

Prevalence of Anemia and Associated Factors among Pregnant Women in Kigeme Refugee Camp, Rwanda

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Abstract

Background

The most prevalent nutritional deficiency experienced by pregnant women is anemia, which is defined as a hemoglobin level below 11 g/dl in a pregnant woman. This study aimed at determining the prevalence of anemia and identifying its associated factors among pregnant women in Kigeme Camp, Rwanda.

Methods

A cross-sectional, quantitative approach was used. Two hundred twenty one participants were chosen by a systematic sampling technique. A questionnaire was used to collect data and SPSS version 21 was used for data analysis. A p-value of 5% or less was set for significance. Multivariable analysis was utilized to identify the factors associated to anemia.

Results

The anemia prevalence among pregnant women in Kigeme Refugee Camp was 20.8%. Not eating variety of food (AOR= 4.72, 95%CI: 1.77–12.57, p=0.002), sleeping hungry (AOR=0.45, 95%CI: 0.27–0.73, p=0.001), iron/folic acid supplementation (AOR=5.83, 95%CI: 2.04–16.68, p=0.001), use of modern contraceptives (AOR=2.12, 95%CI: 1.09–4.10, p=0.025), bleeding during pregnancy (AOR=0.26, 95%CI: 0.17–0.64, p=0.001) and not eating food from animals were significantly associated to the occurrence of anemia among study participants.

Conclusion

The current study's findings will be critical for policymakers in designing strategic interventions; it will provide information necessary for different concerned stakeholders, especially clinicians and policy makers who involve in designing anemia curative and preventive measures.

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Keywords: Anemia, Kigeme Refugee Camp, Pregnant women, Prevalence

Introduction

Globally, 1.62 billion Individuals, or one in six of the world's population, have anemia, making up 24.8% of the total population. [1] Worldwide, anemia affects 41.8% of expectant mothers, with Africa having the highest incidence (57.1%) and most cases (17.2 million).[2] It is the main contributor to maternal morbidity and mortality.[3] Anemia in pregnancy is defined by the WHO as a reduction in blood's ability to carry oxygen as a result of abnormally few circulating erythrocytes or a drop in hemoglobin level below 11 g/dl.[4]

Globally, about two billion people anemic and out of 3,457 per 100,000 anemic people are pregnant women.[5] In Africa, 42% of pregnant women are affected by anemia. West, Central and East Africa have the highest burden in general population and many factors including Malaria and parasitic infections contribute in this high burden of anemia.[5] In Rwanda, 17% of women in reproductive age have anemia and rural area occupies higher proportion than urban ones. The proportion of anemic pregnant mother is 6 % much higher than the overall prevalence from women between 15-49 year old.[6] Anemia affects two billion people worldwide, and it affects pregnant women at a rate of 41.8% worldwide and 61.3% among pregnant women in Africa and pregnant refugees are most vulnerable. [7]

Anemia among pregnant women may be brought on by a number of conditions. For instance, maternal anemia may be linked to geo-helminth infections during pregnancy. In low-income countries, the anemia's causes in pregnant women are complex and include a lack of folate, iron, vitamin B12 deficiencies and diseases due to parasites such as intestinal worms & malaria.[5]

In study conducted in Malesia, majority of anemic pregnant women were multigravidas, gravida from 2 to 4 and above 6, multiparous with their parity between 2-4 and above 6, they were in their trimester 2 & 3.[8]

In another done in India, anemia was common in pregnant mother with no iron and folic acid supplementations and those who did received de-worming medicines, no major difference from multiparous pregnant women (41.5%) to primiparas ones (41.4%). [9]

Anemia causes during pregnancy remain multifactorial and its adverse effects in pregnant women are severe and sometimes fatal. Intrauterine growth restriction, stillbirth, low birth weight, abortions, obstructed labor, caesarean delivery, postpartum hemorrhage, and maternal fetal mortality are some of complications of anemia during pregnancy.[10]

Anemia in refugees is the commonest nutritional condition found in refugees and it has severe adverse outcomes in pregnant refugees if no preventive measures are taken.[11] In humanitarian setting where parasitic infections including malaria, in besides inadequate food, are significant, the magnitude of anemia prevalence may be much higher than in non-humanitarian setting.[11] There is scarce data on the prevalence and of anemia and associated factors among refugee pregnant women in refugee settings in Rwanda in order to provide evidence based interventions to limit adverse outcomes of anemia in pregnancy thus this study is going to be conducted in Kigeme Congolese Refugee camp.

