

RESEARCHARTICLE

FACTORS INFLUENCING ANAEMIA IN PREGNANCY IN THE CAPE COAST METROPOLIS, GHANA

*Theodora DedoAzu

College of Health and Allied Sciences, School of Nursing and Midwifery, Department of Maternal and Child Health, University of Cape Coast, Ghana

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ABSTRACT

This study sought to investigate factors that influence anaemia in pregnancy. This quantitative research adopted a prospective descriptive design, using a cohort of 260 pregnant women attending antenatal clinic in the Cape Coast Metropolis. This research adopted a descriptive cross sectional approach. The study population included all pregnant women in the Cape Coast Metropolis; who received antenatal care at the various health care delivery centres in the defined area preferably government owned hospitals. Pregnant women who attended the Central Regional Hospital within the period of November, 30th, 2013 to December, 30th, 2013 for antenatal care were chosen through random sampling for the study. Descriptive statistics were used to discern basic patterns in data. Correlation methods were used to analyse the quantitative data generated. Logistic regression was used to determine association between variables and to control for different factors. Based on the findings, it is recommended that prophylactic iron supplementation would still be necessary. The prenatal distribution of the combination of iron and folic acid supplement would be very essential in curbing the condition. Renewed efforts should be geared towards making family planning, skilled care at delivery and emergency obstetric care more accessible to all women. Focus should be placed on demystifying some food taboos that might not be beneficial to pregnant women and their unborn children. Health professionals managing obstetric cases should be motivated for prescribing iron preparations and balanced diet with good compliance.

KEY WORDS: Pregnancy, Anaemia, Prenatal, Infant, Pregnancy and Disorder

INTRODUCTION

The world's second top reason for morbidity is anaemia and it is a grave cause of global public health worry for many countries. Anaemia is high among pregnant women in poorer countries and up to 30% and 40% in richer countries (World Health Organization, 2013). The fifth cause of maternal death worldwide is anaemia (Lokare *et al.*, 2010). Over 56 million pregnant women worldwide are afflicted by anaemia (WHO, 2008). Anaemia is the most common form of nutritional problem in the world today (WHO, 2003). Women who are pregnant are more at risk of anaemia than non-pregnant women because anaemia is more common during pregnancy (March of Dimes, 2014). The risk of severe anaemia causing perinatal and infant mortality is about 500 folds amongst pregnant women (Hoque, Hoque & Kader, 2006). In pregnancy, the most common medical disorder that has a varied incidence, aetiology and degree of severity in different population is anaemia (Anorlu, Oluwole, & Abudu, 2006; Buseri, Uko, Jeremiah, Usanga, 2008). Anaemia in pregnancy can affect a pregnant woman's mental and physical wellbeing. Even mild to moderate forms of anaemia can compromise the pregnant woman's health status and decrease her resistance to fatigue, reduce her energy levels, intensify other disorders and affect her productivity, earning power and even relinquish or reduce her maternal caring practices.

It may ultimately lead to low resistance in bleeding during childbirth resulting in maternal morbidity and mortality (Okeke, 2011 & United States Agency for International Development [USAID], 2011). The prevalence of anaemia in pregnancy across different cultures varies considerably because of differences in socioeconomic conditions, lifestyles and health-seeking behaviours (Viveki, Halappanavar, Viveki, Maled & Reshpande, 2012). Two thirds of women with anaemia are from developing countries (Wong, Perry, Hockenberry, Lowdermilk & Wilson, 2006). In developing countries, the major causes of maternal mortality are due to obstetric haemorrhage and postpartum infection which are caused by pregnant women who have anaemia. Anaemia makes pregnant women succumb to these conditions. Heart failure can ensue and cause maternal death during pregnancy and specifically during the time of delivery when a pregnant woman develops severe anaemia (Anorlu *et al.*, 2006).

The most severely affected areas of the world are South-East Asia (48.2%) and Africa (57.1%). A large proportion of anaemic pregnant women in Africa live in the West African sub-region (De Benoist, Mclean, Egli, and Cogswell, 2005). The causes of anaemia in pregnancy in Sub-Saharan Africa are multifactorial; including malaria, iron deficiency and haemoglobinopathies (Mockenhaupt *et al.*, 2000). The USAID (2011) identified that anaemia had numerous causes: when women were unable to meet increased iron requirements during pregnancy, insufficient dietary intake of micronutrients (particularly iron) and closely spaced births that do not allow adequate time for maternal replenishment.

