



## Assessment of Knowledge and Practice of Iron and Other Nutrient Use among Pregnant Women Attending Antenatal Care

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### Abstract

**Background:** In pregnancy, good nutrition is essential to ensure good maternal health and reduce the risk of birth defects, suboptimal fetal growth and development as well as chronic health problems in their children.

**Objective:** The general objective of this research was to assess the supplementary nutrition use practices among pregnant women attending ANC in Nekemte referral hospital.

**Methods:** A cross sectional study design was employed to assess the nutritional status of pregnant mothers in Nekemte referral hospital. Data was presented using descriptive methods like tables and figures. Data comparison was done by Chi Square ( $\chi^2$ ) test with  $P < 0.05$  considered statistically significant at 95 % confidence level (CI) computed.

**Results:** About 192 (80%) of the participants believe that iron and folic acid tablet or syrup supplements were good during pregnancy. Among all, around 175 (72.9%) participants reported as they use different types of supplementary nutrition during pregnancy. However, about 128 (53%) of mothers use iron supplements and 37 (15.5%) of responders use folic acid supplements. The healthcare providers are an important source of the respondents' nutritional information, 89 (39%). Religion ( $\chi^2 = 9.863$ ,  $p = 0.0198$ ), residency ( $P = 0.0003$ ), parity ( $\chi^2 = 5.819$ ,  $p = 0.0159$ ), previous ANC visit history ( $\chi^2 = 21.632$ ,  $p = 0.0001$ ) and ANC visit frequency in the current pregnancy ( $\chi^2 = 23.318$ ,  $p = 0.0001$ ) were associated with iron supplement use. In addition, educational level ( $\chi^2 = 76.757$ ,  $p = 0.0001$ ), occupation ( $\chi^2 = 19.584$ ,  $p = 0.0015$ ) and monthly income ( $\chi^2 = 43.469$ ,  $p = 0.0001$ ) might have an association. However, the some of the expected values were below 5.

**Conclusion:** Pregnant mothers reported as they do have knowledge of nutrient pertinent to pregnancy. However there is a gap between what they reported and what they practiced. There was an association between religion, residency, parity, previous ANC visit history and ANC visit frequency with iron supplement use. The government and other health professionals working in the area can better use the ANC setups as key interventional areas so as to improve mother pregnancy specific nutritional knowledge and practice.

**Keywords:** Supplementary Nutrition; Iron; Pregnancy; Ethiopia

### Abbreviations

ETB: Ethiopian Birr; ANC: Antenatal Care; NRH: Nekemte Referral Hospital; WHO: World Health Organization

### Introduction

International human rights law includes ultimate assurances of states to empower women to survive pregnancy and childbirth as part of their reproductive health and rights [1]. The World Health Organization (WHO) foresees a world where each pregnant and newborn receives quality care during the course of the pregnancy, childbirth and the postnatal period [2].

Within the continuum of reproductive health care, antenatal care (ANC) provides a platform for important health-care functions, including health promotion, screening and diagnosis, and disease prevention. It has been established that by implementing timely and appropriate evidence-based practices, ANC can save lives. Crucially, ANC also provides the opportunity to communicate with and support women, families and communities at a critical time in the course of a woman's life [2]. Mothers encouraging experiences during ANC and childbirth can make the basics for healthy parenthood. In addition, woman's experience of care is key to transforming ANC and creating thriving families and communities [2].

The WHO Technical Consultations led to the development of 39 recommendations related to five types of interventions during pregnancy, among which a nutritional interventions is the first [2].

Nutrition education during pregnancy by health care providers could improve knowledge and practice of women during pregnancy [3]. Thus, attention should be given to promote nutrition education at the ANC for pregnant women to get reliable and accurate information from health professionals [2]. In particular, ANC clinics act as a key entry-point for implementing nutrition and health educational interventions that promote preventive health behaviors to improve maternal and neonatal health through better knowledge, attitudes and practices [4].

Nutrition education during pregnancy about healthy diet and healthy lifestyle during pregnancy can be the right time to encourage adequate daily iron, folic acid intake, and other pregnancy specific foods [4]. The promotion of nutritional practice for a better health care practice would be more crucial during pregnancy particularly in order to improve the reproductive health outcome [5].