In low-income countries, the anemia is among top causes of making sick and killing women who are pregnant and has fetal adverse outcomes. It annually underlies about 1,200 maternal and 6,000 perinatal deaths worldwide. Anemia indicates poor nutrition and health status. Increased maternal and neonatal mortality are the worst outcomes of anemia on both women and foetus.[12] In Rwanda, one in five women between the ages of 15 and 49 who are fertile are anemic. The south of Rwanda holds greatest percentage, 23%.[13] Although anemia is preventable, it has remained a serious public health issue for refugees and much more in pregnant mother.[11]

Therefore, this study aimed at determining the prevalence of anemia and identifying its associated factors among pregnant women in Kigeme Camp, Rwanda.

Methods

Study design

A cross-sectional study design with quantitative approach was used.

Study setting

Kigeme Refugee Camp is located in Gasaka Sector, Nyamagabe District, Southern Province of Rwanda. It started in 2012 and currently accounts 14,350 refugees with 9,471 females from the Eastern Democratic Republic of Congo where most of them are housewives.

Study Population and sample size

The study population consisted of 405 pregnant women in Kigeme Refugee Camp. Pregnant women with hearing and speaking disabilities were excluded from the study as data collectors were not able to use the body language to communicate with them. Yamane's equation,[14] was used to calculate the sample.

$$n = N / (1 + Ne^2),$$

$n = 405 / (1 + 405 * 0.0025) = 201$. Adding an increment of 10% of the sample, the sample size was equal to $201 + 20 = 221$ pregnant women.

And N is the target population, e is the margin error at 95% CI that is 0.05 and n is the sample size. A systematic sampling technique was used to select women for interview and hemoglobin testing.

Data collection instrument and procedure

A structured questionnaire had components, which includes socio-demographic factors, socioeconomic background, household security status, obstetric/gynecological/medical factors, dietary practices. For each interviewee, the hemoglobin test was performed and the results were used to determine the prevalence. The validity of questionnaire for data collection in this study was determined by data from

pregnant women in Mugombwa Refugee Camp by calculating the Pearson's correlation coefficient. The interpretation of values was done after checking all items of the questionnaire one by one. The degree of freedom was 18 as the pilot sample was 20. The questionnaire was confirmed valid, as the obtained values in SPSS for all items of the questionnaire were greater than the critical value in Pearson r table. The critical value for N=18 was 0.444 and it was less than all values in Pearson r table. Therefore, the questionnaire was valid.

Data analysis

Excel computerized form was used for data entry and encoding, then after verification for possible errors and omissions were made. Then after, data were imported into SPSS version 21 and again rechecked for omissions and errors. Univariate, Bivariate and Multivariate analysis followed. At first round, univariate analysis was performed to describe socio-demographic characteristic of respondents and determined anemia prevalence. Significant variables were filtered to multivariate logistic regression to adjust for possible confounders and determine its adjusted odd ratio. Factors with a p-value below 0.05 at the stage of multivariate stage were considered as factors associated with anemia.

Ethical considerations

Mount Kenya University, Rwanda, Institutional Review Board (MKU04/PGS&R0870/2023) approved the study and issued the ethical clearance. Kigeme Camp Management authorities provided permission to conduct this research in the camp. Informed consents were obtained from all study participants before starting interview and questionnaires were anonymous. The privacy and confidentiality for the study participants were ensured throughout and after the study. Participants, benefited from the study by having anemic mothers being oriented to the clinic based in camp for immediate management and counselling about balanced diet practices. There was no risk of taking part in this study,

though there was a little pain on being finger pricked to be tested for anemia. The completed questionnaires were not accessed by anybody else other than the researcher of this study.

Results

Socio-demographic characteristics of respondents

The findings in Table 1 show that 54.3% were aged between 26 and 36 years.

The mean age was 29 (SD=6.4) years while the minimum and maximum ages were 18 years and 48 years respectively. Most interviewees (65.6%) had the family size between 4 and 6 per household, single (80.5%), jobless (95.0%). Majority had completed the primary education (55.2%), and 57.9% Seventh Day Adventist believers. Respondents who stated that they never walked shoeless represented 59.3%.