*Corresponding author: Theodora DedoAzu,
Department of Maternal and Child Health, College of Health and Allied Sciences, School of Nursing and Midwifery, University of Cape Coast, Ghana.

Also infections that destroy erythrocytes, interfere with red blood cell production, increase blood loss and or reduce nutrient uptake (e.g. malaria, hookworm, HIV, diarrhoea) (Van Geertruyden *et al.*, 2005). Perinatal deaths caused by anaemia due to malaria may be approximately 25-80/1000 per annum. In prevalent countries, regardless of parity, the risk of stillbirth is double in pregnant women with placental malaria (Van Geertruyden *et al.*, 2005). The frequency of anaemia in pregnancy in some West African countries are as follows; 50.2% in Togo, 66.7% in Nigeria, 68.3% in Burkina Faso, 72.7% in Benin and 75.1% in Gambia. Ghana's estimated prevalence of anaemia in pregnancy is 64.9% and rated as severely consistent with the other West African neighbours (WHO, 2008). The prevalence rate of anaemia is at its peak among young women aged 15-19 years (63 percent). Among pregnant women, the prevalence rate of anaemia is as high as 70 percent. The prevalence of anaemia among women age 15-49 years in Ghana has increased over the past five years from 45 percent in 2003 to 59 percent in 2008 (Ghana Demographic Health Survey, 2008).

It has been documented and observed that maternal death and morbidity in Ghana is heavily influenced by anaemia. About 20 percent of the maternal deaths can be attributed to anaemia (The African Report, 2013). Reduction of maternal mortality by three quarters is what the MDG 5 mainly aims at achieving between 1990 and 2015. Ghana's advancement in this field has been rather slow, though there has been a decline over the years (National Development Planning Commission, Government of Ghana [NDPC/GOG] and United Nations Development Programme, Ghana [UNDP], 2012). The current maternal mortality rate for Ghana is 350 per 100,000 live births (Central Intelligence Agency [CIA], 2013), which is about double (185 per 100,000 live births) the figure needed to meet the MDG 5 by the year 2015. If the trend continues then it will be difficult to meet the goal (NDPC/GOG and UNDP, 2012). There have been several interventions by stakeholders including the Ghana Health Services and non-governmental institutions to reduce anaemia in pregnancy in the Cape Coast Metropolis. These include, free maternal care, iron and folic acid supplementation as well as free insecticide treated nets given to pregnant women. Anaemia in pregnancy remains still very high in the metropolis (Cape Coast Metropolitan Health Directorate [CCMHD], 2012).

Few literatures are found on anaemia in pregnancy in Ghana, however no literature is found about the issue in the Cape Coast Metropolis. It was in view of the above problem that the study sought to determine the factors that influence anaemia in pregnancy; in the Cape Coast Metropolis. Specifically, the study sought to identify factors that influence anaemia in pregnancy, determine the perceived barriers that influence anaemia in pregnancy and assess prior related behaviours that influence anaemia in pregnancy. The results of the study would help identify the factors that influence anaemia in pregnancy from the pregnant women's perspectives that were most of the time overlooked. It is expected that the results would help policy makers and stakeholders make sound maternal health policies on anaemia. The study would also inform healthcare providers to identify pregnant women with risk of complications from anaemia early in pregnancy for proper management.

In addition, the study would also provide guidelines for clinical management by developing health education strategies.

MATERIALS AND METHODS

This quantitative research adopted a prospective descriptive design, using a cohort of pregnant women attending antenatal clinic in the Cape Coast Metropolis. This research adopted a descriptive cross sectional approach. The study population included all pregnant women in the Cape Coast Metropolis; who received antenatal care at the various health care delivery centres in the defined area preferably government owned hospitals. The target groups were women who attended the hospitals. The study population included all pregnant women receiving antenatal care from the Central Regional Hospital within the period of November, 30th to December, 30th, 2013 for maternal health services. An average of 562 pregnant women attend the Central Regional Hospital for antenatal services monthly, however; Glenn (1992) formula for determining sample size was used to calculate the required sample needed for the study at 5% level of precision. In all 260 participants were selected for the study using the simple random sampling technique. The main instrument used for data collection was questionnaire. An overall Cronbach's Alpha coefficient of 0.766 was obtained, indicating that the questionnaire was largely reliable. Statistics Package for Social Science (SPSS) version 21 software was used to analyse the data. Descriptive statistics was used to discern basic patterns in data. Logistic regression was used to analyse and to determine association and control for different variables.

