



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 9, Issue, 4(G), pp. 26015-26021, April, 2018

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Research Article

RISK FACTORS ASSOCIATED WITH ANEMIA AMONG PREGNANT WOMEN IN KISANGANI IN D.R.CONGO

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DOI: <http://dx.doi.org/10.24327/ijrsr.2018.0904.1975>

ARTICLE INFO

Article History:

Received 8th January, 2018
Received in revised form 21st February, 2018
Accepted 05th March, 2018
Published online 28th April, 2018

Key Words:

Anemia, Primigravida, Malaria, Hookworm, Unemployed

ABSTRACT

Introduction: Anemia in pregnancy continues to be a common problem in many developing countries where poverty, ignorance, and illness are still prevalent among people. The aim of this study is to determine the prevalence of anemia and associated risk factors among pregnant women in Kisangani.

Material and Methods Cross-sectional study with a descriptive and multicentric aim in Kisangani. 1102 pregnant women were selected for this research, from the 15 November 2016 to November 14, 2017.SPSS software version 20.0 was used.

Results: The prevalence of anemia among pregnant women in Kisangani Was 76.2% .The risk factors associated to anemia in pregnancy were the age less than 20 years, being jobless, the primigravida, malaria and hookworm infestation.

Conclusion: Anemia during pregnancy is a common problem in obstetrical practice in Kisangani. Regular screening will help to better manage anemic in pregnant women.

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INTRODUCTION

Anemia is defined as a decrease in the concentration of circulating red blood cells or in the haemoglobin concentration and con-comitant impaired capacity to transport oxygen [1].Anemia is a global public health problem affecting both developing and developed countries with major consequences for human health as well as social and economic development which results in loss of billions of dollars annually [2, 3]. According to World Health Organization report in 2008, anemia affected 1.62 billion (24.6%) people globally [2]. Anemia has devastating costs to individual and national productivity. People with anemia have decreased work capacity. They may be unable to earn their livelihood if the work involves manual labour [2, 4]

When anemia is not adequately monitored and addressed in pregnant women, it can result in severe morbidity, mortality and reduces the resistance to blood loss with the possibility that

death may result from the blood loss associated with delivery [5].

The early stages of anemia in pregnancy are often symptomless and may remain un- recognized clinically with serious outcomes. As the haemoglobin concentration decline, oxygen supply to vital organs declines and the expectant mothers complain of general weakness, tiredness and headaches. Usually, pallor of skin and of the mucous membrane, as well as the nail beds and tongue may not become noticeable until Haemoglobin drops to about 7.0g/dl. With a further decline in haemoglobin concentration to 4.0g/dl, most body tissues become starved of oxygen and the effect is most marked on the heart muscles, which may lead to heart failure and death. Anemic mothers do not tolerate blood loss to the same degree as healthy non-anemic women. During childbirth loss of small volume of blood in an anemic mother can be fatal [6].

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In pregnancy, anemia has a significant impact on the health of the foetus as well as that of the mother. The deleterious effects of anemia in pregnancy include increased risk of maternal and foetal morbidity and mortality, preterm delivery, and low birth weight [7]. There is 500-fold increased risk of maternal, perinatal and infant mortality in pregnant women with severe anemia [1].

Anemia in pregnancy continues to be a common problem in many developing countries where poverty, ignorance and disease are still prevalent among the people. Worldwide, it is estimated that 58.27 million women are anemic during pregnancy, of whom 55.75 million (95.7%) live in developing countries [8]. Recent estimates suggest that up to 60% of pregnant women in developing countries may be anemic, and nearly 7% of pregnant women are severely anemic [3,9]. Anemia is reported to be significantly associated with maternal mortality in developing countries, where it is directly or indirectly responsible for 20-30% of all maternal deaths [3, 6, 10].

The aetiological factors for anemia in pregnancy vary geographically. The reported principal causes in sub-Saharan Africa include nutritional deficiencies, malaria, other parasitic infestations and recently, infection with human immunodeficiency virus [11]. Burden of anemia varies from country to country; in Germany, 51% of pregnant women were anemic, in Trinidad and Tobago 15%, in Nepal 72.6% and 58% in India [12,13]. In Africa, more than 60% of pregnant women, in Benin 24.3% of pregnant women, in Kenya 69.1% of pregnant women and in eastern Sudan 80.3% of pregnant women were anemic [12,14].