Table 1. Socio-demographic characteristics (n=221)

Variables	Frequency	Percentage (%)
Age (years)		
15-25	72	32.6
26-36	120	54.3
37+	29	13.1
Number of family members in household		
1-3	57	25.8
4-6	145	65.6
7+	19	8.6
Marital status		
Married	33	15.0
Single	178	80.5
Divorced	6	2.7
Widow	4	1.8
Occupation of the respondent		
No occupation	210	95.0
Merchandiser	3	1.4
Refugee supporting staff	8	3.6
Education of the respondent		
Not educated	94	42.5
Completed primary education	122	55.2
Completed secondary education	5	2.3
Religion		
Protestant	89	40.3
Islam	2	0.9
Adventist	128	57.9
Catholic	2	0.9
Walking on barefoot		
Sometimes	87	39.4
usually	3	1.4
Not at all	131	59.3

Prevalence of anemia among pregnant women in Kigeme Refugee Camp

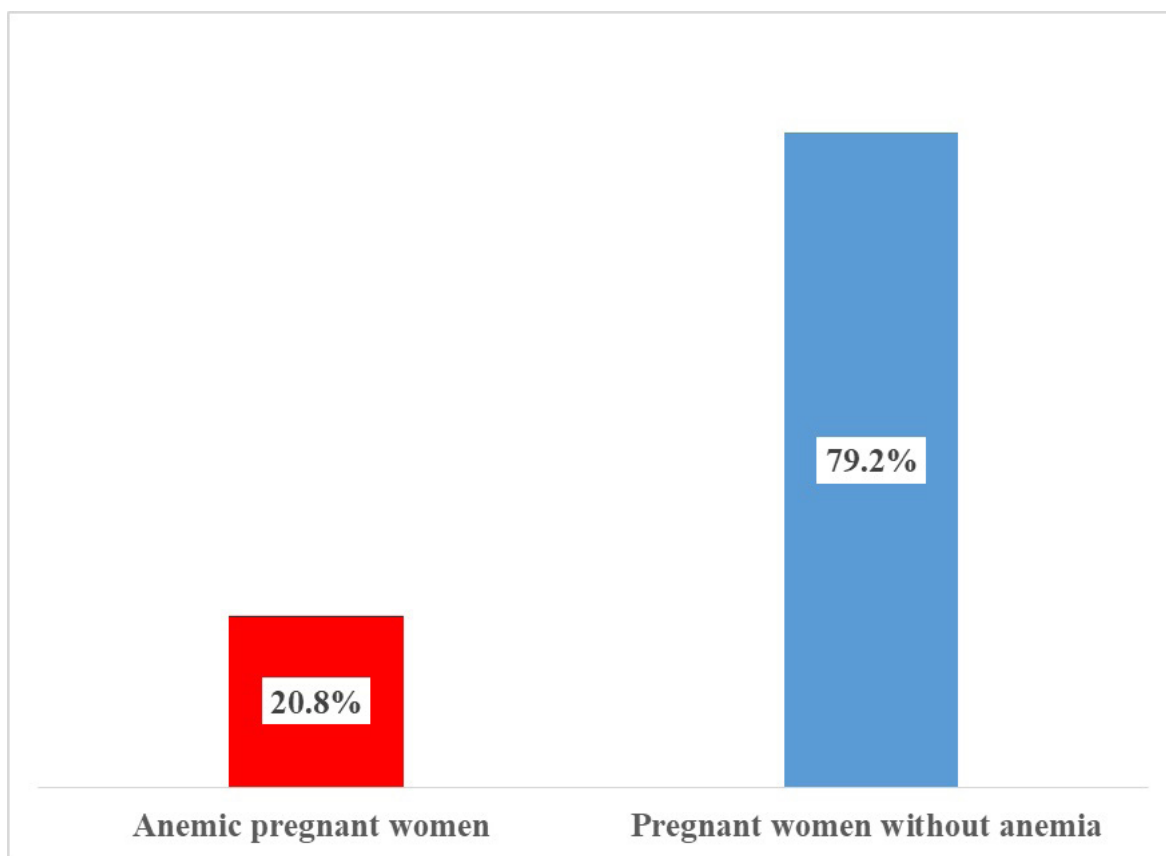


Figure 1. Prevalence of anemia

Figure 1 shows that anemia was prevalent at 20.8% among pregnant women in Kigeme Refugee Camp.