RESULTS

Table 1 revealed that majority 112 (43.1%) of the pregnant women were aged 20-24 years, followed by 84 (32.3%) who were aged 25- 29 years. Thirty (12%) were teenagers between ages 10-15 years and the least 2 (0.8%) were pregnant women between the 40-49 years. This meant that respondents were within the reproductive age. In terms of number of pregnancies, most 92 (35.6%) of the respondents had been pregnant between one and two times, 78 (30.0%) of the respondents were primigravidae, 72 (27.6%) had been pregnant between 3 to 4 times and 15 (6.1%) had been pregnant for more than 5. Almost half (47.7%) of the respondents were in their second trimester of pregnancy during the period of data collection.

About 27.7% were in their third trimester and 24.6% were in the first trimester. A greater proportion of the respondents were Christians 84.2% while 12 % were Muslims. In terms of marital status, 55.0% of the respondents were married, singles constituted 23.8%, cohabiting 14.2%, divorced 2.7%, separated 3.1% and widowed 1.2%. On the level of education, most of the respondents 77 representing 29.6% had attained Junior High School level, respondents with no Formal Education, Tertiary, Primary and Senior High School or National Vocational Training Institution levels were 53 (24%), 53 (24%), 46 (17.7%) and 31 (11.9%), respectively. The result implied that a majority 107 (78.6%) of the respondents had attained less than a tertiary level of education. Majority 151 (58.1%) of the respondents were gainfully employed with another 109 (41.9%) unemployed.

Anaemia (Reference group is Not Anaemic)	B	p-value	OR	95.0% C.I. for OR	
				Lower	Upper
Type of employer	-3.949	.020	0.019	0.001	0.533
Number of pregnancies	1.601	.046	4.957	0.844	29.12
Total yearly family income	-3.664	.023	0.026	0.001	0.599
Weeks in pregnancy	0.560	.420	1.751	0.448	6.844
Age	-0.979	.402	0.376	0.038	3.713
Religion	-0.258	.626	0.773	0.275	2.176
Marital	-0.485	.211	0.615	0.288	1.317
Educational level	0.260	.577	1.297	0.520	3.238
Employment status	1.383	.449	3.988	0.111	143.7
Financial status	0.849	.583	2.338	0.113	48.45
Dependence	2.483	.494	2.432	0.021	1.344
Crave for non-edibles foods	-0.299	.382	0.742	0.379	1.450
Herbs	0.058	.956	1.059	0.138	8.151

At least 109 (41%) of the respondents were employed into private companies or were self-employed and 42 (16.2%) were employed by the public sector. In addition, respondents were mainly traders and artisans. A considerable number of respondents 99 or 38.1% had a yearly total family income of less than GH¢1200. Eighty-two representing 31.5% earned between GH¢1200-3500, 43 (16.5%) earned between GH¢3600-5599, 22 (8.5%) earned between GH¢6000-8399 and 14 (5.4%) had more than GH¢ 8400 per annum. The study showed that a greater proportion (177 or 68.1%) of the respondents travelled a distance of more than 5km from their homes to the hospital and 82 (31.9%) travelled less than 5km from their houses to the health facility or hospital. This implied that pregnant women are not getting access to health facilities within their communities and this could impact anaemia in pregnancy negatively. Health facilities should be with 5km radius within the community as stated by the WHO. The major means used by respondents was vehicle (167 or 64.2%), while 90 (34.2%) travelled on foot and canoe 3 (1.2%). Most of the respondents 155 representing 59.6% said that the state of the road to the hospital was good however a considerable number 105 (40.4%) said that the roads leading to the hospital were in a bad state. This implied that all roads, especially those leading from rural to urban centres were in bad state needed repairs. Untarred roads needed to be tarred to help pregnant women to access health facilities with ease.

