

Original Research Article

Adequate knowledge transformed to practice in relation to iron deficiency anaemia in pregnancy: experience from West Bengal

Arnabi Sarkar, Arista Lahiri, Arup Chakraborty*

Department of Community Medicine, Medical College and Hospital, Kolkata, West Bengal, India

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*Correspondence:

Dr. Arup Chakraborty,

E-mail: dr.arupchakraborty@gmail.com

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ABSTRACT

Background: High prevalence of anaemia among pregnant mothers in rural and urban West Bengal warrants a deeper observation. The current article thus, aims to explore the knowledge and practices towards iron deficiency anaemia (IDA) among the rural and urban antenatal mothers.

Methods: An observational descriptive cross-sectional study was conducted among Fifty-four rural and seventy-one urban ante-natal mothers. A semi-structured interview schedule, Maternal and Child Protection Card (MCPC) and Laboratory evaluation reports were used.

Results: Majority respondents were aged below 20 years and housewives. Around 59.25% rural and 66.19% urban mothers knew the meaning of 'Anaemia'. Rural mothers consider pregnancy (54.55%) as the most common cause of iron deficiency anaemia, whereas, urban mothers think of dietary deficiency of iron rich foods (60.56%). Dietary knowledge was adequate, with 57.40% urban and 53.52% rural mothers consuming an extra home-cooked meal. Overall more than 90% mothers consumed green leafy vegetables. Majority mothers knew iron and folic acid (IFA) tablets should be consumed for at least 3 months (100 days) during pregnancy and should be continued after delivery. But 12.96% and 16.90% rural and urban mothers respectively did not take any tablet of IFA. Overall practice and knowledge were statistically associated in rural and urban settings with proper practice exceeding adequate knowledge in pooled estimate.

Conclusions: The differences between urban and rural area in this study were marginal. But in some cases like IFA tablet consumption, Blood tests etc. there was a gap between knowledge and practice, which may actually indicate a lack of motivation.

Keywords: Anaemia, Ante-natal, Iron deficiency, Knowledge, Practice, Pregnant, Rural, Urban

INTRODUCTION

Globally anaemia is a major health problem, especially among pregnant women and adolescent girls.^{1,2} For the year 2011, it is estimated that 38% of pregnant women have anaemia globally. The prevalence of anaemia in pregnant women worldwide is 32.4 million in 2011.² Prevalence of anaemia among pregnant women in reproductive age group (15 – 49 years) in India is 50.3% and is classified as a severe public health problem.^{2,3} In

India, anaemia among pregnant mothers has the highest prevalence in eastern states of India.¹ In urban and rural parts of West Bengal 54.2% and 53.3% of pregnant women respectively are reported to be anaemic as per the National Family Health Survey – 4 (NFHS-4) report.⁴

On comparative observation the prevalence of anaemia among women of reproductive age group appears to have decreased over a decade. Comparing NFHS-3 report to NFHS-4, the overall prevalence of anaemia among

pregnant women appears to be declining in both national and in case of West Bengal.^{3,4} A meta-analysis by Stevens et al found out that the increase in mean haemoglobin level over past two decades has been marginal, similarly with the decrease in proportion of anaemia.⁵ South Asian region was identified to have high anaemia prevalence in the same study. Risk factors for anaemia in pregnancy include, less spacing, teenage pregnancy, diet deficient in iron, anaemia before pregnancy, multiple pregnancies.⁶⁻¹⁰ Iron deficiency anaemia during pregnancy can cause several perinatal and postnatal complications, like immune depression, pre-term birth, low birth weight and postnatal depression.^{8,11-14}

As a whole anaemia among pregnant women hinders the very concept of comprehensive healthcare by life-cycle approach. The burden in terms of economic-loss due to anaemia is also very high, which is indeed a challenge for growth of any country especially low- and middle-income countries.^{2,13} In 2012, the World Health Assembly set a target of 50% reduction in prevalence of anaemia by 2025, categorically specifying among women of reproductive age group.¹⁵ Even after adoption of life-cycle approach in the RMNCH + A program and implementing specific services for prevention & treatment of iron deficiency anaemia, the high prevalence among pregnant mothers warrants a deeper observation into the ideals and habits of this vulnerable group. Despite a greater burden in rural India the data from West Bengal show an almost comparable though high burden in rural and urban areas (53.3% and 54.3% respectively).^{3,4} The current article thus, aims to explore the knowledge and practices towards iron deficiency anaemia (IDA) among the rural and urban antenatal mothers.

