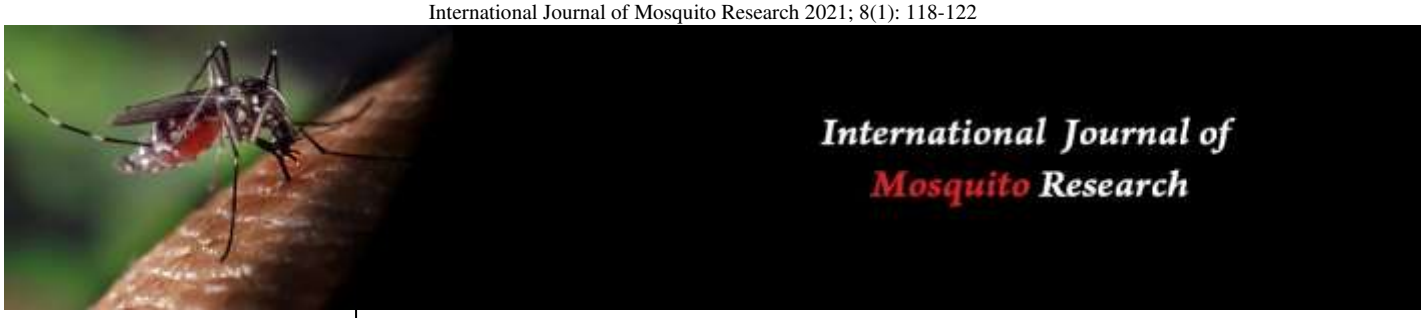

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Yanmeer Simeone Tyotswam
Faculty of Public Health and Applied Human Sciences, Kenyatta University, Nairobi, Kenya

Ekwebene Onyeka Chukwudalu
Faculty of Medicine Nnamdi Azikiwe University, Nnewi Campus, Nigeria

Corresponding Author:
Yanmeer Simeone Tyotswam
Faculty of Public Health and Applied Human Sciences, Kenyatta University, Nairobi, Kenya

Malaria in gravid women attending antenatal clinics in Atani, Ogbaru local government area, Anambra state Nigeria

Yanmeer Simeone Tyotswam and Ekwebene Onyeka Chukwudalu

Abstract
Aim: This study was done to determine the prevalence of malaria among gravid women attending antenatal clinics in Atani, Ogbaru Local Government Area, Anambra State.
Methodology: Venous blood sample were collected from 150 gravid women selected by random sampling techniques. Thick and thin film was prepared. Rapid diagnostic test was done among the study population.
Result: The prevalence of malaria in this study is 59.4%. Age group 28-31 was more (32.67%) while age group 16-19 was the least (3.33%). Age group 28-31 has the highest parasite density of + (25%) and while 16-19 has the least + (1%) while age group 24-27 has the highest parasite density of ++ (6%) and 16-19, 36-39 had the least of (0%) respectively.
Conclusion: The consequences of malaria in pregnancy are severe both on the mother and neonate; however, great efforts are highly needed to curb the occurrence of malaria infection.

Keywords: Malaria, prevalence, endemicity, gravid women

1. Introduction
Malaria is one of the parasitic diseases that are easily preventable, treatable and curable; it is one of the major public health conditions in the country according to FMOH in 2008. The malaria burden as reported in the country is on the spike irrespective of the numerous interventions that have been put in place. The hurdles to the achievement of these interventions are socio-cultural, political and economic in nature [1].
As an infectious disease, malaria is caused by a protozoan parasite of the genus plasmodium. This parasite is transmitted into human blood by the infected female anopheles mosquito. The four identified species of this parasite-causing insect are *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium ovale* and *Plasmodium malariae* [2]. In Nigeria 98percent of all cases of malaria is due to *Plasmodium falciparum*. This is the specie that is responsible for the severe form of this ailment that often becomes fatal. It is transmitted through a bite by an infected female anopheles mosquito. In its severe form, malaria could result to complications that include cerebral malaria, algid malaria or pulmonary oedema. However, of all human afflictions, the greatest toll has been exacted by malaria [3].
The scourge of this ailment malaria has kept humans in the tropics and subtropics, especially sub-Saharan Africa always on the defensive. Ranked as one of the ten deadliest diseases of our time by Micro Health, a data-driven organization run by a team of healthcare professionals, malaria has occupied the stage taken by HIV as most dangerous disease in sub-Saharan Africa [4].
The major impact of malaria infection during pregnancy is due to the presence of parasites in the placenta, which causes maternal anaemia and low birth weight [5, 6]. After the post-partum period, the long-term effects of malaria during pregnancy on the infant include poor development, behavioural problems, short stature and neurological deficits [6, 7].
Protection of pregnant women living in malaria endemic countries has been of particular interest to many malaria control programmes because of this group's higher susceptibility and reduced immunity. Nigeria, accounts for one-quarter of all malaria cases in the 45 endemic countries in Africa [8] and 11% of maternal deaths in the country are attributed to malaria [9, 10].

