Awareness of Anaemia and Educational Level of Pregnant Women: A Baseline Assessment at Kattankudy in Batticaloa District, Sri Lanka

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Abstract

Anaemia in pregnancy is a common public health concern globally. It is linked to sociodemographic factors of individuals. There is a need for up-to-date information on awareness of anaemia among pregnant women. As a result, the study was conducted to determine pregnant women's awareness of anaemia and to investigate the relationship between educational level and awareness of anaemia. This study was done in the Kattankudy area in Batticaloa district, Sri Lanka. According to the consecutive sampling, 352 pregnant women who have registered at antenatal clinics (ANC) were interviewed through a semi-structured questionnaire that focuses on key aspects such as respondents' educational level, awareness of anaemia in terms of signs and symptoms, nutritionally balanced diet and treatment to prevent anaemia. The SPSS statistical software was used to analyse the data. According to the findings, 71.9%, 52% and 52% of the pregnant women were familiar with signs and symptoms like fatigue, tiredness/weakness and dizziness respectively. The majority of them had replied incorrectly for the other symptoms. The correct answer on nutritionally balanced diet and treatment to prevent anaemia was given by the majority of respondents. Meanwhile, 59.9% of pregnant women don't know about treating hookworm infection to prevent anaemia. There was a significant association ($p<0.05$) between the educational level of pregnant women and awareness regarding signs and symptoms of anaemia, nutritionally balanced diet and treatment to prevent anaemia. As a result, during antenatal visits, awareness programmes should be done through adequate dietary counselling for pregnant women to mitigate the adverse effect of anaemia during pregnancy.

Keywords: Anaemia, Awareness, Educational level, Pregnant women.

I. INTRODUCTION

Anaemia in pregnancy is one of the most important causes of the global burden of disease, with iron deficiency anaemia accounting for more than half of the cases (Siteti *et al*., 2014). The fight against anaemia appears to be a difficult effort all around the world, particularly in underdeveloped nations. The severe effects of anaemia may have a considerable impact on national economies. In underdeveloped nations, 58% of pregnant women are anaemic. Furthermore, anaemia is associated with 50% of all maternal fatalities (Galloway *et al*., 2002). Anaemia is seen as threatening and persuasive as infectious illness outbreaks (Mannar, 1991). Anaemia can affect anybody, but babies, school-aged children, and women of reproductive age are the most vulnerable (Hurrell, 1997). According to a study conducted in eight countries, women are aware of the majority of the effects of anaemia during pregnancy (Gallowaya *et al*., 2002).

Anaemia in pregnancy is common globally, according to WHO criteria for designating anaemia as public health risk (WHO, 2008). While pregnant anaemia is a global public health concern, underdeveloped nations are the most hit, with the majority of the anaemia burden falling on them. At both the individual and population levels, anaemia is linked to socioeconomic characteristics such as education, income, and cultural habits. WHO classifies anaemia as a moderate public health problem when it affects 20-39.9% of the population (The World Bank, 2007). In Sri Lanka, anaemia in pregnancy has long been recognized as a serious maternal morbidity condition, and anaemia has evolved into a moderate public health concern among children, nonpregnant, and pregnant populations, with prevalence rates of 33%, 39%, and 34%, respectively (Department of Census and Statistics, 2011).

Various risk factors influence the causes of anaemia during pregnancy. Anaemia in pregnancy is linked to sociodemographic factors such as

family income, educational level, parity (Rai *et al*., 2016; Gogoi *et al*., 2016), types of occupations, pregnancy visits, not taking iron supplementation (Titilayo *et al*., 2016; Xu *et al*., 2016), and a large number of families (Titilayo *et al*., 2016; Xu *et al*., 2016; Bekele *et al*., 2016). An increase in the incidences of anaemia during pregnancy can also be attributed to a lack of vitamin consumption. The most common cause of anaemia in pregnant women is iron deficiency anaemia, which accounts for more than half of all cases (Stevens *et al*., 2013). Anaemia affects around a third of pregnant women due to a lack of micronutrients such as iron, folic acid, and vitamin B_{12} (Lee and Okam, 2011).

