of their pregnancy and 85.5% took at least three ANC visits. Although 83.5% of the women had received at least 100 IFA tablets while only one-third (36.9%) consumed them.

The comparison between the profiles of the mothers who took 100 tablets and who did not revealed significant difference in terms of education, parity, timing of registration and number of ANC visits. The influence of age, religion, SES or family type was not prominent. (Table 1)

Table 1: Comparison of the profile of the RDWs on 100 IFA tablets consumption

Variables	100 IFA consumption			P value#	Crude OR (95% CI)
	Yes (n=130) (%)	No (n=222) (%)	Total (N=352)		
Age					
<25 yrs	57 (35.6)	103 (64.4)	160	0.643	0.902 (0.584 – 1.394)
>25 yrs	73 (38.0)	119 (62.0)	192		1
Religion					
Hindu	117 (36.4)	204 (63.6)	321	0.546	0.794 (0.376 – 1.679)
Muslim	13 (41.9)	18 (58.1)	31		1
Education					
Till primary standard	73 (32.6)	151 (67.4)	224	0.026	1
Beyond primary standard	57 (44.5)	71 (55.5)	128		1.661 (1.062 – 2.596)*
SES					
Till class III	18 (50.0)	18 (50.0)	36	0.086	1.821 (0.911 – 3.642)
Class IV & V	112 (35.4)	204 (64.6)	316		1
Family type					
Nuclear	61 (35.3)	112 (64.7)	173	0.523	0.868 (0.563 – 1.339)
Joint	69 (38.5)	110 (61.5)	179		1
Parity					
Primipara	46 (46.0)	54 (54.0)	100	0.026	1.704 (1.062 – 2.733)*
Multipara	84 (33.3)	168 (66.7)	252		1
Early registration					
Yes	81 (42.9)	108 (57.1)	189	0.013	1.745 (1.122 – 2.714)*
No	49 (30.1)	114 (69.9)	163		1
3 ANC visits					
Yes	118 (39.2)	183 (60.8)	301	0.032	2.096 (1.054 – 4.166)*
No	12 (23.5)	39 (76.5)	51		1

RDW – Recently delivered women; IFA – Iron and folic acid; SES – Socio economic status; ANC – Ante natal care; #Chi-square test applied; *p value < 0.05

On simple logistic regression, no significant relation was found between IFA tablet consumption and the age, religion, SES or family type of the RDWs. However, significant relation was found between IFA consumption and education (OR = 1.661, 95% CI = 1.062 – 2.596), parity (OR = 1.704, 95% CI = 1.062 – 2.733), timing of ante-natal registration (OR = 1.745, 95% CI = 1.122 – 2.714) and number of ANC visits (OR = 2.096, 95% CI = 1.054 – 4.166). Primipara, educated, early registered RDWs and those who went for at least three ANC visits were found to be more likely to take 100 IFA tablets. (Table 1)

At multivariate level, only parity (OR= 2.212, 95% CI= 1.186 – 4.125) and elder age (OR= 1.836, 95% CI= 1.020 – 3.305) stood significant, indicating that primiparity and elderly age could affect IFA tablet intake positively. (Table 2) The result of Hosmer-Lemeshow goodness-of-fit test was not significant (p= 0.217, df= 8). Omnibus test yielded a p value of 0.006 for the model indicating that addition of predictors fits the model better. Nagelkerke's R^2 suggested that the model explains 8.1% of the variation in the outcome. Overall correct classification result indicated that 65.3% of the RDWs are predicted rightly about their consumption of 100 IFA tablets.

Table 2: Association of factors of consumption of 100 IFA tablets by the RDWs from multivariate regression

Variables	Adjusted OR	95% CI	p value
Age			
<25 yrs	1		
>25 yrs	1.836	1.020 – 3.305	0.043
Religion			
Hindu	0.899	0.411 – 1.963	0.788
Muslim	1		
Education			
Till primary	1		
Beyond primary	1.424	0.874 – 2.319	0.156
SES			
Till class III	1.497	0.711 – 3.151	0.288
Class IV & V	1		
Family type			
Nuclear	0.978	0.613 – 1.561	0.926
Joint	1		
Parity			
Primipara	2.212	1.186 – 4.125	0.013
Multipara	1		
Early registration			
Yes	1.470	0.924 – 2.339	0.104
No	1		
3 ANC visits			
Yes	1.792	0.878 – 3.657	0.109
No	1		

RDW – Recently delivered women, IFA – Iron and folic acid, OR – Odd's ratio, CI – Confidence interval, ANC – Ante natal care

DISCUSSION

Pregnant women are one of the vulnerable populations to develop iron-deficiency anemia. Still, all the emphasis was limited to benefit of iron supplementation. Given the paramount significance of adherence, very few studies have ever addressed this issue, even less the reasons behind the problem of non-compliance.

