Knowledge, attitude and practice of pregnant women regarding iron deficiency anaemia among pregnant women in Taiz governorate, Yemen.

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Abstract: Globally according to WHO (1993-2005), prevalence of anaemia among pregnant is still as high as 51% in the developing world where iron deficiency is the most common cause in spite of the implementation of iron in the prophylaxis programme and it has detrimental effects on maternal and child health. **Aim:** The purpose of this study was to assess the knowledge, attitude and practices of pregnant women regarding anemia, Iron rich food and iron supplements and also to assess their impact on their hemoglobin levels in pregnancy. **Patients and Methods**: This is a cross sectional, descriptive institution-based study conducted at in ante natal clinics in Jamhouria university hospital, Taiz city and. Total number of participants 317 women in the period between 1st October 2020 to 31st January 2021. **Results:** Prevalence of anemia in the study group was high, 60.6%. 51.1% of the participants know that of anemia in pregnancy means that HB level is less than 11 gm/dl. 73.2% recognize that pregnant women were more vulnerable to anemia. Most of the participants 75.9% know that anemia may affect the health of the fetus and also can lead to complications to the mothers. 82% of the participants agree that pregnant women should take iron supplementation in spite of taking a healthy diet. Knowledge about iron rich food was good among the participants. Only 33.1 of the participants get information regarding anemia from health workers indicating poor health education. The overall attitude towards antenatal check-up, healthy diet and the benefits of iron supplementation was generally good . Only 41.3% take iron supplementation regularly whereas 34.4% had not taken iron supplementation. Only 34.7% know that Iron tablets are dispensed free of cost in the government hospitals. Anemia was statistically higher during third trimester of pregnancy, in non-working participants, while it was statistically low in those with regular intake of iron supplements and those taking special diet with pregnancy (p value <0.05) **. Conclusions:** The prevalence of anaemia in Yemen is higher than WHO level in developing countries. The present study indicated that there is lack of iron supplementation during pregnancy and lack of free iron supplement from the government and poor practice of women regarding prevention of iron deficiency anaemia in pregnancy.

Keywords: : Anemia, Iron rich diet, Iron supplements, Hemoglobin levels, Pregnant women.

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1 INTRODUCTION

Introduction:

Anaemia among pregnant women is a public health problem in developing countries and associated with adverse maternal and fetal outcome in pregnancy. Anemia affects over two billion people globally, among whom over 40 million are pregnant women (Dim et al, 2007). According to WHO (organization, 2005), prevalence of anaemia among pregnant women in developed countries is about 14%, whereas it is still as high as 51% in the developing world where iron deficiency is thought to be the most common cause of anemia and its account for 75%-95% of cases and is a leading cause of maternal morbidity and mortality. Anemia is an indicator of nutritional deficiencies that significantly contribute to both pregnant women and their neonates encounter negative consequence consist of poor outcome of pregnancy, physical disability, cognitive development, fetal anemia, low birth weight, preterm delivery, intrauterine growth restriction and perinatal mortality. Around 20% of maternal deaths lead by iron deficiency anemia, (Noronha, J. A et al ,2012), Anemia in pregnancy is identified by the WHO as haemoglobin level less than 11g/dl and is divided into three levels of severity, Mild anemia (Hb level, 9 -10.9g/dl), Moderate anemia (Hb level, 7-8.9g/dl) and severe anemia (Hb level 7-4.5 g/dl). Organization (2012). Anemia affects over two billion people globally, among whom over 40 million are pregnant women, where iron deficiency is thought to be the most common cause of anemia and its account for 75%- 95% of cases. (Osungbade , 2012) .Anemia is an indicator of nutritional deficiencies that significantly contribute to birth defects, preterm labour and low birth weight, hence it causes global public health problem. However, iron deficiency anemia is a leading cause of maternal morbidity and mortality, prenatal and prenatal infant loss; physical and cognitive losses thus in developing countries stall social and economic development. (Organization, 2011). The Iron insufficiency paleness comes about because of dietary inadequacy, loss of iron through dying, or expanded requests amid pregnancy in ladies (Camaschella , 2015). Moreover, deficiency of iron is a worldwide medical issue influencing both developing and developed countries with major conse-