The aim of this study is to determine the prevalence of anemia and associated risk factors among pregnant women in Kisangani

MATERIAL AND METHODS

Study Material

Study Population

The study population was made up of all the pregnant women who had been consulted for antenatal consultation and other reasons in the first trimester of pregnancy, and who had given birth to the health institutions selected in Kisangani town, from the 15 November 2016 to November 14, 2017. Pregnant women who have followed the antenatal consultation from the first trimester until the end of pregnancy and at least 3 blood samples have been taken (in the first, second and third trimesters of pregnancy) were eligible for this research.

During investigation's period, 1102 pregnant women met the eligibility criteria, 840 were anemic. The following hospitals were selected because of their high attendance by pregnant and parturient: Makiso / Kisangani General Referral Hospital, Kabondo General Referral Hospital, Lubunga Reference General Hospital, St. Joseph Reference Health Center and Reference Health Marie Queen of Peace Matete Center.

Sampling and Sample Size

We used a Non-probabilistic sampling of convenience. In this study, the minimum sample size was 200, 16. Our sample consisted of 1,102 pregnant women.

Type of Study

Cross-sectional study with a descriptive and multicentric aim.

Data Collection Technique

Data collection was prospective. During the period from 15 November 2016 to 14 November 2017, we followed all the pregnant women included in our research (those who were anemic and not anemic throughout pregnancy) to identify prevalence and other epidemiological aspects.

Data collection has been done at the same monitoring period. To collect our data, we used predetermined Slip's data collection, plugs of prenatal consultation, the vacutainers tubes with and without anticoagulant. The selected pregnant women have been seen 4 times during the search (First, Second, Third Trimester of pregnancy and during delivery).

The investigation team consisted of 17 people including 2 nurses and a physician (by medical structure), in total we had 5 nurses, 5 laboratory nurses and 5 physicians, the analytical laboratory assistant and the principal investigator. These investigators followed maintenance and training sessions in order to standardize the data collection of interview procedure.

Data collection cards were coded and reviewed daily for completeness and consistency. In case of incompleteness or inconsistency, missing information was completed at the next antenatal consultation.

Blood sample: venous blood that will be transported in 2 different tubes: one without anticoagulant for biochemical examinations and the other with EDTA for hemogram.

Medical laboratory

- Provincial Public Health Laboratory (Faculty of Medicine UNIKIS);
- The hemoglobin was made to model the HemoCue 301+ hemoglobinometer;
- Serum iron and ferritin were measured using a model 2100s spectrophotometer.

The physiological anemias of pregnancy were eliminated after comparison of hemoglobin, serum iron, ferritin and gestational age.

Statistical Analyzes

Information collected was encoded and analyzed using SPSS software version 20.0.

Statistical calculations we used to present the results:

For sample is Description: Calculation of frequency and percentage; averages and their standard deviations; the median and areas of variation.

Ethical Considerations

This research presents no harm to maternal and fetal well-being. It has no consequences, either near or far, for the health of all participants. In long run, it will make it easier for pregnant women to cope with anemia. At least all pregnant women gave their verbal consent after an explanation session on the study in detail by the research team before collecting any data information.

RESULTS

Prevalence of anemia in pregnant women

Out of a total of 1102 pregnant women, 840 were anemic. The prevalence of anemia among pregnant women in Kisangani was 76.2%.

Socio-demographic and economic characteristics of pregnant women

Table 1 present pregnant women in function of socio-demographic and economic characteristics

Table 1 Socio-demographic and economic characteristics of pregnant women

Characteristics	General frequency	Pregnant women anemic		OR	P-value	IC
		Effective	%			
Age(in years)						
<20	307	259	84	1.93	0.00	[1.37 ; 2.73]
20-24	262	207	79	1.23	0.22	[0.87 ; 1.72]
25-29	292	210	71.9	0.73	0.04	[0.53 ; 0.99]
30-34	158	116	73	0.81	0.29	[0.55 ; 1.19]
≥ 35	82	48	58.5	0.41	0.00	[0.26 ; 0.65]
Educational status						
University	378	262	69.3	0.57	0.00	[0.42; 0.75]
Secondary	542	423	78	1.21	0.16	[0.92; 1.61]
Primary	152	128	84	1.78	0.01	[1.12; 2.82]
None	30	27	90	2.86	0.07	[0.86; 9.52]
Profession						
Unemployed	874	700	80.1	2.05	0.00	[1.53; 2.75]
Merchant	83	40	48	0.25	0.00	[0.16; 0.40]
Government employed	33	21	63.6	0.53	0.08	[0.25; 1.10]
teacher	33	21	63.6	0.53	0.08	[0.25; 1.10]
Others	79	58	73	0.85	0.54	[0.50; 1.43]
Socio-economic status						
High	54	30	55.5	0.36	0.00	[0.21; 0.64]
Middle	317	189	59.6	0.30	0.00	[0.22; 0.40]
Low	731	621	84.9	3.91	0.00	[2.93 ; 5.23]

84% of pregnant women under 20 years old were anemic. The mean age of the population was 25 ± 6.4 years. Age under 20 (OR: 1.93; p-value: 0.00; IC: 1.37-2.73) has been shown to be a risk factor for anemia during pregnancy. Primary education level (OR: 1.78; p-value: 0.01; IC: 1.12-2.82), the unemployed (OR: 2.05; p-value 0.00; IC: 1.53-2.75), and the low socio-economic level (OR 3.91; p-value 0.00; IC: 2.93-5. 23) are also other risk factors associated with anemia in our pregnant women.