Pregnant women, whose risk of anaemia is enhanced by other variables such as gravidity, the time between pregnancies, and early pregnancy, might be classified as having anaemia based on their socioeconomic standing (Anorlu *et al*., 2006; Ndukwu and Dienye, 2012). More than half the world's pregnant women have levels of haemoglobin that are indicative of anaemia. It is assumed that you are aware of the present condition of affairs in our area. This knowledge would encourage prenatal healthcare providers to diagnose and treat anaemia in pregnant women as soon as possible (Cyril and Hyacinth, 2005). Various studies have confirmed that anaemia in pregnant women is still one of the major public health concerns in developing countries, owing to many socio-cultural issues such as poor education, low income, lack of awareness, cultural and religious taboos, poor dietary habits, and a high prevalence of parasitic infestation (Karaoglu *et al*., 2010).

To combat anaemia in pregnancy, several efforts should be made, including education and awareness campaigns, vitamin supplements, and parasitic infection control and prevention. However, the extent to which such interventions impact the awareness of anaemia towards signs and symptoms, nutritionally balanced diet to prevent anaemia and treatment to prevent anaemia is unknown. In this research area, there is a need for up-to-date information on anaemia awareness among pregnant women. As a result, the study was to determine pregnant women's awareness of anaemia and to investigate the relationship between educational level and awareness of anaemia among pregnant women in this study area.

II. METHODOLOGY

The cross-sectional study was conducted in the Kattankudy area in Batticaloa district, Sri Lanka. According to the consecutive sampling, 352 pregnant women who have registered at antenatal clinics (ANC) during the study period from September 2020 to February 2021 were interviewed through the administration of a semi-structured questionnaire. After examining the literature, a semi-structured survey questionnaire was created and the questionnaire's content validity was determined by consulting with a subject matter expert and a supervisor. Before being given to the research participants, the questionnaire was pretested on 20 pregnant women from a nearby region who had comparable characteristics to the study participants to see if any changes were needed. The semi-structured questionnaire consisted of respondents' educational level, awareness of anaemia in terms of signs and symptoms, nutritionally balanced diet and treatment to prevent anaemia. The administrative approval was obtained from the Medical Officer of Health, Kattankudy and consent was obtained from each respondent by reading the information contained in the consent form. The statistical software for social science (SPSS) version 25.0 was used to analyse the obtained data. The relationship between educational level and awareness of anaemia in terms of signs and symptoms, nutritionally balanced diet to avoid anaemia, and treatment to prevent anaemia was determined using a Chi-square test.

III. RESULTS AND DISCUSSION

A. Awareness of Anaemia on Signs and Symptoms

Most of the study respondents were more familiar with signs and symptoms like fatigue 253 (71.9%), tiredness/weakness 183 (52.0%) and dizziness 183 (52.0%). The majority of them had replied incorrectly for the other symptoms like pale or yellowish skin (240 i.e. 68.2%), brittle nails (281 i.e. 79.8%), irregular heartbeats (196 i.e. 55.7%), shortness of breath (240 i.e. 68.2%), headache (156 i.e. 44.3%), loss of appetite (198 i.e. 56.3%) and cold hands and feet (183 i.e. 52.0%). Respondents had replied don’t know for the symptoms like pale or yellowish skin (14 i.e. 4.0%), dizziness (14 i.e. 4.0%), brittle nails (28 i.e. 8.0%), irregular heartbeats (57 i.e. 16.2%), shortness of breath (42 i.e. 11.9%), headache (42 i.e. 11.9%), loss of appetite (56 i.e. 15.9%) and cold hands and feet (42 i.e. 11.9%) (Table 1).