Therefore this study is aimed at assessing nutrient use practice among pregnant women attending antenatal care in Nekemte Referral Hospital, western Ethiopia. The findings of this study might add to the national effort in improving nutritional use practice of pregnant women.

## Methods and Materials

### Study area and study period

The study was conducted in Nekemte Referral Hospital (NRH), established in Nekemte town located 332 km away from the capital city, Addis Ababa, of the country Ethiopia. The study was conducted from July 1 to 30, 2017.

### Study design

Institutional based descriptive cross-sectional survey was used with semi-structured interviewer administered questioner.

### Study population and sample size determination

All women who were attending antenatal care (ANC) at NRH during the one month study period were included in the study. Among them 240 volunteer women who fulfill the inclusion criteria were interviewed using a semi structured questioner.

### Exclusion criteria

Pregnant mothers with hearing, listening and speaking difficulty for any reason, pregnant who cannot neither listen nor speak either Afan Oromo or Amharic and all other non-volunteers were excluded from the study.

### Study variables

- **Dependent variable:** Iron supplemental use among pregnant women
- **Independent variables:** Socio-demographic characteristics, previous pregnancy and ANC visit history, and ANC visit frequency in the current pregnancy

### Data collection and processing

- **Data collection Tools:** A semi-structured questionnaire was used for data collection. The questioner was initially prepared in English and then translated to both Amharic and Afan Oromo.
- **Data collection:** The questionnaires were administered by two nurses working in the hospital under the supervision of the principal investigator.
- **Data quality assurance:** To assure the quality of the data the following measure were taken. Native speakers of the local language were involved in the translation and decoding of the questioner from English to Amharic then to Afan Oromo and vice versa. The questionnaire was pre-tested on 5% of the total sample size in the nearby clinic. Minor modifications were made and the final validated questioner was used for data collection. Every week the collected data was reviewed and checked for completeness and consistency of response.
- **Data analysis and interpretation:** Before the data entry the collected data was rechecked and 5 incomplete questioners were discarded. In addition multiple variables particularly on the knowledge section of the questioner were excluded from analysis because of confusing nature of the responses. As per our understanding during the ongoing checkup, this is because of a variable and poor understanding of patient towards some nutritional components in question. This is more common for folic acid and omega 3 fatty acids than others. After clearing, the data was entered in to excel sheet and all the calculations were made manually using either a scientific or an online calculator. The descriptive statistics tools like frequency and percentages were used for report in the form of frequency tables and graphs. Data comparison was done by Chi Square (X<sup>2</sup>) test, where P < 0.05 considered statistically significant. In case when the expected values of the chi square table results were less than 5, the fisher exact test was performed, only for two by two contingency tables.

## Result

### Socio demographic characteristics of respondents

Out of the 600 pregnant women attending antenatal care in Nekemte referral hospital 240 were systematically selected and interviewed. Majority of the interviewees are in the age range of 25–29, 114(48%). The high proportions of respondents are Oromo

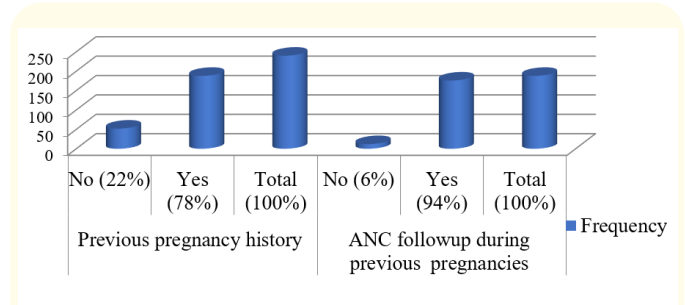
158 (65.5%) and are Protestants, 143 (59%). With regard to educational status about one third, 112 (47%) of respondents were at the level of diploma and 48 (19%) of them had degree. The majority of respondents were house wife 91(37.9%) followed by government employees, 52(21.67%). Greater than one third of respondents 108 (45%) earn greater than 2800 Ethiopian birr (ETB) per month, 96 (40%) of respondents earn 1400 -2800 ETB per month. Majority of the respondents, 193(80%), were from the urban area and were married, 219 (91.25%) (Table 1).