METHODS

Study setting and participants

An observational descriptive cross-sectional study was conducted in rural and urban field practice areas, of Medical College & Hospital, Kolkata, West Bengal. Data collection for the study was conducted between June, 2017 and September, 2017. Pregnant women who were permanent residents in the selected urban and rural areas within the mentioned time-period were included, who gave written consent for participation. However, high risk mothers e.g. mothers with severe pre-eclampsia, eclampsia, threatened abortion, associated severe illness (es) were excluded from the study. Mothers who were absent on the days of data collection were also excluded. During this period total 125 mothers were surveyed meeting the inclusion and exclusion criteria, out of whom 54 were rural and 71 were urban residents.

Study tools, variables and study technique

A semi-structured interview schedule was developed (discussion regarding validation is beyond the scope of

the current article) to assess the knowledge and the practices regarding anaemia among the ante-natal mothers. The questionnaire was based on several published documents, key-informant interview with primary-level service providers and discussion with experts in the field.^{5,8,16-20} The questionnaire had two components, knowledge and practice. In the knowledge section knowledge of the mothers regarding common symptoms and effects of anaemia, dietary habits, health-related and care seeking knowledge were included. The source of the knowledge (information) was also included. In the practice section, the practices related to these variables were considered. The time of the mothers' antenatal registration was considered as well.

Mothers were interviewed using the pre-designed pre-tested semi-structured schedule (translated to local vernacular and was back translated to English by two different language experts). Response of mothers to knowledge and practice questions were noted. The cut-off for diagnosis of anaemia was taken as haemoglobin concentration of 11 g/dl (venous blood) in adult pregnant females.²¹ Maternal and Child Protection Card and Laboratory evaluation reports were also used in assessment of certain practice based questions. Data entry was done in EpiInfo 7 (Centers for Disease Control, Atlanta, USA). Subsequent analysis was done in SPSS version 10 (IBM, New York, USA). For considering overall adequate knowledge variables related to care-seeking behaviour were excluded. Those who responded with at least one correct response to the multiple response questions were considered to have correct knowledge on that issue, provided the respondent did not give any incorrect response alongside. Those responding correctly to all the questions were overall regarded to have adequate knowledge. A similar technique was used in pooling practice variables into proper and improper practice. Those having correct practice at all the relevant issues were regarded as having proper practice. These overall levels were examined for differences in rural and urban settings and also association within with the help of Pearson's χ^2 test. A two-tailed $p < 0.05$ was considered statistically significant.

Ethics

Ethical clearance for the current study was taken from the Institutional ethics committee, Medical College & Hospital, Kolkata. Data collection was done maintaining anonymity and confidentiality and after obtaining informed consent from the willing participants.

RESULTS

Background information

Majority of the mothers in rural and urban area (40.66% and 34.23% respectively) attending antenatal check-up were below 20 years of age. Among the rural and urban mothers 39.26% and 28.45% had secondary level of

education. All of the rural and 97.88% of urban mothers is housewives. Overall majority of the mothers (61.36%) follow Islam and live in nuclear families (54.47%). More than half of urban mothers was multigravida having living children without any history of abortion. Among the mothers interviewed 70.37% rural mothers and 77.46% urban mothers registered their pregnancy in the 1st trimester. During this study period majority of rural mothers (61.13%) and urban mothers (55.45%) were in their 3rd trimester.

Knowledge regarding anaemia during pregnancy

The source of information for majority of the mothers in the mentioned issue was reported to be the local government health centre followed by various audio-visual media. Around 59.25% of rural and 66.19% of urban mothers knew that anaemia is 'reduction in blood or haemoglobin'. Comparable proportions of rural and urban mothers (79.02% and 81.69% respectively) knew that diagnosis of anaemia can be done via blood test. Rest of the mothers did not know any method to detect anaemia.