Another 158 (60.8%) of the respondents agreed that nurses were adequately prepared to check for anaemia in pregnant women while 102 (39.2%) disagreed with nurses being adequately prepared to check for their anaemic statuses. An appreciable 43.3% of the respondents said yes to the hospital being adequately resourced for diagnosing anaemia in pregnancy. However, 82 (31.5%) and 68 (26.2%) either said "probably" or "no", respectively to the hospitals or health facilities being adequately resourced to diagnose anaemia in pregnancy. Some recommendations by the respondents for improving hospital services for checking anaemia in pregnancy included; the provision of more equipment, drugs for treating AIP and teaching and counselling pregnant women to check their haemoglobin levels when asked to do so. Others included training more midwives and laboratory machines being kept well to work always. This implied that when nurses were not adequately resourced, cases of anaemia could go undetected in pregnant women and this could lead to adverse effects later on the pregnancy, labour and puerperium. One hundred and twenty seven (48.8%) of the pregnant women decided by themselves on where to attend antenatal clinics, almost half of the respondents had decisions taken for them by their husbands, (105 or 40.4%) and in-laws (21 or 8.1%).

Although majority 142 (54.6%) of the respondents decided on when to attend antenatal clinic, however 97 (37.3%) had their decisions made on their behalves by their husbands. This showed that most women lacked the decision making power in their homes and decision were taken on their behalves. Stakeholders would have to bring decision makers on board especially husbands when deliberating on issues to prevent AIP.

The study revealed that three (3) out of the thirteen (13) variables were significantly associated with being anaemic. Specifically women who had more pregnancies, were 4.96 times more likely to be anaemic compared to those who had less pregnancies (OR=4.957, p=0.046, CI = 0.844, 29.127). The type of employers for respondents was significantly associated with anaemic status. Specifically, pregnant women who were self-employed were 98% less likely to be anaemic compared to those who were unemployed (OR=0.019, p=0.020, CI = 0.001, 0.533). Total yearly family income was also significantly associated with anaemic status. Women whose total yearly incomes were above GH¢8400 were 97% less likely to be anaemic compared to those who earned less than GH¢1200 per year. OR= 0.03 (p=0.020 CI = 0.001, 0.599). This meant that the higher one's income the less likelihood of becoming anaemic in pregnancy. The result also revealed that the other ten (10) variables were not significantly associated with being anaemic namely; age, religion, marital status, educational status, financial status, financial dependence, craving for non-edible things and herbal medicine use.

DISCUSSION

Factors that Influenced Anaemia in Pregnancy

Parity was statistically associated with being anaemic. Women who had more pregnancies (high parity), were 4.96 times more likely to be anaemic compared to those who had less pregnancies (low parity) (OR=4.96, p=0.046, CI = 0.844, 29.127). The results were congruent with studies conducted in Eastern Nigeria, and Russia (Dim & Onah, 2007, Chumak & Grjibovski, 2010). Some other studies identified multiparity as a risk factor for developing lower haemoglobin during pregnancy and severe anaemia may cause bleeding during the delivery of the child (Shamah-Levy *et al.*, 2003). A study conducted in Oman by Al-Farsi *et al.*, (2011) showed that higher parity carried higher risk of developing incident AIP than lower parity, and that the risk of AIP increased with more pregnancies in a dose-dependent manner. Several studies have shown that mothers might become anaemic after several pregnancies within shorter intervals because their bodies do not

restore adequate stores of iron before the next pregnancy comes. The study implied that 35.6% of the respondents had more than two pregnancies. Women have to be targeted at for counselling on family planning choices to prevent more pregnancies at shorter intervals. High pregnancies raise women's chances of complications in pregnancy, labour and puerperium. There is also reduction of iron stores in women with more pregnancies predisposing them to anaemia in pregnancy.