Table 2 Obstetrical and medical factors associated with anemia in pregnant women

Factors	General frequency	Anemic		OR	p-value	IC
		Effective	%			
Gravidity						
Primigravida	262	222	84.7	1.99	0.00	[1.37; 2.88]
multigravida	585	417	71	0.55	0.00	[0.41; 0.73]
Great Multigeste	255	201	78	1.18	0.32	[0.84; 1.65]
Parity						
nulliparous	296	265	89	2.55	0.00	[1.77; 3.69]
primipare	207	146	70	0.69	0.03	[0.49; 0.97]
Secondipare	234	164	70	0.66	0.01	[0.48; 0.91]
Multiparous	286	216	75	0.94	0.74	[1.84; 3.95]
Great multipar	70	49	70	0.71	0.20	[0.41; 1.20]
Inter pregnancy Interval						
<2 years	739	645	87	5.91	0.00	[4.38; 7.97]
≥ 2 years	363	195	53	0.18	0.00	[0.13; 0.24]
Associated diseases						
Malaria	210	173	82	1.57	0.01	[1.07; 2.31]
Urinary infection	144	43	29	0.08	0.00	[0.05; 0.12]
Intestinal amebiasis	283	175	61.8	0.36	0.00	[0.27; 0.49]
Hookworm infestation	94	88	93.6	4.99	0.00	[2.15; 11.5]

Obstetric and medical factors associated with anemia in our pregnant women

Table 2 presents the pregnant women according to their obstetrical and medical factors.

When reading this table, we notice that 84.7% of primigravida pregnancies were anemic. Primigravida (OR : 1.99 ; p-value: 0.00 ; IC : 1.37 -2.88) has been shown to be a risk factor associated with anemia in our pregnant women. 89% of pregnant nulliparas were anemic. Nulliparity (OR : 2.55 ; p-value 0.00 ; IC : 1.77-3.69) , Inter pregnant Interval less than 2 years (OR : 5.91 ; p-value:0.00 ; IC:4.38-7.97) , Malaria (OR : 1.57; p-value : 0.01; IC: 1.07-2.31) and Hookworm infestation (OR: 4.99 ; p-value:0.00; IC: 2.15-11.5) were also risk factors associated with anemia among our respondents.

DISCUSSION

Prevalence of Anemia in the Gestantes of Kisangani

In our research, the prevalence of anemia during pregnancy was 76.2% in the Kisangani town. Fifteen years ago, Kalenga found a prevalence of anemia in pregnant and lactating women in Lubumbashi ranging from 50 to 80% [5], and at 4 years of our research, Tandu *et al.* found a prevalence of 53. 4% at university clinics in Kinshasa [6].

Our results are close if not so similar to those observed by these authors: Okafor I *et al.*, 76% in Akpabuyo , Nigeria [7] , Sulaiman Shams *et al.*, 76. 7% in the district of Mardan Pakistan [8]; Anam A *et al.*, 75% in Faisalabad in Pakistan [9] ; Prashant D *et al.*, 72. 75% in Karnataka, India [10]; Tanvir J *et al.*, 71. 35% in Multan [11]; and Maleeha M *et al.*,78% in Lahore [12].

However, our prevalence remains high compared to those obtained by some African authors and elsewhere such as Kanyesigye H *et al.*, in south-east Uganda, they found a prevalence of anemia at 62. 8% [13]; Kwabena A *et al.*, Ghana,50.1% [14]; Berhanu E *et al* in Ethiopia 43% [15]; Tunkyi K *et al* in South Africa 42. 7% [16] .

On the other hand, our results remain lower than those observed by other Asian authors such as Agarwal KN *et al* in New delhi, where they had a prevalence of 84% [17],

Mahbooda Rasool *et al.* in Kashmir, 90.45 % [18] and Re naked Bedi *et al* in Rajasthan,91.3%[19].