Positively, malaria control measures have received a more significant attention in the last decade as increased funding has resulted in the scaling up of malaria control programmes. Use of Long Lasting Insecticidal Nets (LLINs) is one of the key components of malaria prevention and control as recommended by the World Health Organization [11]. In a study carried out in north western Nigeria, use of ITNs was found to be associated with malaria infection; pregnant women who did not use ITNs frequently were more affected by malaria as compared to those who did [12]. A previous study conducted in Otukpo also indicated that the rate of malaria increases with a proportionate decrease in the use of Insecticide treated nets [13].

At the onset, malaria is still deeply enrooted in Africa and effective malaria control is under threat from the increased rate of parasite strains which are resistant to anti-malarial drugs and the increased rate of mosquitoes resistant to the pyrethroid insecticides used to produce bed nets [3].

Severe *falciparum* malaria is the commonest cause of anaemia and death in pregnant women and under fives, in areas endemic and hyper endemic for malaria. Low immunity results in rapid increase in the parasitemia resulting in complications. Delay in diagnosis and prompt treatment also contributes to the increased mortality [3].

Malaria is responsible for one out of ten deaths in pregnant women and has caused the Federal Government of Nigeria a lot of resources in treating malaria annually (Government inaction, 2005). At least, a greater percentage of the populace suffers from at least one episode of malaria each year. The disease is the commonest cause of outpatient attendance across all age groups [4].

Malaria is implicated in the reduction of workman capacity and productivity; moreover, it adversely affects the socio-economic development of the nation by FMOH, 2006. The disease therefore constitutes a great worry on the already deteriorated Nigerian economy; moreover the high rate of absenteeism among school children in Nigeria is attributed in part to malaria. Malaria causes a lot of complications to sufferers, and adversely affects the social and psychological well being of individuals, families and the nation at large. Pregnant women, children and immune-compromised individuals are particularly vulnerable to malaria [14].

Intermittent preventive therapy (IPT) using Sulphadoxine Pyrimethamine (SP) has showed great potentials in preventing malaria during pregnancy [15-17]. No vaccine is currently available for malaria therefore preventive drugs must be taken continuously especially during antenatal visits to reduce the risk of infection.

2. Materials and Method

The objective of this study is to determine the number of pregnant women infected with malaria parasite and its specific species.

2.1 Study Area

The study was conducted in Atani, Ogbaru LGA,Anambra South East Nigeria.Atani is a city on the eastern bank of the Niger River in Anambra state. It was a town populated by early fishermen and migrant settlers. Atani is the rice, fish, yam and cassava basin of Anambra state, producing most of the food sold in Anambra and delta markets. The population has grown to an estimated 230,000 [18].

The location of Atani is within the tropical rainforest gives it the ecological basis for production of a wide range of tropical agriculture crops with widespread potential for industrial convention [18].

2.2 Sample and Study Design

Participants for this cross sectional study were selected by random sampling from two Maternity centers in Atani during their ante-natal clinics. The sample included 150 pregnant women from the community with in ages of 15-45years of age.

2.3 Sampling Technique and Sample Size Calculation

Adequate sample size was calculated using malaria prevalence from previous studies by Oluwagbemiga *et al*, 2018 [19].