quences for human well-being as well as social and economic improvement. It happens at all phases of the life cycle, however is more predominant in pregnant ladies and youthful kids ((Prakash, Yadav, Bhardwaj, & Chaudhary, 2015). Likewise, iron deficiency main cause of anemia and more common in developing countries. Anemia posing additional burden on health care system. Due to physiological reason female and children are at high risk (Mawani, Ali, Bano, & Ali, 2016). Furthermore, World health organization (WHO) major health consequences of iron deficiency anemia in pregnancy consist of poor outcome of pregnancy, physical disability, and cognitive development. Iron Anemia increased risk of morbidity in children and reduced work productivity in pregnant women. Around 20% of maternal deaths lead by iron deficiency anemia. (Organization, 2011). Routine antenatal care is a key passage point for pregnant women. Pregnant ladies get a wide scope of wellbeing advancement and preventive wellbeing administrations, including information about healthy practices during pregnancy, nourishing help, and iron deficiency anemia prevention. Othman specified in his article that fitting eating regimen learning is required for pregnant ladies so they can devour balance amount of iron from food and supplement (Othman et al. 2016). Moreover, pregnant women attitude and knowledge about iron deficiency anemia and supplements is an important. It includes as a barrier factor or motivation for iron supplements intake. (Gowri, Sakthi, & Palanivel et al, 2017). An article done by Balasubramanian et al (2016) on generating understanding of pregnant women about iron supplementation and health education can grossly reduce the frequency of iron deficiency anemia and thereby prevents anemia related mortality and morbidity. A study stated that tea consumption should be avoided by pregnant women as it has adverse effect on fetus outcome. (e Paula, Shang et al ,2017) . Similarly, during antenatal check-up comprehensive nutritional knowledge about iron rich diet and Supplements should be made an integral component. Women should be informed effective nutritional practices and benefits of the iron supplements. In antenatal check-up individual should motivate to increase the consumption of such food those are rich in iron, reduce the consumption of tea and coffee that inhibit iron absorption (Rizvi, 2012). The attitude towards antenatal visits, importance of a healthy diet, and iron and folic acid intake during pregnancy could have a profound influence on hemoglobin levels during pregnancy . (Margwe, 2015). knowledge and practice of pregnant have significance towards iron deficiency that tea consumption should be avoided by pregnant women as it has adverse effect on fetus outcome (e Paula, Shang et al. 2017).

The purpose of this study was to assess the knowledge, attitude and practices of pregnant women in Taiz city , Yemen regarding anemia, iron rich food and iron supplements and also to assess the impact of these factors and other sociodemographic variables on the hemoglobin levels.

Patient and Methods:

This is a cross sectional, descriptive institution-based study conducted at Jamhouria university hospital, Taiz, Yemen to assess the knowledge, attitude and practices of pregnant women regarding anemia, iron rich food and iron supplementation and its impact on their hemoglobin levels. The inclusion criteria were all pregnant women with Yemeni nationality were included during the study period consecutively until the required sample size was obtained.

The prevalence of anemia among pregnant women, according to a previous study in Yemen (2015), was 32,9 % and took into consideration a 5% margin of error, 95% CI and a non-response rate of 10%. For this study, the calculated sample size should be 316 pregnant women. We take 317pregnant woman.

Setting pregnant women was enrolled in this study from antenatal clinic , 317 pregnant woman from Jamahiriya university hospital ,Taiz city period between 1st October 2020 to 31st January 2021. Data collection was carried out using a predesigned, self administered structure close ending questionnaire of local language in the antenatal clinic at the time of routine antenatal check-up from pregnant women who consented to participate in the study. The questionnaire had details of socio demographic data and questions to assess knowledge, attitude and practices of these antenatal women regarding anemia, iron rich food and iron supplementation. Knowledge part of the questionnaire had questions regarding their awareness of the term anemia, cause of anemia, complications due to anemia and iron supplementation .