Seeing the different prevalences observed by this research and others, we notice that there are strong variations in proportions from one region to another and from one place to another. Our results are in prevalence ranges described by the WHO, where it states that anemia during pregnancy often reaches prevalence exceeding 50% in developing countries. This corresponds to the reality of several African and Asian countries [2].

With a prevalence greater than or equal to 40%, we and several other authors are part of the group of regions where anemia during pregnancy is a severe problem of public health, therefore not negligible [2].

Note that in some African countries like Nigeria [7], in Uganda [13] and in Ethiopia [15], there is a prevalence of anemia around 20 to 39.9% where this entity is a moderate problem of public health. This situation is due to the fact that most of these women before pregnancy would be in a safe environment and under a diet rich in iron and other nutrients essential for the equilibrium of the iron stock in the body. In addition to iron and folic acid supplementation during pregnancy, many of them fail to develop anemia in its various forms during pregnancy.

Comparing the results of Kalenga [5] and Tandu Umba *et al* [6] to our, being in the same country, we do not have the same proportions but we are all in the severe problem of public health range by seeing our prevalence of anemia during pregnancy. Given the contexts socio-economic and healths leaves to be desired in the Democratic Republic of Congo, we believe that several factors contribute to the rise in the prevalence of anemia in pregnant in our environments; and complete systematic and regular screening may reveal more and more prevalence.

Despite oscillations in the prevalence of anemia during the period from one country to another, and from one region to another, we agree with Caroline Morin's assertions saying that anemia during pregnancy remains a common public health problem around the world, and its prevalence is high and remains worrying in developing countries[20].

Risk Factors Associated with Anemia in Pregnant Women

Age

We found that 84% of pregnant women under the age of 20 years were anemic and 79% of those aged 20 to 24 years were the same. The average age of all pregnant women was 25 ± 6.4years. Age < 20 years has been shown to be a risk factor for anemia during pregnancy (OR: 1.93; p-value : 0.00 ; IC : 1.37-2.73). Our results are similar to those found by Gerald Obai *et al.* in Uganda [21], where pregnant women under the age of 20 years and under 25 years were among the highest among other age groups.

Berhan EF *et al* in Ethiopia [15] found a proportion of 77.5% of subjects under 25 years, of same as Befikadua Z *et al* [22] in their research. The same observations were made by Shilpa A *et al* [23] and Shradha S *et al* [24] in India, where pregnant women predominated with prevalence of anemia at 45.7% and 58% in each respective study.

On the other hand, other researchers have found higher age brackets mostly as ours. This is Tandu Umba *et al* in Kinshasa where pregnant women aged 35 and over were 51.4% [6], Kwabena A *et al* in Ghana, 62% of pregnant women anemic were aged 25 to 34 years [14]; Tunkyi K *et al* in South Africa, 56.9% [16]; and Meaza L *et al*, Ethiopia, 49.8% [25]. Maternal age below 20 years has been identified as a risk factor for developing anemia during pregnancy in pregnant women. Tandu Umba *et al* in Kinshasa [6], and Ana Gomes D *et al* in Lisbon [26], made the same observation in their pregnant women with anemia. In most cases, anemia in pregnant women is more prevalent in pregnant women younger than 20 years old most often, and those under 25 years old. This would be due to the high demand for essential nutrients useful to the hemodynamic balance for a growing organism, the latter would compete with a gravid state that requires even more nutrient to maintain itself, creating an imbalance if it does or did not exist before, at the level of erythropoiesis with hemoglobin deficiency favorable to the occurrence of anemia.

Socio-economic status

Pregnant women at the lower socio-economic status were more numerous and 84.9% of them were anemic. The low socio-economic status has been shown to be a risk factor for anemia during pregnancy in our research (OR: 3.91; p-value: 0.00 ; IC:2.93-5.23).

Our results are similar to those observed by Nwizu EN *et al* in Nigeria [1], Mohammed Y *et al* in Yemen [27], Renu B *et al* in India [19], Prashant D *et al* in Karnataka [10], and Weslla K *et al* in Brazil [28]. These authors found that the majority of anemic gestates were of low socio-economic status, and this social status was also a risk factor for anemia during pregnancy in their research.

We believe that pregnant women living or occupying low socio-economic status live on the threshold or below poverty, for whom already found a balanced diet would pose a problem, and sometimes even live in an unhealthy environment. All these parameters would expose them to a risk of dietary deficiency in essential nutrients and iron, they could develop chronic diseases. Combining all these conditions, they would be vulnerable and more likely to develop more anemia during pregnancy than those at other socio-economic status.

Pregnant women professions

Pregnant Unemployed were 80.1% anemic and predominated the series. 63.6% of pregnant government employee were also anemic. A statistical place has been established between being unemployed and developing anemia during pregnancy (OR:2.05; p-value : 0,00 and IC: 1.53- 2.75).