The knowledge of the mothers regarding anaemia during pregnancy is summarized in Table 1. Most common symptom of anaemia known to the mothers was weakness (51.85% and 59.15% among rural and urban mothers respectively). Rural mothers consider pregnancy (54.55%) as the most common cause of iron deficiency anaemia, whereas, urban mothers think dietary deficiency of iron rich food (60.56%) as the main cause anaemia. However, among the urban mothers 57.73% also consider pregnancy as an important antecedent of anaemia. Among the rural mothers 70.37% think anaemia causes

aggravation of complications of pregnancy. On the other hand 60.56% of mothers from urban area reported a similar thought. According to both urban and rural mothers major sources of iron were green leafy vegetables (94.44% and 94.36% respectively). Whole grains, cereals & jaggery, dry fruits and nuts, meat were also known to the mothers as good sources of dietary iron. Majority of the mothers irrespective of their residence knew that consumption of Amla, Guava, Orange, and Lemon etc. with iron rich food is beneficial and knew that it is better not to consume coffee or tea within an hour of meal. While 87.03% and 87.32% mothers of rural and urban area respectively knew skipping meals during pregnancy was not healthy the remaining mothers responded otherwise. Among the urban mothers majority (46.47%) knew that iron and folic acid tablets (IFA tablets) are needed during pregnancy for prevention of anaemia. But among the rural respondents, 33.33% knew this fact and majority (51.85%) believed that only iron in tablet form can prevent anaemia. Around 11.11% of rural and 18.30% of urban respondents did not know what medication can prevent anaemia during pregnancy. Most of the mothers (55.55% rural and 53.52% urban) knew that IFA tablets should be consumed for at least 3 months (100 days) during pregnancy and should be continued after delivery. More than half of the mothers responded that IFA tablets should be continued for less than 6 months duration following delivery. Still, 27.77% rural respondents and 35.22% urban respondents did not know that IFA tablets should be continued in the post-partum period. Majority of the rural (68.51%) and urban (85.91%) respondents believed that following experience of symptoms of anaemia or diagnosis of anaemia during pregnancy attending a hospital is required.

Table 1: Distribution of the participants according to knowledge regarding anaemia and the area of residence.

Knowledge regarding different aspects of iron deficiency anaemia	Rural residents (n=54) N (%)	Urban residents (n=71) N (%)
Common symptoms of anaemia*		
Pallor	25 (46.29)	35 (49.29)
Weakness	28 (51.85)	42 (59.15)
Dizziness	20 (37.05)	23 (32.39)
Shortness of breath	9 (16.66)	20 (28.16)
Palpitation	2 (03.70)	5 (07.04)
Oedema	6 (11.11)	3 (04.22)
Did not know	9 (16.66)	12 (16.90)
Common causes of iron deficiency*		
Pregnancy	30 (54.55)	41 (57.73)
Lack of spacing	8 (14.81)	18 (25.35)
Not consuming enough iron rich food	27 (50.00)	43 (60.56)
Intestinal worm infestation	2 (03.70)	2 (02.81)
Don't know	3 (05.55)	4 (05.64)
Common effects of anaemia in pregnancy*		
Low birth weight	23 (42.59)	34 (47.88)
Aggravation of complication	38 (70.37)	43 (60.56)
Post-partum depression	12 (22.22)	12 (16.90)
Don't know	1 (01.85)	4 (05.63)

Continued.