Table 01: Awareness of signs and symptoms of anaemia

Variables		Frequency	Percentage (%)
Fatigue	Yes	253	71.9
	No	99	28.1
	Don't Know	0	0.0
Tiredness/weakness	Yes	183	52.0
	No	169	48.0
	Don't Know	0	0.0
Pale or yellowish skin	Yes	98	27.8
	No	240	68.2
	Don't Know	14	4.0
Dizziness	Yes	183	52.0
	No	155	44.0
	Don't Know	14	4.0
Brittle nails	Yes	43	12.2
	No	281	79.8
	Don't Know	28	8.0
Irregular heartbeats	Yes	99	28.1
	No	196	55.7
	Don't Know	57	16.2
Shortness of breath	Yes	70	19.9
	No	240	68.2
	Don't Know	42	11.9
Headache	Yes	154	43.8
	No	156	44.3
	Don't Know	42	11.9
Loss of appetite	Yes	98	27.8
	No	198	56.3
	Don't Know	56	15.9
Cold hands and feet	Yes	127	36.1
	No	183	52.0
	Don't Know	42	11.9

The data reveals that most women know only the sign and symptoms of anaemia like fatigue, tiredness/weakness and dizziness. Most of them don't know about other symptoms like pale or yellowish skin, dizziness, brittle nails, irregular heartbeats, shortness of breath, headache, loss of appetite and cold hands and feet. According to Gies *et al*. (2003), the majority of pregnant women are unaware of the signs and symptoms of anaemia. Except for the previously reported signs

and symptoms of anaemia, the current study found that awareness of signs and symptoms is below average. Raksha and Shameem (2016) found that awareness about the signs and symptoms of anaemia was lacking. Detecting signs and symptoms early will significantly reduce moms' need to seek medical help. As a result, anaemia progresses to a more advanced state, resulting in worse pregnancy and neonatal outcomes (Chang *et al*., 2013). An understanding of the signs and symptoms of anaemia during pregnancy is essential for early detection and treatment of anaemia and it is also required to have biochemical confirmation for anaemia in these women.

B. Awareness of a Nutritionally Balanced Diet to Prevent Anaemia

The correct answer on a nutritionally balanced diet to avoid anaemia was given by the majority of respondents (Table 2). A well-balanced diet during pregnancy prevents anaemia, according to 254 (72.2%) of respondents. 338 (96.0%) answered green leafy vegetables and sprouted grains are high in iron, whereas 282 (80.1%) stated meat is an excellent source of iron, 338 (96.0%) said dates and dry grapes contain a rich source of iron, 254 (72.2%) said orange and lemon juice promotes the absorption of iron, 211 (59.9%) said tea and coffee inhibit the absorption of iron. 225 (63.9%) said fasting or missing meals must be avoided during pregnancy.

According to this study, people were more knowledgeable than the average about the effect of tea and coffee on iron absorption. This result was consistent with the findings of Kdivar *et al* (2007). Anaemia can affect anybody, but babies, school-aged children, and women of reproductive age are the most vulnerable (Mannar, 1999). Our findings were in line with those of Chacko *et al* (2016). Further, they stated that the majority of pregnant women were aware of the diet they must follow during their pregnancy. Other study findings suggested that the relationship between awareness of anaemia and food may be lacking. Anaemia was recognized as a concern connected to food by less than 1% of respondents in a nationwide lifestyle study. They also discovered that anaemia was more likely in people who ate meat infrequently or never (Baines *et al*., 2007). This clearly shows that majority of mothers had average knowledge regarding diet.

Table 02: Awareness of nutritionally balanced diet to prevent anaemia

Variables		**Frequency**	**Percentage (%)**
A well-balanced diet during pregnancy prevents anaemia	Yes	254	72.2
	No	70	19.9
	Don't Know	28	8.0
Green leafy vegetables and sprouted grains are rich in iron	Yes	338	96.0
	No	14	4.0
	Don't Know	0	0.0
Meat, fish, liver and eggs are rich sources of iron	Yes	282	80.1
	No	42	11.9
	Don't Know	28	8.0
Dates and dry grapes contain a rich source of iron	Yes	338	96.0
	No	14	4.0
	Don't Know	0	0.0
Orange and lemon juice promotes the absorption of iron	Yes	254	72.2
	No	28	8.0
	Don't Know	70	19.9
Tea and coffee inhibit the absorption of iron	Yes	211	59.9