Reporting results similar to ours were obtained by Berhanu E *et al* [15] and Z Befikadua *et al* [22] in Ethiopia; Okafor I *et al* in Nigeria [7], Rehab M *et al* in Bahrain [29], Mohammed Y *et al* in Yemen with 96.9% of unemployed anemic mothers [27]; and Nagah A *et al* in Qatar [30].

Access to employment for a woman is a problem in many countries around the world, which may justify the presence of numerous unemployed pregnant women in several research projects in the world and in Africa in particular.

The unemployed for most cases, have financial problems to ensure their survival. Therefore, these pregnant women are not able to provide a good diet for herself and her family. They live in environments that are sometimes convenient and unhealthy. These pregnant women would have a progressive iron deficiency and are exposed to certain chronic diseases (intestinal parasitosis, Malaria ...). This condition would facilitate the outbreak of anemia during pregnancy in already fragile terrain.

Level of education

Pregnant Primary and No Instruction Level were anemic at 84% and 90%, respectively. Primary education level was a risk factor for anemia during pregnancy (OR: 1.78; p-value: 0.01; CI : 1.12 –2.82).

Low-level of education to anemic pregnant women were mostly found in studies by Obai G *et al* in Uganda [21], Kwabena A *et al* in Ghana [14], Berhanu E *et al* [15], and Befikadua Z *et al*, Ethiopia [22]; Nazirah J *et al* in Malaysia [31], Mohammed Y *et al* in Yemen [27], and Renu B *et al* in India [19].

We think that this result is resemblance would be due to the lack of schooling of the girls, which in many societies still poses a problem. These ladies are not destined to evolve to higher or university studies to keep the home and become a mother. Several factors contribute to the prevention of anemia during pregnancy, such as a balanced diet rich in nutrient, living in a healthy environment ... To better understand and take into consideration and practice the various sensitizations or advice received at prenatal consultations and sometimes by the media, requires a certain level of education and personal culture. Or pregnant with low level of instruction would have difficulty integrating and especially apply all information to their scope.

Gravidity

Primigestes were 84.7% anemic. The mean gestational age was 3±2.02 pregnancies. Primigestity has been strongly associated with the onset of anemia during pregnancy (OR:1.99 ; p-value : 0.00 ; CI : 1.37-2.88).

Similar observations have been made in the studies carried out by Befikadua Z *et al* in Ethiopia [22], Yaghoobi H *et al* in Iran [32], and Bisoi S *et al* in Bengal [33]. Multigestity was predominant at Obai G *et al* in Uganda [21], Mohammed Y *et al* in Yemen [27], and Okafor *et al* in Nigeria [7].

Predominance of primigravidae develop anemia is explained by the abundance of sympathetic signs of pregnancy especially vomiting, anorexia, geophagy , ... settled with acquitted in the first trimester of pregnancy. They lead to a malnutrition in pregnant would be exposed depletion of essential nutrients and sometimes infection face an increased demand by placentaire-fetal unit. These pregnant women could easily develop anemia even though they would have enough iron stock before pregnancy.

Parity

89% of nulliparous pregnant women and 75% of multiparous women were anemic. The average parity was 1±1.8. The Nulliparity proved to be a risk factor for anemia during

pregnancy in our surveyed (OR: 2.55; p-value: 0.00; IC:1.77-3.69).

Similar results were obtained by Kwabena A *et al* in Ghana [14], Nwizu EN *et al* in Nigeria [1], Abera A *et al* in Ethiopia [34], Prashant D *et al* in India [10], Ana G *et al* in Lisbon [26], and Manisha Nair *et al* in Great Britain [35]. In these authors, as in our research, nulliparas and multiparas predominated in all anemic gestates. This could always be justified by nutritional deficiency engendered by sympathetic signs on a malnourished or not initially ground, and weakened by the pregnancy. The presence of multiparas is explained by the failure of the maternal organism to rebuild the necessary stocks of nutrients essential for erythropoiesis after significant losses due to previous pregnancies and childbirth.

Inter pregnant interval

Pregnant women with birth intervals of less than 2 years old were anemic in 87%. This inter pregnant interval < 2 years was found as a risk factor associated with the occurrence of anemia during pregnancy during our work (OR: 5.91; p-value: 0.00, CI:4.38-7.97).

Our results are similar to those found by Obai G *et al* in Uganda [21], Nwizu EN *et al* in Nigeria [1], Mishu M *et al* in India [36].