Knowledge regarding different aspects of iron deficiency anaemia	Rural residents (n=54) N (%)	Urban residents (n=71) N (%)
Skipping meals during pregnancy		
Not healthy	47 (87.03)	62 (87.32)
Healthy	7 (12.97)	9 (12.68)
Common iron rich foods*		
Green leafy vegetables	51 (94.44)	67 (94.36)
Other vegetables	44 (81.48)	63 (88.73)
Whole grains	16 (29.62)	21 (29.57)
Cereals & jaggery	9 (16.66)	13 (18.30)
Dry fruits & nuts	4 (7.40)	3 (4.21)
Meat	6 (11.11)	9 (12.67)
Tea or coffee consumption		
Not within an hour of meal	46 (85.18)	66 (92.95)
Within an hour of meal	8 (14.82)	5 (7.05)
Consumption of amla/guava/orange		
Healthy	46 (85.18)	61 (85.90)
Not healthy	8 (14.82)	10 (14.10)
Drug to prevent anaemia in pregnancy		
Iron and folic acid	18 (33.33)	33 (46.47)
Iron alone	28 (51.85)	22 (30.98)
Calcium	2 (3.71)	3 (4.25)
Don't know	6 (11.11)	13 (18.30)
Consumption of IFA tablets during pregnancy		
Less than 3 months	19 (35.18)	27 (38.02)
3–6 months	30 (55.55)	38 (53.52)
More than 6 months	5 (9.25)	6 (8.45)
Consumption of IFA tablets after delivery		
Continued for <6 months	31 (57.50)	37 (52.11)
To be continued for ≥6 months	8 (14.73)	9 (12.67)
Not to be continued	15 (27.77)	25 (35.22)
Care seeking behaviour*		
Attend sub-centre	7 (12.96)	2 (2.81)
Attend PHC	10 (18.57)	4 (5.63)
Attend Hospital	37 (68.51)	61 (85.91)
Attend private clinic	3 (05.55)	8 (11.26)

*Multiple response answers.

Table 2: Distribution of the participants according to experiences and practices regarding anaemia and the area of residence.

Practice regarding different aspects of iron deficiency anaemia	Rural residents (n=54) N (%)	Urban residents (n=71) N (%)
Symptoms of anaemia experienced	No symptoms	7 (12.96)
	Feeling weak	20 (28.16)
	Dizziness	44 (61.97)
	Shortness of breath	30 (42.25)
	Rapid heartbeat	24 (33.80)
Status of anaemia on haemoglobin (Hb) estimation	Anaemic	8 (11.26)
	No anaemia	24 (33.80)
	Hb estimation not done	30 (42.25)
Intake of extra meal	Home cooked	17 (23.94)
	No extra meal	38 (53.52)
Consumption of amla/guava/orange	Consumed	23 (46.47)
	Not consumed	41 (75.92)
		13 (24.07)

Continued.

Practice regarding different aspects of iron deficiency anaemia		Rural residents (n=54) N (%)	Urban residents (n=71) N (%)
Consumption of green leafy vegetables	Yes	49 (90.74)	67 (94.36)
	No	5 (9.25)	4 (5.63)
Daily consumption of IFA tablets	None	7 (12.96)	12 (16.90)
	1	18 (33.33)	23 (32.39)
	2	29 (53.70)	36 (50.70)
Procurement of IFA tablets	Sub-centre & Municipal ward health centre	11 (20.37)	6 (8.45)
	PHC& Municipal/ Borough health centre	12 (22.22)	10 (14.08)
	Hospital / drug store	33 (61.11)	59 (83.09)
Care seeking behaviour on having symptoms of Anaemia	Sub-centre& Municipal ward health centre	2 (3.70)	4 (5.63)
	PHC& Municipal/ Borough health centre	11 (20.36)	2 (2.81)
	Secondary/ tertiary care hospital	43 (79.62)	65 (91.54)

Table 3: Overall knowledge & practice level of the mothers and its relationship with their area of residence.

Knowledge and practice observed		Rural residents (n=54) N (%)	Urban residents (n=71) N (%)	Total (n=125) N (%)	Odds ratio (95% confidence interval)	P value
Knowledge	Adequate	12 (22.22)	28 (39.44)	40 (32.00)	0.439 (0.197 – 0.975)	0.041
	Inadequate	42 (77.78)	43 (60.56)	85 (68.00)		
Practice	Proper	19 (35.19)	31 (43.66)	50 (40.00)	0.701 (0.338 – 1.453)	0.338
	Improper	35 (64.81)	40 (56.34)	75 (60.00)		

Table 4: Relationship between knowledge and practice regarding anaemia in pregnancy according to different area of residence.