	No	71	20.2
	Don't Know	70	19.9
Fasting or missing meals must be avoided during pregnancy	Yes	225	63.9
	No	98	27.8
	Don't Know	29	8.2

C. *Awareness of Treatment to Prevent Anaemia During Pregnancy*

According to Table 3, most of the respondents knew that regular medical checkup i.e., 295 (83.8%), daily intake of iron and folic acid i.e., 281 (79.8%) and vitamin C tablet is taken along with iron tablet i.e., 296 (84.1%) are necessary during pregnancy to prevent the anaemia. Meanwhile, most of the pregnant women i.e., 211 (59.9%) don't know about treating hookworm infection to prevent anaemia. This result is much compatible with the findings of the study done by Kulkarni (2015), the role of deworming was known to only 16 women out of 250 participants. According to Chacko *et al*. (2016), the participants are unaware of the value of antenatal appointments and therapy during pregnancy. But according to this study, most of the women were having a higher level of awareness regarding treatment to prevent anaemia during pregnancy.

Table 03: Awareness of treatment to prevent anaemia

Variables		**Frequency**	**Percentage (%)**
A regular medical checkup is necessary during pregnancy	Yes	295	83.8
	No	42	11.9
	Don't Know	15	4.3
Daily intake of iron and folic acid is necessary	Yes	281	79.8
	No	71	20.2
	Don't Know	0	0.0
Adequate treatment is necessary to treat hookworm infection to prevent anaemia	Yes	70	19.9
	No	71	20.2
	Don't Know	211	59.9
Vitamin C tablet is taken along with iron tablets	Yes	296	84.1
	No	14	4.0
	Don't Know	42	11.9

A. *Association between the Education Levels of Pregnant Women with the Awareness of Pregnant Women Regarding Anaemia*

According to the findings, there was a significant association between the educational level and awareness regarding signs and symptoms of anaemia at a $p<0.05$ significance level. According to the Pearson Chi-Square analysis, sign and symptoms of anaemia such as fatigue ($x^2 = 83.08$, $p<0.05$), tiredness/weakness ($x^2 = 53.74$, $p<0.05$), pale or yellowish skin ($x^2 = 73.95$, $p<0.05$), dizziness ($x^2 = 51.20$, $p<0.05$), brittle nails ($x^2 = 87.85$, $p<0.05$), irregular heartbeats ($x^2 = 80.20$, $p<0.05$), shortness of breath ($x^2 = 50.72$, $p<0.05$), headache ($x^2 = 44.65$, $p<0.05$), loss of appetite ($x^2 = 54.43$, $p<0.05$) and cold hands and feet ($x^2 = 51.24$, $p<0.05$) had significant association with education levels of pregnant women (Table 4).

Table 04: Association between the women's education level and the awareness regarding signs and symptoms of anaemia

	Women's Education	Yes Frequency	No Frequency	Don't know Frequency
Fatigue	Primary education	26	52	0
	O/L	84	15	0
	A/L	101	32	0
	Graduate and above	42	0	0
	$x^2 = 83.08$ $p < 0.05$			
Tiredness/weakness	Primary education	26	52	0
	O/L	42	57	0
	A/L	73	60	0
	Graduate and above	42	0	0
	$x^2 = 53.74$ $p < 0.05$			
Pale or yellowish skin	Primary education	13	65	0
	O/L	14	85	0
	A/L	43	76	14
	Graduate and above	28	14	0
	$x^2 = 73.95$ $p < 0.05$			
Dizziness	Primary education	39	26	13
	O/L	56	43	0
	A/L	74	58	1
	Graduate and above	14	28	0
	$x^2 = 51.20$ $p < 0.05$			
Brittle nails	Primary education	0	78	0
	O/L	28	57	14
	A/L	1	118	14
	Graduate and above	14	28	0
	$x^2 = 87.85$ $p < 0.05$			
Irregular heartbeats	Primary education	28	52	0
	O/L	28	56	15
	A/L	45	46	42
	Graduate and above	0	42	0
	$x^2 = 80.20$ $p < 0.05$			
Shortness of breath	Primary education	26	52	0
	O/L	14	71	14
	A/L	30	75	28
	Graduate and above	0	42	0
	$x^2 = 50.72$ $p < 0.05$			
Headache	Primary education	26	39	13
	O/L	42	57	0
	A/L	58	46	29
	Graduate and above	28	14	0
	$x^2 = 44.65$ $p < 0.05$			
Loss of appetite	Primary education	13	39	26
	O/L	28	71	0
	A/L	43	60	30
	Graduate and above	14	28	0
	$x^2 = 54.43$ $p < 0.05$			
Cold hands and feet	Primary education	26	39	13
	O/L	28	71	0
	A/L	59	45	29
	Graduate and above	14	28	0
	$x^2 = 51.24$ $p < 0.05$			