2.4 Ethical Approval

Approval to carry out the study was obtained from the Scientific and Ethical Review Boards of Nnamdi Azikiwe University Teaching Hospital (NAUTH) Nnewi, Anambra State, South East Nigeria with ethical number NAUTH/CS/66/VOL.13/VER111/98/2020/027. On the scheduled sample collection dates, the ethical approval letter given by the NAUTH Ethical committee was read to the pregnant women followed by an informed consent script for those who volunteered to participate. The recruitment script explained the purpose, significance, benefits and potentials risks of the study. The informed consent stated that participation in the study was anonymous and voluntary and non participation will not have any social or academic consequences.

2.5 Data Collection and Examination of Blood Samples

The consent of the patients was taken before commencing the study. A face-to face questionnaire relating to their pregnancy trimester, haematological status (Blood group and genotype), environmental and socio economic status was executed. It was designed to include the age, drugs taken as prophylaxis, method of mosquito control, location and type of occupations. Blood samples were collected from the pregnant women by venipuncture. A touniquette was tied around the upper arm to increase blood pressure in the veins. The upper arm area of the venipunture was thoroughly cleaned with cotton wool soaked in methylated spirit. Venous blood was collected and transferred into an Ethylene Diamine Tetra-acetic Acid (EDTA) sample tube and labelled accordingly, rapid diagnostic test was done on the spot with the collected sample, while the remaining blood sample was sent to Dozzy-link laboratory odekpe for thick and thin film smear.

2.5.1 Thick and Thin Film Slide Preparation for Detection of Malariaparasite

Thick film Method*:* The thick film was prepared according to Fleck *et al* (1988).Three drops of blood were placed on a slide and spread with a spreader to cover an area of about 12-15mm in diameter and allowed to air dry. The unfixed film is then stained for 15 minutes using Giemsa solution diluted with distilled water at P.H of 7.2. The slide was then gently washed with a few drops of distilled water dried and examined under x100 oil immersion objective lens to detect the presence of Plasmodium specie. The film was considered to be positive for malaria parasite if the presence of the ring form trophozoites or any other blood stage of erythrocyte

schizogony was detected. A film was considered negative if no parasites were seen after scanning at least 100 fields.

Thin film method: The thin film was prepared according to Fleck *et al* (1988).
Three drops of blood were placed on a slide and spreading with a spreader and finally, the spreader was pushed along the slide away from the largest drops at an angle of 45^0. The thin film was fixed in absolute methanol for 2 minutes and stained with Giemsa solution diluted with distilled water at p: H7.2 for 15 minutes. The slides were then washed in running water, dried and examined under microscope with x100 oil immersion objective lens to identify the species of Plasmodium. The identification of Plasmodium species undertaken was based on species-specific, including morphological features with respect to size and shape of infected red cells, chromatin dot, pattern of ring form, trophozoites, number of ring forms per red blood cells, shape and features of gametocytes in peripheral blood as outlined by Fleck *et al*, (1988).

2.6 Data Analysis
Data collected were analyzed using descriptive statistics. Variations between groups were obtained using chi-square.

3. Results

Table 1: shows the age, marital status and parity of the gravid women attending antenatal clinic in atani.

Variable	Frequency	Percentage (%)
Age		
16-19	5	3.33
20-23	16	10.67
24-27	46	30.67
28-31	49	32.67
32-35	23	15.33
36-39	11	7.33
Marital Status		
Single	26	17.30
Married	124	82.70
Index Pregnancy		
1	59	39.3
2	59	39.3
3	20	13.3
4	9	6.0
5	3	2.0

Table 1: shows the age, marital status and parity of the gravid women attending antenatal clinic in atani. In this table age group 28-31 was more (32.67%) while age group 16-19 was the least (3.33%), married were more than single women (88.7%) and women whose history of index pregnancy was one and two has the highest presentation (39%) respectively.