Attitude regarding antenatal check-up, blood test during pregnancy and healthy diet was assessed using a 3-point Likert scale. Questionnaire had 4 items on practice which included information on their diet, iron supplementation, timing of consumption of iron and reason for not taking iron. At the same sitting, 1 ml of blood was collected for haemoglobin estimation, analysed and the result was recorded and disclosed to the patient.

Data analysis:

The data was entered in SPSS version 23 and analysed using descriptive and (Chi square test). A P value of <0.05 was considered to be statistically significant. The results were presented in the form of tables, figures and text using frequencies and summary statistics such and percentage to describe the study population in relation to relevant variables.

Results

From the total of 317 pregnant woman from most of the participants were at age category found under age category of 20-29, 185(58.4%) Majority of participants from were at school level, (173,54.6% and while 83 (26.2%) while 61 (19.2%) were illiterate . Majority of the participants were housewife 259(81.7%) and most of of participants were multigravida(had 3 & above pregnancies). 208,56.6%. Most of the participants in were with very low monthly income and most of the them get between 50000 to 100000 Yemeni Ryal (between 60 to 120 US dollars) which were 130 (41%). So most of the attendance to government hospitals were poor due to low cost of the health services. Majority of the participant 180 ,56.8% were at their third trimester of pregnancy, followed by second trimester and first trimester respectively. (Table 1)

According to the WHO cut of definition of anemia in pregnancy is 11gm/dl, the prevalence of anemia among the participants

Table 1: Socio-demographic data of the participants (n=316)

	Taiz	
character	Number	percentage
Age(in years)		
<20	30	9.5
20-29	185	58.4
30 and above	102	32.2
Educational level		
Illiterate	61	19.2
School	173	54.6
College	83	26.2
Working status		
Working	58	18.3
Homemaker	259	81.7
Financial status		
>100000 YR	88	27.8
50000-100000 YR	130	41
>50000 YR	99	31.2
Gravidity		
Primigravida	89	28.1
Multigravida	208	56.6
Grand multigravida	20	6.3
Pregnancy trimester		
First trimester	40	12.6
Second trimester	97	30.6
Third trimester	180	56.8

were high, 60.6% According to WHO categories of three levels of severity of anaemia in pregnancy, mild (Hb level, 9-10.9g/dl), moderate (Hb level, 7-8.9g/dl) and severe anemia (Hb level 7-4.5 g/dl) the prevalence of mild , moderate and severe anemia were 96/ 33.2%, 69/ 23.9%, 10/ 3.5%. (Figure 1)

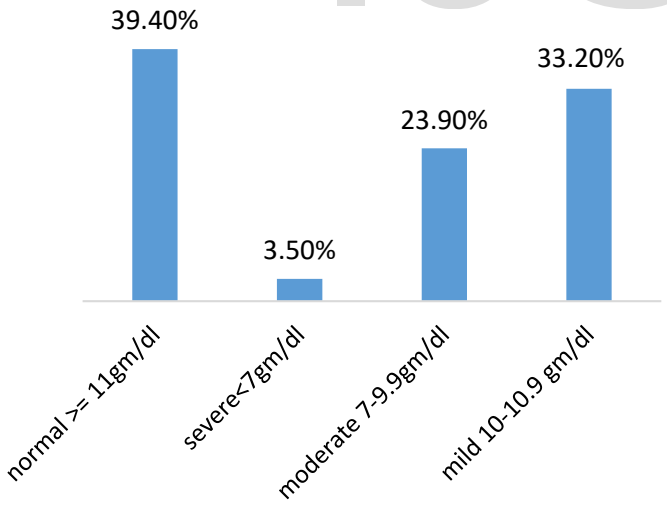

Figure1 : HB level of the participants in current pregnancy (n317)

Table2: knowledge regarding causes of iron deficiency anaemia (n316)

Items	Yes	No
Not taking iron supplement During pregnancy	184 63.7%	105 36.3%
Not consuming iron rich diet	251 79.2%	65 20.5%
Short interval between subsequent pregnancies	174 61.3%	110 38.7%
Menorrhagia before pregnancy	145 51.4%	136 48.2%
Excessive consumption of Tea/coffee can lead to IDA.	207 65.3%	14 4.4%

Knowledge of pregnant mothers regarding definition of anemia;162(51.1%) know the correct definition of anaemia in pregnancy means HB is less than 11 gm/dl.