Variable	Variable Category	Frequency (N=240)	Percentage
Age	18 - 24	38	16%
	25 - 29	116	48%
	30 - 35	72	30%
	36 - 40	14	6%
Religion	Protestant	143	59.6%
	Orthodox	65	27.1%
	Muslim	24	10.0%
	Others	8	3.3%
Ethnicity	Oromo	159	66.3%
	Gurage	27	11%
	Amhara	38	16%
	Tigre	16	7%
Educational level	Illiterate	10	4%
	1 - 8	33	13.75%
	9 - 12	37	15.41%
	College diploma	112	47%
Occupation	Farmer	18	7.5%
	Gov.t employee	52	21.67%
	Merchants	26	0.9%
	Private org, employee	43	17.83%
	Students	10	4.16%
	House wife's	91	37.91%
Monthly income	< 700	10	4%
	700 - 1400	26	11%
	1400 - 2800	96	40%
	Above 2800	108	45%
Residence	Urban	193	80%
	Rural	47	20%
Marital status	Single	6	3%
	Married	219	91.25%
	Divorced	11	4.5%
	Widow	4	2%

**Table 1:** Socio demographic characteristics of respondents attending ANC at NRH from July 1 to 30, 2017.

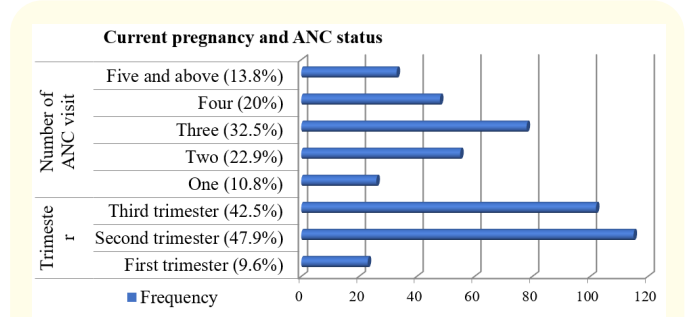
**Respondent's pregnancy history and antenatal care visits**

Among all 240 mothers, majority, 188 (78%) were pregnant previously and 176 (94%) of them had history of antenatal care visit. However, 52 (22%) of them were newly pregnant (Figure 1).



**Figure 1:** Previous pregnancy and ANC follow up history of respondent's attending ANC at NRH from July 1 to 30, 2017.

Currently 115 (47.91%) of mothers were in second trimester followed by 102 (42.7) in third and 23 (9.58%) in the first trimester respectively. Most of the mothers in the current pregnancy had visited antenatal care center three times, 66(35%) (Figure 2).



**Figure 2:** Current pregnancy and ANC follow up status of respondent's attending ANC at NRH from July 1 to 30, 2017.

**Respondents knowledge about nutritional supplements and their use**

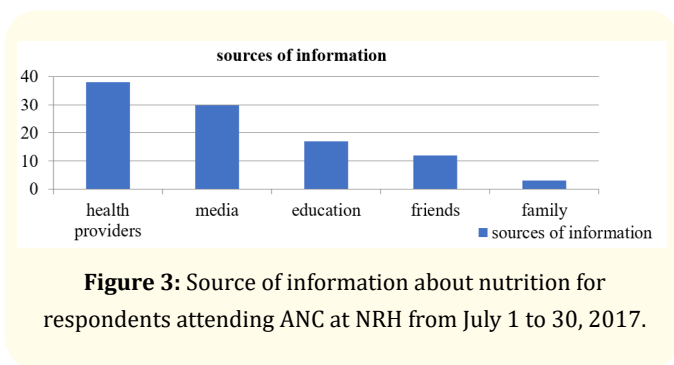
About 95% of the pregnant reported as they aware of the nutritional requirement during pregnancy. Despite 204 (85%) participants responded as they do have knowledge on balanced diet, only 98 (46.4%) were able to mention the components of balanced diet correctly. Furthermore, 186 (77.5%) of the respondents reported as they knew the benefits of iron. However, about 110 (59%) of them were able to mention the advantages of iron. Among, 144 (60%) reported as they have knowledge of iron rich foods, only about 55% were able to mention the sources of iron (Table 2).