Setting	Knowledge	Practice			Odds ratio (95% confidence interval)	P value
		Proper N (%)	Improper N (%)	Total N (%)		
Rural	Adequate	11 (57.89)	1 (2.86)	12 (22.22)	46.75 (5.247 – 416.570)	<0.001
	Inadequate	8 (42.11)	34 (97.14)	42 (77.78)		
	Total	19 (100.00)	35 (100.00)	54 (100.00)		
Urban	Adequate	21 (67.74)	7 (17.50)	28 (39.44)	9.9 (3.262 – 30.043)	<0.001
	Inadequate	10 (32.26)	33 (82.50)	43 (60.56)		
	Total	31 (100.00)	40 (100.00)	71 (100.00)		
Overall	Adequate	32 (64.00)	8 (10.67)	40 (32.00)	14.889 (5.855 – 37.860)	<0.001
	Inadequate	18 (36.00)	67 (89.33)	85 (68.00)		
	Total	50 (100.00)	75 (100.00)	125 (100.00)		

Practices regarding anaemia during pregnancy

The practices of the antenatal mothers regarding the different aspects of anaemia during pregnancy are listed in Table 2. Mothers complained of feeling weak as the most common symptom. About 68.51% of the rural mothers and 61.97% reported to have felt weak; followed by 53.70% rural and 42.25% urban mothers complained of dizziness. However, among these mothers complaining of different symptoms 14.81% and 23.94% rural and urban mothers respectively did not perform a blood

check-up for anaemia (Haemoglobin estimation). Around 33% of both rural and urban mothers were haematologically diagnosed to have anaemia. Among the rural respondents 57.40% consumed an extra meal, while 53.52% of the urban respondents did a similar practice. The extra meal the mothers took was home-cooked meal. But the remaining mothers did not take any extra meal. In their regular diet 75.92% rural mothers & 80.28% of mothers in urban area reported to have consumed Amla/ Guava/ Orange/ Lemon. Regarding consumption of green leafy vegetables overall more than 90% mothers

consumed them. While in the rural area 90.74% mothers consumed them, in the urban area the consumption was higher at 94.36%. Around 53.70% of rural mothers and 50.70% of urban mothers had 2 iron folic acid tablets (IFA tablets) daily. But 12.96% and 16.90% rural and urban mothers respectively did not take any tablet of IFA. In the rural area 61.11% of the mothers consumed IFA tablets from nearby secondary/ tertiary care hospital. However this proportion was even higher among the urban respondents, with 83.09% procuring IFA tablets from hospitals. In the rural areas the primary health care infrastructure was utilized by the mothers for procurement of IFA tablets in 42.59% cases. Majority of mothers, 79.62% of rural mothers and 91.54% of urban mothers, went to the nearest secondary/ tertiary care hospital if any symptom of anaemia developed during pregnancy. This was reported as in addition to their routine check-up at the local health-centre or sub-centres.

Overall knowledge and practice level and their relationship

The overall knowledge and practice level of the participants are depicted in Table 3. Around 22.22% of the rural mothers had adequate knowledge compared to 39.44% urban mothers. This difference was found to be statistically significant. Similarly Proper practice was displayed by 43.66% of the urban respondents, which was higher compared to 35.19% of the rural mothers. But the differences in practice were not statistically significant. The relationship of practice and knowledge regarding anaemia in pregnancy is shown in Table 4 marking rural, urban setting along with the overall or pooled findings. In the rural area the odds of those with adequate level of knowledge to exhibit proper practice was 46.75 (95% CI: 5.247 – 416.570). While the odds of the same in the urban area was 9.9 (95% CI: 3.262 – 30.043). These two bivariate models did show statistically significant difference amongst themselves, implying the odds of adequate knowledge leading to proper practice was statistically lower in a significant way if urban mothers were considered.