Regarding causes of iron deficiency anemia; majority of participant know that non taking iron supplementation not consuming iron rich diet, short interval between subsequent pregnancies, heavy vaginal bleeding before pregnancy can cause anemia ,Excessive consumption of tea and coffee also reported as cause of anemia by two thirds of the participant. (Table 2).

Majority of participants know that dates, chicken, vegetables are iron reach food while half of the participants know this regarding eggs and. Half of the participants argue the good iron contents of cereals (Table 3).

Half of the participants were aware about anemia in pregnancy. About three quarters of the participants from know that anemia is more prevalent in pregnant woman. Majority of participants know that severe anemia can affect growth of the fetus and pregnant women can develop complications due to anemia, while less than half know that consuming Iron along with food reduces side effects. Only one third of the participant know that Iron tablets are dispensed free of cost in Government Hospitals. 228(71.9%) of the participants were aware of their hemoglobin level in the current pregnancy.(Table 4)

Table 4: knowledge of the participants on prevention , complications of iron deficiency anaemia (n=316)

Responses	Yes	No	Don't know
Knowledge regarding what is anemia	162 51.1%	39 12.3%	116 36.6%
Anemia is more prevalent in pregnant women	232 73.2%	27 8.5%	58 18.3%
Pregnant women can develop complications due to anemia	255 80.4%	13 4.1%	49 15.5%
Severe anemia can affect growth of the fetus	229 72.2%	13 4.1%	75 23.7%
Consuming Iron along with food reduces side effects.	152 47.9%	31 9.8%	134 42.3%
Iron tablets are dispensed free of cost in Government Hospitals	110 34.7%	85 26.8%	122 38.5%
Intake foods rich with vitc fruites vegetables increase iron absorption	162 51.1%	20 6.3%	135 42.6%
wareness of Hb level during pregnancy	228 71.9%	89 28.1%	--------

Table 6 : Practice of the participants during current pregnancy:

Practice	
How is your food after becoming pregnant	
Taking regular diet	232 73.2%
Taking special diet	85 26.8%
Are you taking iron tablets during this pregnancy	
Regular	131 41.3%
Irregular	77 24.3%
Not taking	109 34.4%
When are you taking iron tablets	
Before food	19 8.9%
After food	176 82.2%
With food	19 8.9%
What is the reason for irregular iron consumption?	
Forgetfulness	31 38.3%
Side effects	20 24.7%
It is not necessary	10 12.3%
Cost	12 14.8%
Not prescribed	7 8.6%
Husband not agree	1 1.2%

The majority of the participants agree about the importance of antenatal check-up, eating healthy and special diet during pregnancy, taking iron supplementation and promotion of family planning will prevent iron deficiency anemia and the majority also agree that taken iron tablets during pregnancy is beneficial for mother and baby.(Table 5).

Poor practice about type of food seen by three quarters of participants where the participants only taking regular diet rather than special diet in the current pregnancy. 131(41.3%) of the participants taken iron supplementation regularly whereas 34.4% 36.6% had not taken iron supplementation. In this study 176(82.2%) were taking iron after food. The most common reasons behind irregular iron intake during current pregnancy in the participants were forgetfulness followed by side effects of iron tablets.(Table 6)

Table 5: Attitude of participants regarding on knowledge, attitude and practice on prevention of iron deficiency anemia among pregnant women attending ante-natal care unit at university hospitals of Taiz and Mukalla cities, Yemen (n=321)