Variable	Category	Frequency	Percentage
Respondents awareness about nutritional value during pregnancy (N=240)	Yes	229	95.4%
	No	11	4.6%
Knowledge on balanced diet (N=240)	Yes	204	85.0%
	No	36	15.0%
List components of balanced diet (n=211)	Correctly listed	98	46.4%
	Incorrectly listed	113	53.6%
Knowledge on the benefit of iron (N=240)	Yes	186	77.5%
	No	54	22.5%
What is the importance of iron (n=186)	Correctly listed	110	59.1%
	Incorrectly listed	76	40.9%
knowledge on example of foods rich in iron (N=240)	Yes	144	60.0%
	No	96	40.0%
List sources of iron (n=144)	Correctly listed	79	54.9%
	Incorrectly listed	65	45.1%

**Table 2:** Nutritional knowledge among pregnant mothers attending ANC at NRH from July 1 to 30, 2017.

**Respondent’s source of information about nutrition for pregnancy**

Eightynine (39%) of them respond as the get the information from health care providers and 73 (30%) of them from the social medias. And small number of respondents said (3%) they get information from their family.



**Figure 3:** Source of information about nutrition for respondents attending ANC at NRH from July 1 to 30, 2017.

**Practice of nutrition use among pregnant mothers**

Among all, around 227 (95%) participants responded as they use supplementary nutrition during pregnancy. About 128 (53%) of mothers use iron supplements during pregnancy and 106 (83%) of them start taking in some months of pregnancy. Thirty seven (15.5%) respondents reported as they use folic acid supplements in some months of pregnancy. Most of respondents use milk, 182 (75.8%), of whom 155(85.5%) use two times in a week and

the rest three times a week. And regarding about the uses of foods rich in omega 3, almost all 186 (77%) don’t know and use, and 192 (80%) of pregnant women uses iodized salts (Table 3).

Variable	Category	Frequency	Percentage
Do you use commercially available supplementary nutrition during pregnancy	Yes	175	72.9%
	No	65	27.1%
	Total	240	100%
Do you use iron supplements	Yes	128	53.3%
	No	112	46.7%
	Total	240	100%
When you use iron supplement	In some months of pregnancy	106	82.8%
	Throughout pregnancy	12	9.4%
	Don’t know	10	7.8%
	Total	128	100%
Do you use folic acid supplements	Yes I have	37	15.4%
	No I haven’t	184	76.6%
	Don’t Remember	19	7.9%
	Total	240	100%
When you use folic acid supplement	In some months of pregnancy	35	94.6%
	Throughout pregnancy	2	5.4%
	Total	37	100%
Do you use milk	Yes I have	182	75.8%
	No I haven’t	58	24.2%
	Total	240	100%
	Twice in week	155	85.2%
	Once in week	27	14.8%
Total	182	100%	
Do you use salts rich in iodized salts	Yes	192	80.0%
	No	48	20.0%
	Total	240	100%
Do you use omega3 foods	Yes	54	22.5%
	No	186	77.5%
	Total	240	100%

**Table 3:** Nutritional practice among pregnant mothers attending ANC at NRH from July 1 to 30, 2017.

**Practice of nutrition use among pregnant mothers**

Among the socioeconomic factors, religion ( $\chi^2 = 9.863, p=0.0198$ ), educational level ( $\chi^2 = 76.757, p=0.0001$ ), occupation ( $\chi^2 = 19.584, p=0.0015^*$ ), residency ( $P=0.0003$ ), and monthly income ( $\chi^2 = 43.469, p=0.0001$ ) has an association with iron supplement use. However, for educational level, occupation and monthly

income some observed or expected frequencies are less than 5; thus the Central Limit Theorem may not apply and the resultant  $\chi^2$  may be invalid. On the other hand, parity ( $\chi^2 = 5.819, p=0.0159$ ), previous ANC visit history ( $\chi^2 = 21.632, p=0.0001^*$ ) and ANC visit

frequency in the current pregnancy ( $\chi^2 = 23.318, p=0.0001$ ) were associated with iron supplement use. For previous ANC visit history where there is expected values less than 5, the Fisher's exact test calculated for the two-tailed test also confirms the presence of association with  $p<0.0001$  (Table 4).