The minimum time for an organism to restore the acceptable stock of essential nutrients and when the intake is sufficient according to WHO standards [2, 26] after childbirth is 2 years. The presence of anemia in these pregnant women at short inter pregnant interval or < 2 years is therefore justified by the lack or lack of time required for a maternal organism to recover or restore the amount of iron and other nutrients lost or consumed during the pregnancy or previous pregnancy. This would make it favorable to the occurrence of anemia during the next pregnancy.

Diseases associated with anemia during pregnancy

Of the pregnant women with malaria, 82% were anemic. 93.6% of pregnant women with hookworm infestation were anemic and 29% of pregnant women with urinary tract infection were anemic. Malaria and Hookworm infestation revealed risk factors related to the occurrence of anemia during pregnancy. Similar observations were made by Tandu U *et al* in Kinshasa [6] where malaria and urinary tract infections were more associated with anemia during pregnancy, Berhanu E *et al* in Ethiopia [15] : 63% malaria (OR:3.8; p-value: 0.00; IC:2.51-5.76) and Hookworm infestation (OR:12.27; p-value: 0,00; CI: 6,97-21,78). The same results were found by Bisoi S *et al* in Bengal [33], Hinderaker SG *et al* in Tanzania [37], Kanyesigye H *et al* in Uganda [13], Okafor I and al in Nigeria [7]; Meaza L *et al* [25], Getachew M *et al* [38], and Befikadua Z *et al* [22], all in Ethiopia.

These observations may be due to the endemicity or presence of malaria in several African countries. The plasmodium parasitized erythrocyte hysteresis exposes pregnant women to anemia due to the lack of time required for efficient erythropoiesis in order to form the erythrocytes in time and to fill the losses of the maternal organism.

Intestinal parasitosis, including hookworm infestation in particular, has long been recognized as one of the major causes

of anemia in poor communities. It is estimated that between a quarter to three quarters of pregnant women in Africa sub-Saharan are reported to be infected by hookworm and present a risk of anemia due to hookworm [39, 40].

The blood loss caused by hookworms in a pregnant already exposed by strong demand fetal-placentaire in a deficient or no body, often plunges pregnant women in anemia table sometimes tolerated or severe as the case [39].

CONCLUSION

Anemia during pregnancy is a problem frequently encountered in obstetrical practice in Kisangani. Regular screening will help any practitioner, to better manage anemic agents in time in order to avoid the harmful effects of anemia in the maternal-fetal couple. Age less than 20 years, the level of primary education, being unemployed, Lower socio-economic status, primigravida, the Nulliparity, inter pregnant Interval less than 2 years, malaria and hookworm infestation are the risk factors associated with anemia in pregnant women.

Conflict of Interest

There is no conflict of interest declared in this research.