Items	Agree	disagree	Neither
Regular antenatal check up	266 83.9%	20 6.3%	31 9.8%
Taking special diet in pregnancy	233 73.5%	37 11.7%	47 14.8%
Iron tab is beneficial for mother and baby	277 87.4%	8 2.5%	32 10.1%
Iron should be taken in spite healthy diet	260 82.0%	31 9.8%	26 8.2%
Promotion of family planning methods for Spacing prevent anaemia	222 70.0%	45 14.2%	50 15.8%

Table 3: knowledge of the participant regarding iron rich foods (n=316)

Type of food	Yes	No	Don't know
Dates	242 76.3%	13 4.1%	62 19.6%
Chicken	148 46.7%	61 19.2%	108 34.1%
Green vegetables	251 79.2%	17 5.4%	49 15.5%
Eggs	168 53.0%	48 15.1%	101 31.9%
Cereals	185 58.4%	53 12.3%	87 29.3%
milk	177 55,8%	35 16,7%	87 27.4%

Table 7: Source of information about iron deficiency anemia among the participants

source	Yes	No
TV	47 14.8%	270 85.2%
Radio	7 2.2%	310 97.8%
friends	59 18.6%	258 81.4%
Internet	54 17.0%	263 83.0%
Family	110 34.7%	206 65.0%
Health workers	105 33.1%	212 66.9%

The main source of educational information regarding anemia in Taiz and Mukalla was the family followed by health workers, friends and social media. (Table7).

Determinants of hemoglobin levels among the participants School level of education, participants in the third trimester of pregnancy non-working participants and participants with income from 50000 -100000 YR where significantly associated with anaemia while regular intake of iron supplements (p value <0.05) and those taking special diet with pregnancy (p value <0.05)where at low risk of anemia.

Discussion

In the current study the prevalence of anaemia was 60.6% which was higher than studies done in Mekaa ,Saudia Arabia 39% (Abdelhefez AM et al ,2012) , Nepal 49%(Maskey M et al. 2014) , Addis Ababa , , Oman 41.7% (Seshman V et al. 2018) , Indonesia 40.7% (Lestari S et al, 2018) Ethiopia 32% (Serbesa ML et al 2019) , Uganda 7.4%(Okia CC et al. 2019) , Khamis Mushayt , Saudi Arabia 42.5% (Enas AD et al 2020) . While the prevalence of anaemia was lower than the study done in India where it was 62.7%. (Navidita K et al ,2016) . In the current study most of the participants (58.4%) were mainly within age group of 20 to 29, which was similar to study done by Ademuyiwa IY et ,2020 were mean age was 26–30 years .In the current study 54.6% of the participants where at school level which was lower than the study done by Nelofar M et al ,2018) which was 63.5 % while illiteracy was seen in 19.2% where it was lower than the same study done by Nelofar M et al were 38% were illiterate, this is because none of the participants were at college level . In the current study most of participants were housewives, 81.7% which was slightly lower than that reported by the Nelofar M et al (2018) which was 85.5%. Half of the participants were aware about anemia in pregnancy which was similar to that reported by Nivedita K. et al (2016) higher than one study in Ethiopia reported by Oumer A (2019) were found in 11.7 %. In the current study 51 % of the participants know the correct definition of anemia which was higher than that reported by Nivedita K. et al (2016) which was 39.87%. The majority of the participants (73.2%) in this study know that anemia is more prevalent in pregnant which was higher than seen in the study done by Nivedita K. et al (2016) where it was 53.8% . 71.9% of the participants know their Hb level during current pregnancy which was higher than that noticed by Nivedita K. et al (2016) which was 44.62%,The overall attitude towards antenatal check-up, healthy diet and promotion of family planning the benefits of iron supplementation was generally good which was similar to the studies done by Narahari et al (2015) and Nivedita K. et al (2016), Serbesa MLet al (20019) while poor attitude was seen by Nelofar M et al (2018).Only 34.7% of the participants know that Iron tablets are dispensed free of cost in which was low although one study done by Habib, A. et al (2018) were 100% participants revealed they didn't get iron supplements from government hospital. In the current study severe anemia was seen only in 3.9 % which was similar to that reported by Enas A D et al (2020) in Saudi Arabia, which was 3.8%. while mild and moderate anemia was lower than the study done by Maskey, M. et al (2014). In this study, 73.2% were taking only the usual diet during their pregnancy which is higher than studies done in India by Nivedita K. et al (2016) and by Habib A et al (2018) which were 49.36% and 3.1% respectively and this means that pregnant women don't take special diet during pregnancy in Yemen. In this study 41.3% and of the participants were taken iron regularly which was lower than 53% reported by Nelofar M et al (2018) and then 62.9% Serbesa ML, et al. (2019). The main source of educational information regarding anemia was the family which was 34.7% participants while only 33.1% of the participants from health workers which was lower than that reported by Enas A D et al (2020). In this study low level of education, low socioeconomic status and 3rd trimester of pregnancy significantly associated with anemia (p value <0.05) which was consistent with the study done in Makkah (KSA) by Abdelhefez AM et al (2012) and by Nepal by Maskey, M, et al (2014). In current study regular intake of iron and having special food with pregnancy were significantly reducing development of anemia.