In this study, the type of employers for respondents was statistically associated with anaemic status. Specifically pregnant women who were self-employed were 98% less likely to be anaemic compared to those who were unemployed (OR=0.010, $p=0.020$, CI = 0.001, 0.533). This is contrary to a study that found that unemployment was directly related to AIP. A study conducted in North Western Ethiopia, found that the risk of anaemia was 2.42 times higher among housewives as compared to governmental employee (Meseret, Bamlaku, Aschalew, Tigist, Mohammed & Yadessa, 2013). A study in Russia found that anaemia was less likely among women employed as clerks and service employees (Chumak & Grjibovsk, 2010). The problem of anaemia in pregnancy may be lessened when women are gainfully employed. The study implied that 41.9% were not gainfully employed and had to depend on others for their food, shelter and other healthcare need. This could be a constraint to accessing health care facility for diagnosing and management of anaemia in pregnancy. The results showed that the total yearly family income was also significantly associated with anaemic status. Women whose total yearly income was above GH¢ 8400 were 97% less likely to be anaemic compared to those who earned less than GH¢1200 per year. (OR= 0.03 $p=0.023$ CI = 0.001, 0.599). The study was congruent with studies conducted in Iran and Tibet which found out that there was a significant correlation between anaemia and family income status (Sadeghian, Fatourechi, Lesanpezheshki & Ahmadnezhad, 2013; Xing, Yan, Dang, Zhuma, Zhou & Wang, 2009). A study in Northwest Ethiopia found that mothers who had low monthly family income were three times more likely to be anaemic as compared to those with high monthly family income. As income is low, the expenditure for food becomes low. Besides, due to food price inflation, the purchasing power of income is low. So, low income groups did not get adequate nutrition and thereby low family income groups were at risk of anaemia (Melku, Addis, Alem & Enawgaw, 2014).

A study in Democratic Republic of Congo revealed that neither individual wealth, household wealth, nor number of household members were significantly associated with individual anaemia outcome (Messina, Mwandagalirwa, Taylor, Emch & Meshnick, 2013). The implication of the study was that 38.1% of the respondents earned below the current national monthly income of GH¢180 totalling GH¢2160 per annum. The results also showed that 61.9% of respondents had to depend on others especially partners to meet their financial needs including diet, antenatal care, transportation cost from house to hospital amongst others. This is logical in that, most women who earn very little wages agreed that they cannot afford to buy the necessary ingredients needed to prevent anaemia in pregnancy. They would not also frequently access healthcare facilities than those who earned more because they cannot afford the

transportation fares; and will wait till complication set in before mobilizing funds to seek medical care from the hospitals. The study also revealed that maternal age was not statistically significant. This was congruent with studies carried out in Southern Malawi, Malaysia and Trinidad and Tobago (van den Broek, 2005; Haniff, 2007). Conversely some studies conducted in Northern Tanzania and Saudi Arabia found out that age was significantly associated with AIP (Viveki *et al.*, 2012; Elzahrani, 2012). In this study gestational age was not found to be statistically significant. These results are contrary to studies conducted in Bangladesh (Manhamuda, Tanira, Feroza, & Shamin, 2011). A study conducted by Karaoglu *et al.*, (2010) stated that anaemia was more than twice more prevalent during the third trimester than the first and second trimesters.

The association between educational status and anaemia in pregnancy was not statistically significant. This was similar to studies conducted in Ethiopia, Nigeria, DR Congo and Saudi Arabia (Obse, Mossie & Gobena, 2013; Ndukwa *et al.*, 2012; Elzahrani, 2012; Messina *et al.*, 2013). In contrast, a study conducted in Pakistan and Tanzania; found the means haemoglobin concentrations of respondents were significantly lower among women with no formal education than among women with some formal education (Baig-Ansari *et al.*, 2008). Education provides people with the knowledge and skills that can lead to a better quality of life. Sixty-three percent of women were literate, while 37 percent of women were not. As in the case of educational attainment, men were more likely to be literate than women. Level of education was found to be closely associated with the health of women as well as reproductive health behaviours of women in Ghana (GDHS, 2008). Better educated and wealthier women are more likely to participate in decision-making especially about their health than women with little or no education (GDHS, 2008). The study showed that, 78.6% of respondents had attained less than a tertiary level of education. This explained the reason why pregnant women could not make decisions about when and where to attend antenatal clinic but had to depend on others such as husbands. Women who had less education did not know what to do to detect, prevent or manage anaemia in pregnancy.