The finding from our study suggests that receiving and consuming IFA tablets do not run side by side. While percentage of women receiving 100 IFA tablets are similar to a recent study, the consumption of IFA tablets was much lower, as compared to the norm.[16] Poor compliance about iron tablet consumption were revealed by a few studies earlier although none of them had addressed the socio-economic aspects.[6,8,14,17-19]

Among different socio-economic factors, multiparity has earlier been linked with maternal anemia.[10,20,21] Our study finding that multipara RDWs were less likely to consume sufficient IFA tablets supports that hypothesis. Previous studies also found less tendency among multipara to consume these supplementation.[22,23] Given the blood loss associated with previous pregnancies, low iron intake coupled with nutritional deficiencies make them more vulnerable for developing anemia. As far as our finding is concerned, it was seen that receipt of 100 IFA was not associated with parity (data not shown), thus excluding the possibility that the difference was attributed to variation in receipt of iron tablets. Therefore, the difference was solely confined only to consumption which might be related to lack of motivation. Health promotion activities targeting this problem should try to ensure solutions like supervised intake of iron tablets.

Education is known to affect anemia status as well as utilization of ante-natal care. [24-27] Thus, it might have a relation with IFA intake although it was not found to have an impact on the later in our study, at the multivariate level. Health workers should be more careful about illiterate/ less literate RDWs. The unmet need for better information and education should be emphasized to the community level workers.[28]

The role of early registration is also evident. It might ensured a long time of interaction between RDWs and health workers which resulted in better counseling and, ultimately, higher adherence to iron supplementation. Nevertheless, it did not come out as a predictor for IFA tablet consumption. One study found the number of ante-natal visits to be a determinant of adherence to iron supplementation.[9] It was apparently associated with IFA consumption in our study, as evident from simple logistic regression, but, after applying multivariate model, it was not significant.

Age is another factor. Elderly women ageing more than 25 years were more likely to consume hundred IFA tablets. Previous studies documented higher tendency of consuming iron and folic acid supplementation among elderly.[22,23,29] Other factors like socio-economic status, type of family or religion was not found to have any impact on intake of enough number of iron tablets. Still, social background needs special mention. Many a times, social environment, coupled with cultural constrains puts obstacles in the way of seeking appropriate health care.[28] For ensuring not only better consumption of iron tablets but improvement of the whole spectrum of maternal health, this root cause should be redressed.

The present study has considerable strengths. Adequate sample size, systematic way of selecting representative sample and community based approach are some of them. The existence of limited such efforts to determine socio-economic

factors responsible for adherence to iron supplementation adds credit to this study. Among its limitations, the reasons for not consuming iron tablets were not collected. Collected data being recall based, bias is also not an unexpected loophole here. As anemia was not assessed, the effect of adherence in reducing maternal anemia could not be estimated. Nevertheless, this study casts light on most neglected aspect of ante-natal care, keeping MDG 5 and improvement of maternal health in view. In addition, it opens new avenue for research on effect of adherence to iron tablets at different socio-economic strata.

CONCLUSION

This is probably high time that the Government of India should focus on redressing this vital issue during policy making. Assuring three ANC care or institutional deliveries are, no doubt, pivotal for the outcome of pregnancy. But, considering maternal health in the long run for the sake of a healthy reproductive life, IFA tablets consumption probably remains the most important decider. At a time, when maternal health is being seen as a right rather than a set of programs to be delivered to a target population, attention should be shifted from development of new technologies to ensure continuum of care.[28] To ensure early registration is the primary step to facilitate ante-natal care for a sufficient duration and to enhance the probability of consumption of IFA tablets in sufficient number. Multipara and young pregnant, as evident from the present study, are to be kept under special observation to ensure better compliance to IFA supplementation. Targeted strategies like supervised intake of IFA tablets, offering parenteral iron to the non-compliant RDWs or stressing on behavior change communication through peer education are some of the other options.[30-32] In essence, the intake of 100 IFA tablets needs to be addressed with its due gravity and action oriented modifications are to be intensified and taken to the grass-root level.

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