The study found that there was a significant association between the educational level and awareness regarding a nutritionally balanced diet to prevent anaemia at a $p<0.05$ significance level. According to the Pearson Chi-Square analysis, awareness regarding a nutritionally balanced diet such as a well-balanced diet during pregnancy prevent anaemia ($x^2 = 71.53$, $p<0.05$), green leafy vegetable and sprouted grains are rich in iron ($x^2 = 24.01$, $p<0.05$), meat, fish, liver and eggs are a rich

source of iron (x^2 = 91.0, p<0.05), dates and dry grapes contains a rich source of iron (x^2 = 42.35, p<0.05), orange and lemon juice promote the s absorption of iron (x^2 = 95.04, p< 0.05), tea and coffee inhibits the absorption of iron (x^2 = 20.08, p<0.05) and fasting or missing the meals must be avoided during pregnancy (x^2 = 72.03, p<0.05) had a significant association with education levels of pregnant women (Table 5).

The study found that there was a significant association between the educational level and awareness regarding treatment to prevent anaemia at a p<0.05 significance level. According to the Pearson Chi-Square analysis, awareness regarding treatment to prevent anaemia such as regular

medical checkups is necessary during pregnancy (x^2 = 48.99, p<0.05), and daily intake of iron and folic acid is necessary (x^2 = 65.19, p<0.05), adequate treatment is necessary to treat hookworm infection to prevent anaemia (x^2 = 71.64, p<0.05), vitamin C tablet is taken along with iron tablets (x^2 = 187.84, p<0.05) had a significant association with education levels of pregnant women (Table 6).

Table 05: Association between the women's education level and the awareness regarding a nutritionally balanced diet to prevent anaemia

	Women's Education	**Yes Frequency**	**No Frequency**	**Don't know Frequency**
A well-balanced diet during pregnancy prevents anaemia	Primary education	52	13	13
	O/L	71	28	0
	A/L	103	29	1
	Graduate and above	28	0	14
	x^2 = 71.53 p < 0.05			
Green leafy vegetables and sprouted grains are rich in iron	Primary education	78	0	0
	O/L	99	0	99
	A/L	119	14	0
	Graduate and above	42	0	0
	x^2 = 24.01 p < 0.05			
Meat, fish, liver and eggs are rich sources of iron	Primary education	78	0	0
	O/L	85	14	0
	A/L	105	14	14
	Graduate and above	14	14	14
	x^2 = 91.0 p < 0.05			
Dates and dry grapes contain a rich source of iron	Primary education	65	13	0
	O/L	99	0	0
	A/L	132	1	0
	Graduate and above	42	0	0
	x^2 = 42.35 p < 0.05			
Orange and lemon juice promote the absorption of iron	Primary education	65	0	13
	O/L	85	14	0
	A/L	90	14	29
	Graduate and above	14	0	28
	x^2 = 95.04 p < 0.05			
Tea and coffee inhibit the absorption of iron	Primary education	52	13	13
	O/L	57	28	14
	A/L	74	30	29
	Graduate and above	28	0	14
	x^2 = 20.08 p < 0.05			
Fasting or missing meals must be avoided during Pregnancy	Primary education	65	13	0
	O/L	56	28	15
	A/L	90	43	0
	Graduate and above	14	14	14
	x^2 = 72.03 p < 0.05			