Distribution of the prevalence of anemia by age group and severity in Kigeme Refugee Camp

The findings in Table 2 reveals that most (10.9%) of anemic pregnant women were aged 26-36 years and there were more pregnant women (11.8%) with mild anemia than moderate anemia; no one had severe anemia.

Table 2. Prevalence of anemia by age category and severity in Kigeme Refugee Camp

Variables	Frequency (n=46)	Percentage (%)
Age (years)		
15-25	14	7.2
26-36	24	10.9
37+	6	2.7
Anemia severity		
Mild	46	11.8
Moderate	20	9.0

Multivariable analysis of factors associated with anemia among pregnant women in Kigeme Refugee Camp

The Table 3 shows that eating variety of food, sleeping hungry, iron/folic acid supplementation, use of modern contraceptives, bleeding during pregnancy and frequency of eating food from animals were significantly associated with anemia among study participants. Pregnant women who did not eat varied food were more likely to suffer from anemia (AOR= 4.72, 95%CI: 1.77–12.57, p=0.002) compared to those who ate varied food. The pregnant women who did not sleep hungry were 0.45 times as likely to develop anemia as those who slept hungry [AOR=0.45, 95%CI=0.27-0.73, p=0.001]. Pregnant women who did not receive iron/folic acid supplements during antenatal care visits had 5.83 odds (AOR=5.83, 95%CI: 2.041–6.68, p=0.001) of developing anemia as those who did. Contrary to those who used contemporary contraceptives, pregnant women who did not were more likely to experience anemia (AOR=2.12, 95%CI: 1.09–4.10, p=0.025).

Pregnant women who did not bleed during pregnancy were 0.26 times as likely to develop anemia as those who did, (AOR=0.26, 95%CI=0.17-0.64, p=0.001). Pregnant women who said that they ate food from animal

resources every two days (AOR=0.21, 95CI: 0.04–0.56, p=0.001), once a week (AOR=0.34, 95CI: 0.13–0.64, p=0.003) and once a month (AOR=0.45, 95CI: 0.22–0.84, p=0.011) were less likely to develop anemia than those who did not eat animal food.

Table 3. Multivariable analysis for factors associated with anemia among pregnant women in Kigeme Refugee Camp

Variables	AOR	95%CI		P-value
		Lower	Upper	
Eating variety of food				
Yes	Reference			
No	4.72	1.77	12.57	0.002
Sleeping hungry				
Yes	Reference			
No	0.45	0.27	0.73	0.001
Iron/Folic acid supplementation				
Yes	Reference			
No	5.83	2.04	16.68	0.001
Use of modern contraceptives				
Yes	Reference			
No	2.12	1.09	4.10	0.025
Bleeding during the pregnancy				
Yes	Reference			
No	0.26	0.17	0.64	0.001
Frequency of eating food from animal sources				
I do not eat animal products	Reference			
Every two days	0.21	0.04	0.56	0.001
Once a week	0.34	0.13	0.64	0.003
Once a month	0.45	0.22	0.84	0.011

AOR=Adjusted Odds Ratio, CI: Confidence Interval

Discussion

This study aimed at assessing the prevalence and factors associated with anemia among women living in a refugee camp in Rwanda. According to the study findings, anemia affected 20.8% of the pregnant women living in Kigeme refugee camp in Rwanda. This prevalence was greater than the 7.9% anemia prevalence among pregnant women in Northern Ethiopia,[4] but somewhat comparable to those reported in Southern Ethiopia at 23.2%,[15] South America (24%),[16] and in Rwanda (23.5%).[17] Compared to studies conducted in Asia (56%) and Africa (48%)

the prevalence of this study was lower.[16] Additionally, the prevalence was lower than that of research done in South Sudan.[11] This indicates gaps in quantity and quality of food to satisfy the needs of the rapidly growing populations in low- and middle-income countries, which is much worse in refugees settings.