References

- Nwizu EN, Iliyasu Z, Ibrahim SA and Galadanci HS. Socio-Demographic and Maternal Factors in Anaemia in Pregnancy at booking in Kano, Northern Nigeria. *African Journal of Reproductive Health*. December 2011 ; 15(4) :36-41
- WHO. World wide prevalence of Anemia 1993-2005;Global data base on anaemia,WHO,Geneva,Switzerland,2008
- Uche-Nwachi E, Odekunle A, Jacinto S, Burnett M, Clapperton M, David Y, Durga S, Greene K, Jarvis J, Nixon C, et al. Anaemia pregnancy: Associations with party, abortions and child spacing in primary healthcare clinic attendees in Trinidad and Tobago. *Afr Health Sci*. 2010;10 (1): 66-70
- Balarajan Y, Fawzi w, Subramanian S. Changing patterns of social inequality in anemia among women in India: cross sectional study using nationally representative data. *BMJ Open*. 2013; 3: e002233
- Kalenga M K, M-K.Nyembo, M.Nshimba, J-M Foidart. Etude de l'anémie chez les femmes enceintes et les femmes allaitantes de Lubumbashi (République démocratique du Congo), Masson Paris 2003. *J Gynecol Obstét Biol Reprod* 2003 ;32 :647-653
- Tandu Umba Barthélemy and Muela Mbangama Andy. Association of maternal anemia with other risk factors in occurrence of Great obstetrical syndrome at University clinics, Kinshasa, DR Congo. *BMC Pregnancy and Child birth* (2015)15:183
- Okafor I. M, Okpokam D. C. Antai A. B., Usanga. E. A. Iron Status of Pregnant Women in Rural and Urban Communities of Cross River State, South-South Nigeria. *Niger.J. Physiol. Sci.* 31 (Dec 2016). 121-125
- Sulaiman Shams, Zarmina Ahmad and Abdul Wadood. Prevalence of Iron Deficiency Anemia in Pregnant Women of District Mardan, Pakistan. *J Preg Child Health* 2017.4 :6.p356-60
- Anam Anjum, Maleeha Manzoor, Nadia Manzoor and Hafiz Abdullah Shakir. Prevalence of anemia during pregnancy in district Faisalabad, Pakistan. *Punjab Univ.J.Zool.*, vol.30(1), pp.015-020,2015
- Prashant D, Jaideep K.C., Giriya A., Mallapur M.D. Prevalence of anemia among pregnant women attending antenatal clinics in rural field practice area of Jawaharlal Nehru Medical College, Belagavi, Karnataka, India. *Int J Community Med Public Health*. 2017 Feb :4 (2) :537-541
- Tanvir Jahan, Ishaq M, Arif Siddiq. Anemia in pregnant women : Prevalence in IBN-E-SIENA Hospital Multan. *Professionnal Med J* 2017 ; 24(5) :675-679
- Maleeha Manzoor, Madiha M, Qurat-ul-ain A, Sobia Ahmed, Shazia Manzoor. Frequency and causes of iron deficiency anemia in patients visiting gynae outdoor unit: an institutional based study. *Punjab Univ.J.Zool.*, vol.32(1), pp111-115,2017
- Kanyesigye Hamson MD, Joseph Ngonzi MD, Mugisha Julius MD, Byaruhanga Emmanuel MD, Mayanja Ronald MD. Prevalence, Morphological Types and Factors Associated With Anemia among Mothers Attending Antenatal Clinic at Mbarara Regional Referral Hospital, South Western Uganda. *Journal of Health, Medicine and Nursing*. vol.25,2016.p115-119
- Kwabena Acheampong, Stella Appiah, Dorothy Baffour-Awuah, Yeboah saka Arthin. Prevalence of Anemia among Pregnant Women Attending Antenatal Clinic of a Selected Hospital in Accra, Ghana. *Int J of Health sciences and research*. January 2018, vol.8 ; Issue : 1, p186-193
- Berhanu Elfu Feleke and Teferi Elfu Feleke. Pregnant mothers are more anemic than lactating mothers, a comparative cross-sectional study, Bahir Dar, Ethiopia. *BMC Hematology* (2018) 18 :2 :2-7
- Tunkyi K and Moodley J. Prevalence of anaemia in pregnancy in a regional health facility in South Africa. *SAMJ* January 2016, vol.106, No 1 : 101-104
- Agarwal K.N, Agarwal D.K, Sharma A, Sharma K, Prasad K, Kalita M.C et al. Prevalence of anaemia in pregnant and lactating women in India. *Indian J Med Res* 124, August 2006, pp 173-184
- Mahbooda Rasool, Abdul Rouf, Taha A, Salim K and Shaugfta aara. Prevalence of anemia among pregnant women in Block Hazratbal of Srinagar District. *Int J Medical Science and Clinical Inventions* 4(8):3157-3159,2017
- Renu Bedi, Rekha Acharya, Rashmi Gupta, Swati Pawar and Rakesh Sharma. Maternal factors of anemia in 3rd trimester of pregnancy and its association with fetal outcome. *International Multispecialty Journal of Health*, vol 1, 2015, issue-7, p9-16.
- Caroline Morin. Besoins nutritionnels et malaises courants de la grossesse. *Québec Pharmacie*, Vol 53, n°9 :56-64 ; Octobre 2006.
- Gerald Obai, Pancras Odongo and Ronald Wanyama. Prevalence of anaemia and associated risk factors among pregnant women attending antenatal care in Gulu and Hoima Regional Hospitals in Uganda : A cross sectional study. *BMC Pregnancy and Childbirth*(2016) 16 :76.p865-873