Table 06: Association between the women's education level and the awareness regarding treatment to prevent anaemia

	Women's Education	Yes Frequency	No Frequency	Don't know Frequency
A regular medical check-up is necessary during pregnancy	Primary education	65	13	0
	O/L	70	14	15
	A/L	118	15	0
	Graduate and above	42	0	0
		x^2 = 48.99 p < 0.05		
Daily intake of iron and folic acid is necessary	Primary education	78	0	0
	O/L	56	43	0
	A/L	119	14	0
	Graduate and above	28	14	0
		x^2 = 65.19 p < 0.05		
Adequate treatment is necessary to treat hookworm infection to prevent anaemia	Primary education	26	0	52
	O/L	14	42	43
	A/L	16	29	88
	Graduate and above	14	0	28
		x^2 = 71.64 p < 0.05		
Vitamin C tablet is taken along with iron tablets	Primary education	78	0	0
	O/L	71	14	14
	A/L	133	0	0
	Graduate and above	14	0	28
		x^2 = 187.84 p < 0.05		

IV. CONCLUSIONS

According to the findings, there was a significant association ($p<0.05$) between the educational level of pregnant women and knowledge regarding signs and symptoms of anaemia, nutritionally balanced diet to prevent anaemia and treatment to prevent anaemia. As a result, during antenatal visits, awareness programs should be done through adequate dietary counselling for pregnant women to mitigate the adverse effect of anaemia during pregnancy.

REFERENCES

Anorlu, R.I., Oluwole, A.A. and Abudu, O.O., (2006) 'Sociodemographic factors in anaemia in pregnancy at booking in Lagos, Nigeria', *Journal of Obstetrics and Gynaecology*, 26(8), pp.773-776.

Baines, S., Powers, J. and Brown, W.J., (2007) 'How do the health and well-being of young Australian vegetarian and semi-vegetarian women compare with non-vegetarians?', *Public Health Nutrition*, 10(5), pp.436-442.

Bekele, A., Tilahun, M. and Mekuria, A., (2016) 'Prevalence of anaemia and its associated factors among pregnant women attending antenatal care in Health Institutions of Arba Minch Town , Gamo Gofa Zone, Ethiopia: A Cross-Sectional Study'. *Anaemia,*2016(3), pp. 1-9.

Chacko, R., Premkumar, U., Joseph, M., James, J., Prabha, S., Jacob, M.K. and Sivakumar, T., (2016) 'Knowledge, Attitude and Practices of anaemia among pregnant women in a government hospital', *Indo-American Journal of Pharmaceutical Research*, 6(11), pp.6988-92.

Chang, S., Zeng, L., Brouwer, I.D., Kok, F.J. and Yan, H., (2013) 'Effect of iron deficiency anaemia in pregnancy on child mental development in rural China', *Paediatrics,* 131(3), pp. e755-e763.

Cyril, C. and Hyacinth, E., (2005) 'Prevalence of anaemia among pregnant women in Enugu: Nigeria', *African Journal of Blood Research*, 33(7), pp. 80-155.

Department of Census and Statistics., (2011) 'Prevalence of anaemia among children and women. Demographic and Health Survey 2006/7, Ministry of Healthcare and Nutrition, Sri Lanka', http://www.statistics.gov.lk.

Galloway, R., Dusch, E., Elder, L., Achadi, E., Grajeda, R., Hurtado, E., Favin, M., Kanani, S., Marsaban, J., Meda, N. and Moore, K.M., (2002) 'Women's perceptions of iron deficiency and anaemia prevention

and control in eight developing countries', *Social Science and Medicine,* 55(4), pp.529-544.

Gies, S., Brabin, B.J., Yassin, M.A. and Cuevas, L.E., (2003) 'Comparison of screening methods for anaemia in pregnant women in Awassa, Ethiopia', *Tropical Medicine and International Health*, 8(4), pp.301-309.