Variable		Use Iron supplement	Not use Iron supplement	Chi square test	P-value
Age	18 - 24	14	24	$\chi^2 = 6.239$	0.1005
	25 - 29	68	48		
	30 - 35	37	35		
	36 - 40	9	5		
Religion	Protestant	84	59	$\chi^2 = 9.863$	0.0198
	Orthodox	33	32		
	Muslim	6	18		
	Others	5	3		
Ethnicity	Oromo	82	77	$\chi^2 = 3.664,$	0.3001
	Gurage	16	11		
	Amhara	24	14		
	Tigre	6	10		
Educational level	Illiterate	3	7	$\chi^2 = 76.757^*$ ,	0.0001
	School	8	62		
	Collage & above	117	43		
Occupation	Farmer	5	13	$\chi^2 = 19.584^*$ ,	0.0015
	Gov.t employee	35	17		
	Merchants	11	15		
	Private employee	29	14		
	Students	8	2		
	House wife's	40	51		
Monthly income	< 700	2	8	$\chi^2 = 43.469^*$ ,	0.0001
	700-1400	6	20		
	1400 -2800	38	58		
	Above 2800	82	26		
Residency	Urban	119	74	$\chi^2 = 27.441,$	0.0001
	Rural	9	38		
Marital status	Single	2	4	$\chi^2 = 5.752^*$	0.1243
	Married	122	97		
	Divorced	3	8		
	Widow	1	3		
Parity	Primigravida	36	17	$\chi^2 = 5.819,$	0.0159
	Multigravida	92	95		
Previous ANC visit history	Yes	127	49	$\chi^2 = 21.632^*$ ,	0.0001**
	No	1	10		
ANC visit frequency in the current pregnancy	One	5	21	$\chi^2 = 23.318,$	0.0001
	Two	22	33		
	Three	52	26		
	Four	29	19		
	Five and above	20	13		
Knowledge on the iron supplement importance	Yes	120	66	$\chi^2 = 41.536,$	0.0001
	No	8	46		

**Table 4:** Determinants of iron supplement consumption for ANC attendants at NRH from July 1 to 30, 2017

\*Some observed or expected frequencies are less than 5; \*\* The Fisher's exact test for two-tailed test  $P < 0.0001$

## Discussion

The main findings of the current study were that about 95% of the pregnant reported as they aware of the nutritional requirement during pregnancy. This is much higher than a study performed in the region, Guto-Gida health center (only 64.4%) in East Wollega, western Ethiopia [4]. Probably the difference may be because of the difference in the study settings. Our study is conducted in the hospital and the Guto-Gida study is at the health care level. However, similar to the Guto-Gida health center study [4] there is a great discrepancy of response by the participants between their knowledge report and their ability to mention the components of the balanced diet. In the current study most (74.0%) of the respondents did not know the main food groups or the balance diet components.

Furthermore, 186 (77.5%) of the respondents reported as they knew the benefits of iron, about 59% of them were able to mention the advantages of iron. Among 60% respondents reported as they have knowledge of iron rich foods, only about 55% were able to mention the sources of iron.

Equivalent this report the about 61 % of pregnant mother in the Guto-Gida study had good knowledge about the sources of iron [4]. Generally in the current study, although the significant majority of the participants had reported as they do have the awareness the benefit of nutrition only about half of them were able to address the specific issues correctly. Therefore this implies the necessity of pregnancy specific nutritional education. The healthcare professionals are responsible for this education. The current study testified that the healthcare providers are the most common reported source of respondents' knowledge (39%). Similar findings were reported (59% of respondents) in other study in the country [3].

### Nutritional use practice

Among all, around 175 (72.9%) participants responded as they use any supplementary nutrition available commercially during pregnancy. Slightly higher than half (53%) of them also reported as they use iron supplements during pregnancy and majority (83%) of them start taking after some months of pregnancy. The iron supplement use figures reported in the current study were higher than other pregnant mother dietary use practices reported by other studies like West Shoa 50% [6], Addis Ababa study (34.5%) [7] and Gondar study (40.1%). These variations were because of the fact that all other reports performed a pool of an overall use practice unlike to the current study focusing only on iron supplement use practice. For the overall supplementary use practice 72.9%) reported in our study the question we used is nonspecific and nondiscriminatory to supplements that are peculiar to pregnancy condition. All these would contribute to the difference in the aforementioned reports.