In the study, marital status was not statistically significant. This is congruent with a study conducted in Russia that found that the highest prevalence of anaemia was observed among unmarried and unemployed women, housewives, students and women with unknown occupation. Unmarried pregnant women were more likely to be anaemic in pregnancy than the reference groups (Chumak, Andrej & Grjibovski, 2010). Conversely a study in River State, Nigeria also found AIP to be more common amongst married mothers (97.18%) than amongst single women (2.82%), but this relationship was not statistically significant (Ndukwa *et al.*, 2012). A study in Vietnam by Duong, Binns and Lee, (2004) stated that marital status influenced the pregnant woman's accessing healthcare. Single and divorced women were more independent than their married counterparts. In terms of marital status, (55.0%) of the respondents were married, singles constituted (23.8%), cohabiting (14.2%), divorced (2.7%), separated (3.1%) and widowed (1.2%). The association between marital status and AIP was not statistically significant. This result is congruent with a study from Nigeria and Ghana, where AIP was also found to be more common amongst married mothers (97.18%)

than amongst single women (2.82%) (Ndukwa *et al.*, 2012; Glover-Amengor, Owusu and Akanmori, 2005). Religion was not found to be statistically significant. This was contrary to a study conducted in Western Rajasthan by Bansal, Takkar, Soni, Agrawal and Agarwal (2013) that found a strong relation between religion and anaemia in pregnancy. In north eastern Nigeria, religion is a key component working against the acceptance of antenatal diagnoses of sickle cell anaemia (Kagu, Abjah & Ahmed, 2003). Religion has an effect on peoples' behaviour towards their fertility and family spacing in Sub Saharan Africa.

Religion cannot be said to be a cause of anaemia in pregnancy, however it accounts for the variety in nutrition, food taboos, etc. (Lokare *et al.*, 2012). Food taboos were not found to be statistically significant however, out of the total number 28 (100%) of respondents who knew of various food taboos, 9 (32.1%) said that snails were a food taboo that when taken by a pregnant mother could lead to the baby drooling. This implied that more effort should be geared at demystifying some food taboos that may influence AIP negatively. This was congruent to the study done by Onuorah and Ayo, (2003) in Ghana which stated that consuming of snails was a taboo amongst the Ga's and Ewe's from Adaklu while it was a transitory food taboo for pregnant women among various ethnic groups in Ghana. Food taboos is believed to be actions to avoid certain foods set on causal explanation which may be supernatural, logical or sometimes challenging to explain rationally (Purnamasari, 2010).

Perceived Barriers that Influenced Anaemia in Pregnancy

Results from the study showed that the bearer of the cost of transportation was statistically associated with anaemic status. Specifically pregnant women who bore the cost of transportation themselves were 1.01 more likely to be anaemic than those whose cost of transportation were paid for by others (OR= 1.988, $p=0.043$, CI= 0.422, 2.134). In rural areas, poor women have financial constraints and are delayed before travelling to health care services for care.

These women do not have adequate bargaining power within the household causing unnecessary delays in deciding when and where to seek care. The role of the husbands in childbirth was described as paying the costs for antenatal care, the delivery and all expenses for the health. If he cannot pay (because he is unemployed, travelled away from the village or if he has too many spouses and /or children) the pregnant woman has to pay all the costs herself (Jansen, 2006). Ambulances in emergencies especially during antenatal periods are costly in terms of purchase, fuel, maintenance, and repair. They are usually stationed at referral hospital level and it is too expensive to provide rural health centres services.

Seasonal factors such as the weather and condition of roads did not affect referral time greatly. Occasional long delays were the result of breakdown, such as a puncture (Hofman, Dzimadzi, Lungu, Ratsma and Hussein, 2008). The main challenges to the Ghana Health Sector Medium Term Development Plan for 2010-2013 was "inadequate and untimely access to services by those who need them most, and the quality of these services" (Ghana Health Service, 2007). Though maternal services may be poor, pregnant women may

not be able to access health care facilities due to economic hardships or unemployment especially among rural folks or urban poor. The study implied that pregnant women were not economically empowered to help them bear the cost of transportation to the healthcare centre for the early detection and management of anaemia in pregnancy. Most women who were unemployed or had low earnings relied on others especially their husbands to give them monies to board vehicles to the nearest healthcare centre.