Gogoi, I., Mahanta, T.G., Sarma, R., Gogoi, P.P. and Saikia, H., (2016) 'Prevalence and socio-demographic factors affecting anaemia in pregnant women of Dibrugarh District, Assam, India', *Indian Journal of Community Health,* 28(2), pp. 202-207

Hurrell, R.F., (1997) 'Preventing iron deficiency through food fortification', *Nutrition Reviews*, 55(6), pp.210-222.

Karaoglu, L., Pehlivan, E., Egri, M., Deprem, C., Gunes, G., Genc, M.F. and Temel, I., (2010) 'The prevalence of nutritional anaemia in pregnancy in an east Anatolian province, Turkey', *BMC Public Health,* 10(1), pp.1-12.

Kdivar, A. A., Masoum, J. S., Mohammadi, S. and Mordhi, F., (2007) 'Knowledge and practice of pregnant women in Fars province about intake of iron supplements', *Acta Medica Iranica*, 45(4), pp. 301-304.

Kulkarni, K.K., (2015) 'KAP Studies Among Indian Antenatal Women: Can We Reduce the Incidence of Anaemia?', *The Journal of Obstetrics and Gynecology of India,* 65(5), pp.320-322.

Lee, A.I. and Okam, M.M., (2011) 'Anaemia in pregnancy', *Haematology/Oncology Clinics*, 25(2), pp.241-259.

Mannar, M.V., (1999) 'Designing effective programmes to prevent and control iron deficiency anaemia', *South African Medical Journal*, 89(2), pp.23-26.

Ndukwu, G.U. and Dienye, P.O., (2012) 'Prevalence and socio-demographic factors associated with anaemia in pregnancy in a primary health centre in Rivers State, Nigeria', *African Journal of Primary Health Care and Family Medicine*, 4(1), pp.1-7.

Rai, N., Nandeshwar, S. and Rai, P., (2016) 'A study on magnitude of anaemia and its socio-demographic correlates among pregnant women in Sagar city of Bundelkhand Region, Madhya Pradesh, India', *International Journal of Community Medicine and Public Health*, pp.128-132.

Raksha, M. and Shameem, V.P.A., (2016) 'Knowledge, attitude and practice study regarding anaemia in antenatal women', *International Journal of Reproduction, Contraception, Obstetrics and Gynecology,* 5(7), pp.2101-2104.

Siteti, M.C., Namasaka, S.D., Ariya, O.P., Injete, S.D. and Wanyonyi, W.A., (2014) 'Anaemia in pregnancy: Prevalence and possible risk factors in Kakamega County, Kenya', *Science Journal of Public Health,* 2(3), pp.216-222.

Stevens, G.A., Finucane, M.M., De-Regil, L.M., Paciorek, C.J., Flaxman, S.R., Branca, F., Peña-Rosas, J.P., Bhutta, Z.A., Ezzati, M. and Nutrition Impact Model Study Group, (2013) 'Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data', *The Lancet Global Health*, 1(1), pp.e16-e25.

The World Bank., (2007) 'Malnutrition in Sri Lanka. Scale, Scope, Causes and potential response', *Health Nutrition and Population, Human Development Network, Human Development Unit, South Asia Region, Washington,* DC, USA, 2007, http://un.lk/un team in SL/pdf.

Titilayo, A., Palamuleni, M.E. and Omisakin, O., (2016) 'Sociodemographic factors influencing adherence to antenatal iron supplementation recommendations among pregnant women in Malawi: analysis of data from the 2010 Malawi demographic and health survey', *Malawi Medical Journal*, 28(1), pp.1-5.

World Health Organization., (2008) 'Worldwide prevalence of anaemia 1993-2005: WHO global database on anaemia', Retrieved at: *http://www.who.int/vmnis/publications/anaemia_prevalence/en/.* Accessed on 05th January 2022.

Xu, X., Liu, S., Rao, Y., Shi, Z., Wang, L., Sharma, M. and Zhao, Y., (2016) 'Prevalence and sociodemographic and lifestyle determinants of anaemia during pregnancy: A cross-sectional study of pregnant women in China', *International Journal of Environmental Research and Public Health*, 13(9), pp. 908.