Table 2: shows the relationship between age group of gravid women with the parasite density

Age Group	No. Infected	+(%)	++(%)	CHI-Square	DF	P-Value
16-19	1	1	0	2.814	5	0.729
20-23	9	7	2			
24-27	28	22	6			
28-31	30	25	5			
32-35	13	10	3			
36-39	9	9	0			
Total	90	74	16			

Table 2, shows the relationship between age group of gravid women with the parasite density, showing that age group 28-31 has the highest parasite density of + (25%) and while 16-19 has the least +(1%) while age group 24-27 has the highest parasite density of ++ (6%) and 16-19, 36-39 had the least of (0%) respectively. The total malaria parasite prevalence is 59.4%.

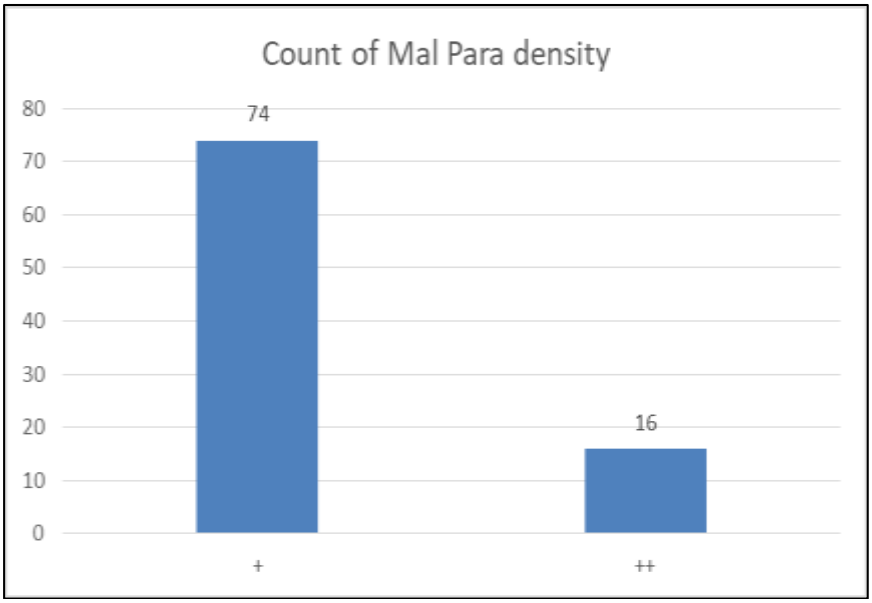

Fig 1: showing the graphical representation of parasite density having + more represented than ++.

Table 3: shows that the entire parasite viewed was of *plasmodium* *falciparium specie.*

Malaria Parasite Species	Frequency	Percentage
Plasmodium falciparium	90	60

Table 4: shows that 89 respondents tested positive with RDT (59.33%) while 61 tested negative (40.67%).

Rapid Diagnostic Test (RDT)	Frequency	Percentage
Negative	61	40.67
Positive	89	59.33

Table 5: shows that artemether was used more by the respondents as drug for prophylaxis (16.67%) while fansider was used less (0.7%).

Variable Prophylaxis Malaria Drug	Frequency	Percentage
Amatem forte	8	5.3
Andermal	10	6.7
Artelumex	12	8.0
Artemether	25	16.67
Artexaten	4	2.7
Camosunate	12	8.0
Chloroquine	3	2.0
Coartel forte	8	5.3
Coartem	11	7.3
Aquamal	1	.7
Fansidar	1	.7
Laridox	4	2.0
Lonart	11	7.3
Lookmal	8	5.3
Mylanta	3	2.00
Malarich	4	2.7
Maldox	6	4.0
P-alaxin	8	5.3
Quinine	4	2.7
Shel-atem	5	3.3

Table 6: shows that the respondents used mosquito nets more (52.67%) for the control of mosquito bite.

Method Of Malaria Control	Frequency	Percentage
Insecticide	64	42.67
Mosquito net	79	52.67
Insecticide and Mosquito net	3	2.00

4. Discussion

The study had a prevalence rate of 59.4% of malaria parasitaemia among the gravid women. This is in close relation with the work done in Enugu 58.4% 10. Similar studies in Africa is in conflict with this study prevalence with the following report having the prevalence of malaria parasitaemia among gravid women in Kenya 26.1%[20], 82.4% in Cameroun [21] and 21.5% in Burkina faso [22]. These variations in prevalence rate might be due to many factors which include seasonal variations, intensity of transmission, behaviour of the study population and climatic conditions.