In the study, staff attitude was statistically associated with anaemic status. Poor staff attitude was 1.09 times more likely to be significantly associated with anaemic status than good staff attitude toward respondents (OR= 1.085, $p=0.031$, CI= 0.727, 1.620). The attitude of staff and their perceived competence are clearly important factors in the management of maternal healthcare. Negligence and lack of staff competence contribute to the poor quality of care. Patients and their families were aware of the problem, but often powerless to do something about it. Staff attitude was sometimes problematic; in many cases, this reinforced the women's feeling of being mistreated by health care workers and their feeling of disempowerment (Kabali, Gourbin & De Brouwere, 2011). Some adolescent mothers in Swaziland feared going to antenatal clinics for being scolded by healthcare staff (Mngadi, Zwane, Alberg & Ransjo-Arvidson, 2003). The results implied that negative staff attitudes deterred pregnant women from visiting healthcare centres for antenatal care. Pregnant women would rather go to untrained Traditional Birth Attendants who lacked the requisite training on how to detect and manage anaemia and other related conditions like malaria because they would receive and attend to them nicely.

In this study, distance was statistically associated to anaemic status. Specifically distance of more than 5km was 1.12 times more likely to be associated with anaemic status of respondents than distance less than 5km (OR=1.120, $p=0.043$, CI = 0.325, 3.857). In a similar study conducted in Ethiopia, perception of distance to health institutions and ANC attendance were found to be significantly associated ($p<0.05$) with delivery care attendance (Birmeta *et al.*, 2013). Grzybowski, Stoll and Kornelsen, (2011) stated that the relative distance women had to travel to access healthcare services is also associated increased rates of adverse perinatal outcomes.

A study in Zimbabwe stated that some villages have no health centres. If services are available, they are sometimes located at unreasonable distances, often lack medicines and healthcare personnel, and sometimes do not have basic diagnostic equipment. Transportation is a major problem because there is no developed road service between available health centres and the resettlement villages (Mupepi, Sampsel and Johnson, 2011). The study implied that health facilities were cited far away from homes and communities. Distance to antenatal centres can serve as a deterrent to accessing healthcare by pregnant women. This is true because not all communities especially in rural Ghana, have access to a health centre with a 5km radius. Inhabitants of such areas had to walk long distances, cross rivers by boats or canoes and/or join vehicles that plied untarred routes for long hours before getting to healthcare centres.

Prior Related Behaviours that Influenced Anaemia in Pregnancy

The results revealed that knowledge factors were statistically associated with anaemic status. Respondents who were more knowledgeable about anaemia, were 97% less likely to be anaemic compared to those who were not (OR=0.026, p=0.003, CI = 0.001, 0.599). This finding is congruent with a study conducted by Vongvichit *et al.*, (2003), which found that there was a significant association between knowledge on anaemia and compliance of pregnant women regarding iron supplementation. This might be due to the fact that knowledge of pregnant women about anaemia in respect of causes, symptoms, effects, treatment and prevention might affect their compliance of iron tablets routine. In a similar study conducted in India, high prevalence of AIP was strongly associated with low socioeconomic status (OR=1.409 [1.048– 1.899]; p=0.023) which affected the respondents' knowledge and health seeking behaviours (Noronha, 2010). A study in Western Kenya found that a high maternal education level were significantly positively associated with maternal health knowledge (Perumal *et al.*, 2013). In contrast there was no significant association between maternal knowledge of anaemia and maternal anaemia in a study conducted in Indonesia (Souganidis *et al.*, 2012). A study conducted in Rwanda found that a large majority of pregnant women knew that malaria might have serious consequences on the outcome of pregnancy and that bed nets, and more specifically insecticide treated nets, were good means of protection. The impact of malaria combined with the knowledge of the pregnant women was a good basis for intervention with bed nets (Geertruyden, 2005). The results implied that 97% of pregnant women who knew anaemia would be better equipped than those who had inadequate knowledge about anaemia.

Conclusion

The study revealed that anaemia in pregnancy is very high despite some interventions that have been implemented in the past. These include prophylactic iron supplementation during antenatal clinic visits by pregnant women to prevent and alleviate anaemia. It is prudent that the government of Ghana recognizes that anaemia in pregnancy is a major public health problem that needs urgent attention. There is the need to intensify public education on anaemia in pregnancy and its adverse effects on the mother, child and the entire nation. More efforts should be geared at the provision of health facilities closer to the pregnant women especially rural folks. Women are to be empowered both intellectually and economically to be able to be autonomous in making decision especially decision concerning their own health.

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