Conclusion

In this study 60.6% of pregnant women were anemic (Hg level of <11 mg/dl) while which was higher than other studies, this

may be inspite of good knowledge on causes and prevention of anemia, positive attitude for most of preventing method of iron deficiency anemia positive attitude on implementation of family planning and supplementation of iron for pregnant mothers, due to that most of pregnant mothers don't take special diet in pregnancy or take iron supplement regularly and had habit to eat food like cereals which decrease iron absorption.

Recommendation: I. Improving and personalization Health education about anaemia during pregnancy, along with a mass media campaign for awareness purposes in the region. II. Prescribing iron free of cost from government hospitals and MCH canters for all pregnant women.

References

Abdelhefez AM, EI-Soadaa SS (2012. Prevalence and risk factors of anemia among a sample of pregnant females attending primary health care .Pak J Nutr.;11:1113-20.

Ademuyiwa IY, Ayamolowo SJ, Oginni MO, Akinbode MO (2020). Awareness and Prevention of Anemia among Pregnant Women attending Antenatal Clinic at a University Teaching Hospital in Nigeria. Calabar J Health Sci;4(1):20a-6.

Balasubramanian, T., Aravazhi, M., & Sampath, S. D.(2016) Awareness of anemia among pregnant women and impact of demographic factors on their hemoglobin status. Int J Sci Stud, 3(12), 303-305.

Camaschella, C. (2015). Iron-deficiency anemia. New England Journal of Medicine, 372(19), 1832-1843.

Enas A. Dhaher (2020),. Descriptive study for pregnant women's knowledge attitude and practices regarding iron deficiency anemia and iron supplements in the southern region of KSA. Asian J. Clin. Nutr.: 12: 21-33.

e Paula, T. d. M. D., et al. (2017). "Caffeine Intake during Pregnancy: What Are the Real Evidences?" Journal of Pharmacy and Pharmacology 5: 249-260.

Dim CC, Onah HE (2007). Prevalence of anaemia among pregnant women at Booking in Enugu, South Eastern Nigeria. Med Gen Med.;9(3):71– 81.

Gowri, D., Sakthi, D., & Palanivel, C. (2017). Influence of Awareness and Attitude about Anemia and Iron Supplements on Anemic Status of Pregnant Women Attending a Tertiary Care Centre in South India. Journal of Contraceptive Studies.

Ghaffar, A., et al. (2012). "Provision and utilization of routine antenatal care in rural Balochistan , Pakistan: a survey of knowledge, attitudes, and practices of pregnant women." Journal of Applied Medical Sciences 1(1): 93-24. Heider, F. (2013).