Age group 28-31 (32.67%) was more in number followed by 24-27(30.67%), then with 16-19 (3.33%) been the least. Married respondents were more (82.7%) than single mothers (17.3%). Gravid 1 and 2 women had the highest representation with 39.3% respectively.

The result from this study observed that the prevalence of malaria was more in primigravida 61.4% than multigravida 38.6%. This is in tandem with the study by Nwagha *et al* [24]. This might be due to the greatest risk faced by primigravidae due to lack of specific immunity to plasmodiasis which is acquired from exposure to malaria parasite during pregnancy [23, 25]. At higher parities there seems to be a boosting immunity with concurrent gravidity provided there is exposure to malaria parasite.

Age group 28-31 has the highest parasite density of + (25%) and while 16-19 has the least + (1%) while age group 24-27 has the highest parasite density of ++ (6%) and 16-19, 36-39 had the least of (0%) respectively.

The chi-square statistics showed that there is no significant relationship between the age groups of respondents and parasite densities (x^2 =2.814, df=5, p=0.729), this is in contrast with the study by Adefioye *et al* and Killeen *et al* [26] [27]. Where there was significant difference between age group and parasite density.

This study showed that artemether was used more by the respondents as drug for prophylaxis (16.67%) while fansider was used less (0.7%). This showed that these women possibly are doing self medication or possibly visiting a patent medicine dealer who has little or no knowledge about treatment of malaria in pregnancy.

This study showed that the respondents used mosquito nets more (52.67%) for the control of mosquito bite, this percentage showed that nevertheless some don't even protect themselves at all.

5. Conclusions

The consequences of malaria in pregnancy are severe both on the mother and neonate; however, great efforts are highly needed to curb the occurrence of malaria infection. Training and re-training of health care workers especially at the primary health care level on the principles and practice of preventive measures, targeted counselling and health education on the risks associated with plasmodiasis in pregnancy. Gravid women should also be encouraged to keep their surroundings clean to prevent mosquitoes from breeding around their homes thereby targeting and curbing the vector.

Long lasting Insecticide treated nets (LLITNs) should be provided to the pregnant women free or at subsidized prices in other to encourage them to carryout seasoned preventive measures against malaria.

The populace should be trained targeting women of reproductive age on the need to have a good health seeking behaviour immediately they get pregnant in other to get the adequate medication due to them when they present with symptoms and not self or over the counter medication which most pregnant women did in this study. This self medication and drugs prescription from untrained personnel also contribute to drug resistance. The current regimen with sulphadoxine-pyrimethamine (SP), which has eventually replaced chloroquine (CQ), as the first line drug treatment is already beginning to show reasonable failure rate mostly because of abuse and non compliance drug regimen by gravid women and the populace at large, it therefore becomes necessary that efforts to identify the most effective drug or drug combination to use for chemoprophylaxis in pregnancy be intensified.

Competing Interest

Authors declared there is no competing interest.

6. References

1. Federal Ministry of Information. Ministry of Information, Anambra state, Nigerian Diary 2008, 12.
2. Fievet N, Cot M, Ringwald P, Bickii J, Dubois B, Le Hesran J. Immune response to *Plasmodiumfalciparum*