DISCUSSION

According to Bharati et al anaemia was most prevalent in the east zone.¹ The occurrence of severely anemic women in India varied between 1% and 2%. The highest prevalence rates were observed among women who were 15 to 24 years of age, illiterate, from non-Christian scheduled tribes (STs), unmarried, and whose standard of living was low. In the current study around 33% of the ante-natal mothers were found to be anaemic on blood examination. The authors in the current study however observed that majority of the participants were aged 20 years or less. For the state of West Bengal, according to National Family Health Survey-4 (2017), 54.3% of urban and 53.3% of rural Pregnant women (age 15-49) were anaemic (<11 gm/dl).⁴ In a study at a tertiary care hospital, 97.63% reported to have performed blood test

for haemoglobin.¹⁶ But in the current study, 15% and 24% rural and urban residents respectively did not undergo a blood test. The fact may be that mothers coming to a tertiary care hospital are expected to have attained a higher level of compliance and willingness driven may be by a higher level of knowledge.

In the study by Basu et al about 47.11% of the study population were between the age of 20-30 years and 60.53% were from rural area.¹⁶ Around 65.26% of them got registered during the first trimester. In the current study 70% of rural and 77% of urban mothers registered during 1st trimester. Basu et al also reported that 43.96% consumed 100 or more IFA tablets.¹⁶ The current study found out that in the rural areas 13% mothers and 17% in the urban areas did not consume IFA tablets. The remaining mothers consumed at least one IFA tablet per day for at least three months. In another study by Sonkar et al Iron supplementation was consumed by 63% of the mothers while 55% consumed it correctly.¹⁷ The proportion of consumption was higher in both urban and rural area as observed by the current authors. The mothers also knew about the continuation of IFA tablets consumption following delivery.

In a study in southern India regarding knowledge, attitude and practice the authors reported a lower knowledge level (~50%) with even poorer practice related to the knowledge.¹⁸ Nivedita and Fatima Santhini observed that nearly 50% of the mothers were anaemic, which was higher compared to 33% in the current study.¹⁹ This is most probably due to the difference in study setting and willingness of the participants to get tested. But in terms of knowledge the participants of the current study knew correctly the meaning of anaemia (60% rural and 66% urban mothers) with almost 80% mothers in urban and rural area knew about the method of diagnosis of anaemia. This is higher with respect to the study by Nivedita et al where they reported only 40% mothers to have correct knowledge. Regarding diet during pregnancy and prevention of anaemia the mothers showed a lower level of knowledge with practice of proper diet with 49% mothers taking only the usual diet.¹⁹ Interestingly in the current study it was observed that 87% mothers knew that it was unhealthy to skip meal but 57% rural and 53% urban mothers actually had taken extra home-cooked meal. Similar to other studies the authors in this study found out that the awareness regarding ill effects of anaemia in pregnancy was high among both urban and rural mothers (~70%).¹⁷⁻¹⁹

It is interesting to note that the difference in knowledge and practice regarding anaemia in pregnancy persists when compared to studies of different parts of India, but not when compared to those conducted in West Bengal but in different areas. This may be attributed to the fact that socio-economic homogeneity is greater in West Bengal, which influences the knowledge and practice of the beneficiaries in healthcare. However lack of information education regarding anaemia in ante-natal

period in the other study settings is more likely to be vital. The differences between urban and rural area in this study are almost always marginal, with proper knowledge higher in some cases among rural mothers. Interestingly some practices like consumption of vegetables, fruits are more in urban areas. This discrepancy may be due to seasonal availability of the food items in the rural areas &/or comparatively higher purchasing power among urban residents. Though overall knowledge did differ significantly among urban and rural areas, the practice overall was not statistically significantly different. This marginal disproportion between the two study settings points out the fact that there is urbanisation and allied effects in the rural areas nearing the cities.

The authors explored different aspects related to anaemia in pregnancy through a community-based study in urban and rural settings. The issue of self-reported/ survey questionnaire is always present with its own drawbacks like recall, conscious falsification etc. It would have been better if comparison could be done with almost equal number of participants in rural and urban areas. But the low birth rate in both the field practice areas forced the authors in temporally recruiting the participants within a time constraint. Still the results show promising though not satisfactory level of knowledge and care-seeking behaviour regarding anaemia in pregnancy, with practices of the same sometimes better when considered altogether. While the reason may be economic &/or social, the key for improvement is motivating the community about how beneficial the good practices can be for not only the mother's health but also for the children.

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