Habib, A. (2018). Knowledge, Attitude and Practices of Pregnant Women Regarding Iron Deficiency Anemia in A Rural Area of Lahore. Journal of Health, Medicine and Nursing, 50, 58-62.

Margwe, J. (2015). Prevalence, knowledge, and attitude of pregnant women on control measures of anaemia in Mbulu District, Tanzania. Sokoine University of Agriculture. Maskey, M., Jha, N., Poudel, S., & Yadav, D. (2014). Anemia in pregnancy and its associated factors: A study from Eastern Nepal. NJE, 4(4), 386-92.

Mawani, M., Ali, S. A., Bano, G., & Ali, S. A. (2016). Iron Deficiency Anemia among Women of Reproductive Age, an Important Public Health Problem: Situation Analysis. Reproductive System & Sexual Disorders: Current Research., 5(3), 1.

Nelofar M, Mukhtar M, Bashir H, Salim Khan M, Ruqia Quansar (2018) . Awareness of anaemia during pregnancy among the pregnant women attending a health facility in District Srinagar JMSCR 6 (6) 826-829 .

Nivedita K., Fatima Shanthini N (2016). Knowledge, attitude and practices of pregnant women regarding anemia, iron rich diet and iron supplement. IJRCOG. .2;5(2):425-431

Noronha, J. A., Khasawneh, E. A., Seshan, V., Ramasubramaniam, S., & Raman, S. (2012). Anemia in pregnancy-consequences and challenges: A review of literature. Journal of SAFOG, 4(1), 64-70.

Okia CC, Aine B, Kiiza R, Omuba P, Wagubi R, Muwanguzi E, Apecu RO, Okongo B, Oyet C. (2019) Prevalence, Morphological Classification, And Factors Associated With Anemia Among Pregnant Women Accessing Antenatal Clinic At Itojo Hospital, South Western Uganda. J Blood Med.;10:351-357.

Organization, W. H. (2005) Micronutrient Deficiency Information System(Geneva)

Organization, W. H. (2011). Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity.

Organization, W. H. (2012). WHO guidelines: daily iron and folic acid supplementation in pregnant women. Geneva (Switzerland): World Health Organization.

Osungbade O K,. Oladunjoye O .A (2012) Anaemia in Developing Countries: Burden and Prospects of Prevention and Control, Anemia, Dr. Donald Silverberg (Ed.), ISBN: 978-953-51-0138-3, InTech .

Othman, M., Alghamdi, A., Alghamdi, M., Alkhuraimi, W., Alshihri, A., & Alghamdi, A. (2016) Pregnant women knowledge of nutritional iron deficiency anemia in Al-Baha area. Education, 35(36.4), 53.

Oumer A (2019) Knowledge, Attitude and Practice of Pregnant Mothers towards Preventions of Iron Deficiency Anemia in Ethiopia: Institutional Based Cross-Sectional Study. Health Care Current Reviews 7: 238

Prakash, S., Yadav, K., Bhardwaj, B., & Chaudhary, S. (2015). Incidence of Anemia and its Socio-demographic determinants among pregnant women attending for antenatal care: A cross sectional study. Int. J. Med. Health Res, 1(3), 12-17.

Rizvi, F. (2012). Impact of maternal education, and socioeco-

nomic status on maternal nutritional knowledge and practices regarding iron rich foods and iron supplements. Ann Pak Inst Med Sci, 8(2), 101-105.

Serbesa ML, Iffa MT. (2019). Knowledge, attitude and practice on prevention of iron deficiency anemia among pregnant women attending ante–natal care unit at public hospitals of Harar Town, Eastern Ethiopia: institutional based cross-sectional study. Int J Pregn & Chi Birth.;5(2):48–55.

Vidya Seshan1, Esra Alkhasawneh1, Salam Al Kindi , Fayez Abdel-Majid Al Simadi and Judie Arulappan. (2018) .Can Gestational Anemia be Alleviated with Increased Awareness of its Causes and Management Strategies? Implications for Health Care Services. Oman Med J,133 , (4) .