This study also identified six factors associated with anemia among pregnant women in Kigeme Refugee Camp: not eating a variety of food, sleeping hungry, not taking iron/folic acid supplementation, not using

modern contraceptives, bleeding during pregnancy and not eating food from animal resources. In this study, other variables namely age of respondents, marital status, number of family members within a household, educational level, religion, frequency of missing food, missing money to buy food, spending the whole day without eating, number of pregnancies, malaria in pregnancy, history of suffering from tuberculosis in the past, deworming during antenatal care, frequency of eating vegetables were not significantly associated with anemia among the study participants. Pregnant women who said that they did not eat food from animal resources were more likely to develop anemia than those who ate it. This finding was consistent with that of a study carried out in Ghana.[18] In the camp, food items that provide animal proteins to refugees are expensive considering their daily life; the UNHCR (United Nations High Commissioner for Refugees) Representative in the camp is hereby recommended to provide pregnant women not only with the fortified flour to prepare porridge but also to provide with rabbits for rearing and poultry farming towards availability of meat for consumption and varied food items through kitchen gardens construction.

Pregnant women in Kigeme Refugee Camp who did not sleep hungry were less likely to develop anemia than those who slept hungry. Similar finding was reported in a study conducted in Kenya.[19] The reason of some refugees sleeping hungry may be attributed to insufficient monthly funding for food package allocated to individuals. There is need to find additional support for pregnant women to receive adequate nutrition.

In this study, pregnant women who did not get iron/folic acid supplements during antenatal care visits had higher odds of developing anemia than those who did. This result is consistent with a study carried out in Southern Ethiopia.[15] Therefore, the camp clinic should always stock iron/folic acid tablets with which to provide

pregnant women during their antenatal care. The sensitization of pregnant women by health care providers in the camp clinic, community health workers and villages' leaders of the camp administration to swallow tablets given during antenatal care visits is of paramount importance in preventing anemia in pregnancy.

Women who did not use modern contraceptives were most likely to suffer from anemia compared to those who used modern contraceptives according to the findings of this study. These findings were in line with study conducted in Southern Ethiopia,[15] in low and middle income countries, [20] and in Western Ethiopia.[21] Camp administration, community health workers and health care providers should continue educating refugees to adhere to family planning methods.

In this research, pregnant women who bled during pregnancies were most likely to be affected by anemia than those did not bleed; this is similar to the results of a study conducted in Northern Ethiopia. [4] Community health workers in the camp have to accompany pregnant women at the camp clinic directly without delay whenever they bleed in their homes. The management of the camp clinic needs to conduct trainings health care providers on preventing and managing any bleeding on pregnancy.[22]

In contrast to the findings of a meta-analysis study that revealed the occurrence of anemia among pregnant women who had malaria in South Sudan,[16] and Ghana,[18] This study revealed that having malaria was not associated with the development of anemia among pregnant women because pregnant women are brought to the camp clinic as soon as possible once they present malaria signs and symptoms in their villages and there is few cases of malaria in the camp as it is among cold areas where malaria cases are generally few compared to other endemic zones of malaria in Rwanda.

This study was limited in that it was carried out in only one camp among refugee camps that are in Rwanda and therefore the findings may not be generalized to the whole country. Nevertheless, this study provides insight into the possible factors contributing to anemia in pregnancy in a refugee camp setting for targeted intervention. The strength of this study is that all study participants were present enabling us to draw recommendations for the whole the whole camp.

Conclusion

Anemia prevalence in pregnant women in Kigeme Refugee Camp is still high. This requires more efforts to diversify food for pregnant refugees, sensitize refugees to adhere to family planning. Eating variety of food, sleeping hungry, iron/folic acid supplementation, use of modern contraceptives, bleeding during pregnancy and not eating food from animals were significantly associated with anemia among participants. To prevent anemia in pregnant women in Kigeme Refugee Camp, trainings for health care providers are of a paramount importance. The following suggestions are targeting further researchers in the same area: Outcomes of anemia treatment in Kigeme refugee camp, knowledge, attitudes and practice of anemia management by health care providers in camps, and birth outcomes for anemic pregnant women in refugee camps.

Conflict of interest

We declare that we have no conflict of interest.

Authors' contribution

SMJJ designed the study, led the data collection, cleaned, analyzed and interpreted the data. SMJJ, JNR, HA contributed to the conception, development of the manuscript and working on reviewers' comments until its publication.

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