### Factors associated with iron supplement use

This study showed that among the socioeconomic factors, religion ( $\chi^2 = 9.863$ ,  $p=0.0198$ ), educational level ( $\chi^2 = 76.757$ ,  $p=0.0001$ ), occupation ( $\chi^2 = 19.584$ ,  $p=0.0015$ ), residency ( $P=0.0003$ ), and monthly income ( $\chi^2 = 43.469$ ,  $p=0.0001$ ) has an association with iron supplement use. However, for educational level, occupation and monthly income some observed or expected frequencies are less than 5; thus the Central Limit Theorem may not apply and the resultant  $\chi^2$  may be invalid (Table 4).

Although multiple studies [4,6-9] in our setup did not address religion, the variable does have an association with iron supplemental use practice. This is a unique area that may need future investigation using advanced statistical methods. Residency had also association with iron supplement use. This is probably because of the healthcare access difference among rural and urban residents. In support of this judgment, a study in West Shoa Zone the country reported a positive association between urban residence and good nutritional knowledge [6].

Some other studies reported [7,9] the association of family income and knowledge but Tenaw, *et al.* [7] reported the absence of such association between income and nutritional practice.

Multiple studies had proven that mothers educational level is associated with better nutritional knowledge [7,9]. Given the aforementioned limitations in our study mother educational level has an association with dietary practice in other studies too [8]. Furthermore, pregnant mothers' knowledge about the importance of iron supplement is associated with its iron use practice ( $\chi^2 = 41.536$ ,  $P=0.0001$ ). Other multiple regression studies also evidenced the association of pregnant mothers nutritional knowledge with their nutritional practice [7-9]. Nutrition education during pregnancy by health care providers could improve knowledge and practice of women during pregnancy [3]. This would be more feasible and acceptable if it is performed in the ANC clinics by the health professionals in the area. In the current study ANC clinics were found to be a very significant role player in the practice of nutritional supplementation use during pregnancy. Mothers with previous ANC visit history ( $\chi^2 = 21.632$ ,  $p=0.0001$ ) and ANC visit frequency in the current pregnancy ( $\chi^2 = 23.318$ ,  $p=0.0001$ ) had an associated with their iron supplement use practice. One study assessing the effect of nutritional education in Addis Ababa underscored the indispensable role of ANC clinics in these respect.

On the other hand, number of pregnancies ( $\chi^2 = 5.819$ ,  $p=0.0159$ ) had also an association with iron supplement use. The effect of the number of pregnancies on nutritional practice also reported in other studies [6,7].

## Conclusion

Based on the findings of the present study, it can be concluded that pregnant mothers had positive attitude about nutritional supplements. Although they reported as they knew some nutritionally important supplements, they fail to mention their correct sources and benefits. There was an association between religion, residency, parity, previous ANC visit history and ANC visit frequency in the current pregnancy with iron supplement use. In addition, educational level, occupation and monthly income might have an association. However, some of the expected values of them were below five.

## Ethics approval and consent to participate

Ethical clearance was obtained from the Ethical Review Committee of Wollega University. Letters of permission was presented to NRH. Then officials at different levels in the study area were communicated through the permission letter received from the hospital director. Verbal informed consent was obtained from participants prior to the data collection, after the purpose of the study was explained. All other confidentiality and privacy issues were assured.

## Declarations

All the necessary materials were included in this manuscript.

## Consent for Publication

Not applicable

## Availability of Data and Materials

All the necessary materials were included in this manuscript.

## Competing Interests

The authors have no conflicts of interest to declare.

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The source of funding for the research was Wollega University student research administration office. The funder has no role in the design of the study and collection, analysis, and interpretation of data and in writing the manuscript.

## Author Contributions

Both authors contributed equally to the conceived, designed, analysis, and interpretation of data, critical review of the manuscript. Both authors read and approved the final manuscript.

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