22. Befikadua Zekarias, Asrat Meleko, Abdu Hayder, Abraham Nigatu and Tilahum Yetagessu. Prevalence of Anemia and its Associated Factors among Pregnant Women Attending Antenatal care (ANC) In Mizan Tepi University Teaching Hospital, South West Ethiopia. *Health Science Journal* .2017 ; vol.11 No.5 :529-36
23. Shilpa A. Sapre, Nitin S. Raithatha, Rumi S. Bhattacharjee. Severe anemia in late pregnancy : a retrospective study at a tertiary care rural medical college in Gujarat, India. *Int J Reprod Contracept Obstet Gynecol*.2018 Mar ;7(3) :1112-1115
24. Shradha S. Maka, Sangamesh B. Tondare, Mahesh B. Tondare. Study of impact of anemia on pregnancy. *Int J Reprod Contracept Obstet Gynecol*.2017 Nov ; 6(11) :4847-4850
25. Meaza Lebso, Anchamo Anato, Eskindir Loha. Prevalence of anemia and associated factors among pregnant women in Southern Ethiopia : A community based cross-sectional study. *PLOS ONE. Journal .pone*.018.Dec 11,2017.p1-11
26. Ana Gomes da COSTA, Sara VARGAS, Nuno CLODE, Luis M. GRACIA. Prevalence and Risk Factors for Iron Deficiency Anemia and Iron Depletion During pregnancy : A Prospective Study. *Acta Med Port* 2016 sep ; 29(9) :514-518
27. Mohammed Yahya M. Akabat, Abdulqawi A A S, Amat O M, Abdulelah H AA, Abdullatif D A. Prevalence and Associated Factors of Anemia Among Pregnant Women Residing at High Altitude in Yemen. *American Journal of Health Research* 2017 ; 5(4) :93-98
28. Weslla Karla Albuquerque Silva de Paula, Elaine Aparecida da Silva Gomes, Islane Carla da Silva. Prevalence of anemia in pregnant women seen at basic health units Caruaru, Pernambuco, Brazil. *DEMETRA* ; 2016, 11(2) :415-426
29. Rehab Merza, Ruqaya Alekri, Shayma Alekri, Azhar Alsaleh, Faisal Alnasir. The Prevalence and Factors Associated with Iron Deficiency Anemia in Anemic Pregnant Women. *Bahrain Medical Bulletin*, vol.36, No 3, p122-31. *Septembre 2014*
30. Nagah Abdel A S, Mariam Al-Mass, Mohammed Al-Kuwari and Mansoura Salem Ismail. Assessment of Anemia, IDA and ID among Pregnants in Qatar : Cross Sectional Survey. *SM J Public Health Epidemiol*.2016 ; 2(3) :1035-43
31. Nazirah Jusoh, Tengku Alina Tengku Ismail, Aziah Daud. Anemia Among Teenage Pregnancy In Northwestern Malaysia : What Are The Factors ? *International Journal of Collaborative Research on Internal Medicine and Public Health*.vol.7.No12(2015),p196-205
32. Yaghoobi H, Zolfizadeh F, Asadollahi Z, Vazirinejad R, Rezaeian M. Prevalence of iron deficiency anemia and some related factors among pregnant women referred to health care centers in Bandar Lengeh, Iran, in 2015. *JOHE, Spring 2015 ;4(2) :92-100*
33. S. Bisoi, Haldar D, Majumdar T.K , Bhattacharya N ,Sarkar GN and Ray SK. Correlates of anemia among pregnant wmen in a Rural area of west Bengal .*The Journal of Family Welfare*,vol.57,No1,June-2011.p72-78
34. Abera Abay, Haile Woldie Yalew, Amare Tariku and Ejigu Gebeye. Determinants of prenatal anemia in Ethiopia. *Archives of Public Health(2017) 75 :51.p50-60*
35. Manisha Nair, David Churchill, Susan Robinson, Cathy Nelson-Piercy, Simon J. Stanworth and Marian Knight. Association between maternal haemoglobin and stillbirth : a cohort study among a multi-ethnic population in England. *British Journal of Haematology*, 2017, 179, 829-837
36. Mishu Mangla, Deepak Singla. Prevalence of anaemia among pregnant women in rural India : a longitudinal observational study. *Int J Reprod Contracept Obstet Gynecol*. 2016 Oct ; 5(10) :3500-3505
37. Hinderaker SG, Olsen BE, Lie RT, Bergsjø PB, Gasheka P, Bondevik GT *et al*. Anemia in pregnancy in rural Tanzania : associations with micronutrients status and infections. *European Journal of Clinical Nutrition(2002)56,192-199*
38. Getachew Mullu Kasa, Achenef Asmamaw Muche, Abadi Kidanemariam Berhe and Gedefaw Abeje Fekadu. Prevalence and determinants of anemia among pregnant women in Ethiopia ; a systematic review and meta-analysis .*BMC Hematology(2017)17 :17-24*
39. Gentilini M., Médecine tropicale, flammation-science, 1993 .p510-537
40. Brooker S, Hotez PJ, Bundy DAP. Hookworm-Related Anaemia among Pregnant women: A Systematic Review. *PLoS Negl Trop Dis*.2008 : 2(9) : e291

How to cite this article:

Likilo Osundja Jeremy *et al*.2018, Risk Factors Associated With Anemia Among Pregnant Women In Kisangani in D.R.Congo. *Int J Recent Sci Res*. 9(4), pp. 26015-26021. DOI: <http://dx.doi.org/10.24327/ijrsr.2018.0904.1975>