antigen in Cameroonian primigravidae: Evolution after delivery and during second pregnancy. Clin. Exp. Immunol., 1997;107(3):462-467.
3. Sherma IW. A brief history of malaria and discovery of the parasite's life cycle. In. I.W Sherman (ed.), *malaria:* Parasite Biology, Pathologenesis and Protection, ASM Press, Washington, D.C 1998, 90.
4. Gilles HM. Diagnostic methods in malaria. In *Bruce-Chwatt's Essential Malariology*, 3rd Edition (Gilles H.M, Warrell D.A. eds), Edward Arnold 1993, 78-95.
5. Rogerson SJ, Boeuf P. New approach to malaria in pregnancy. Parasitology 2007;134:1883-1893.
6. Hartman TK, Rogerson SJ, Fischer PR. The impact of maternal malaria on newborns. Ann Trop Paediatr 2010;30(4):271-281.
7. Desai M, terKuile FO, Nosten F, McGready R, Asamoa K, Brabin B. Epidemiology and burden of malaria in pregnancy. Lancet Infectious Diseases 2007;7(2):93-104.
8. World Health Organization: World Malaria Report. Switzerland: World Health Organization 2012, 50-80.
9. Chimere O Agomo, Wellington A Oyibo, Funke Odukoya-Maije. Parasitologic Assessment of Two-Dose and Monthly Intermittent Preventive Treatment of malaria during Pregnancy with Sulphadoxine Pyrimethamine (IPTP-SP) in Lagos, Nigeria. Malaria Research and Treatment 2011, 6. Article ID 932895.
10. Rupashree S, Jamila M, Sanjay S, Ukatu V. Knowledge, attitude and practices on malaria among the rural communities in Aliero, Northern Nigeria. Journal Family Medicine Primary Care 2014;3(1):39-44.
11. World Health Organization World Malaria Report. Geneva, Switzerland: World Health Organization; 2005.
12. Sani AF, Mohammed DA, Sule AA, Asiya UI, Shehu UN. Prevalence and Risk Factors Associated With Malaria Infection among Pregnant Women in A Semi-Urban Community of North-Western Nigeria. Infectious Diseases of Poverty 2015;4:24.
13. Jombo GTA, Mbaawuaga EM, Ayegba AS, Araoye MA. Malaria Burden and Its Control Methods among Pregnant Women in A Semi-Urban Community Of Northern Nigeria. Journal of Public Healthand Epidemiology 2011;3(7):317-323.
14. WHO. WHO Fact sheet 2007, 94, retrieved in 14 December 2019.
15. WHO. Strategic Framework for Malaria Prevention and Control in African Region. WHO Document. AFR/MAL/04/01:1-3. 2004.
16. Valley A, Valley L, Changalucha J, Greenwood B, Chandramohan D. Intermittent preventive treatment for malaria in pregnancy in Africa: Malaria Journal 2007;6:16.
17. Mbanefo EC, Ogolo BA, Obi PC, Otiji MO, Eneanya CI. Effect of Intermittent Preventive Treatment (IPT) of malaria during pregnancy using Sulfadoxine and Pyrimethamine (SP) on neonatal birth weight in Anambra State, South East Nigeria. J. of Scientific and Industrial Studies 2009;7:2.
18. Onwutalobi, Anthony-Claret. Nnewi Industrial overview -Nnewi City Portal. www.nnewi.info. Retrieved 2020-10-26.
19. Oluwagbemiga A, Bamidele A, Babatunde A, Chimere A, Medinat S, Olalekan R. Prevalence of Malaria in Pregnant Women Attending Antenatal Clinic in Primary Health Centres in Lagos, South West, Nigeria. J Advances Med Medical Res 2018;25(12): 1-9
20. TerKuile FO, Terlouw DJ, Phillips Howard PA, Hawley WA, Friedman JF *et al*. Reduction of malaria during pregnancy by permethrin-treated bednets in an area of perennial malaria transmission in Western Kenya. Am J Trop Med Hyg 2003;68(4):50- 60.
21. Walker Abbey, Djokam R, Eno A, Leke RF, Titanji VP, *et al*. Malaria in pregnant Cameroonian women: effect of age and gravidity on submicroscopic and mixed species infections and multiple parasite genotypes. Am J Trop Med Hyg 2005;72(3):229-235.
22. Sheick O, Oumar Coulibaly, Sabine Gies, Umberto D'Alessandro. Malaria burden among pregnant women living in the rural district of Boromo, Burkina faso. Am J Trop Med Hyg, 2007;77(6):56-60.
23. Agomo CO, Wellington AO, Rose IA, Phillip UA, Prevalence of malaria in pregnant women in Lagos, South-West Nigeria. Korean J Parasitol 2009;47(2):179-183.
24. Nwagha U, Ugwu VO, Nwagha TU, Anyachie BU. Asymptomatic plasmodium parasitaemia in pregnant Nigerian women: Trans R Soc Trop Med Hyg 2009;103(1):16-20.
25. Elliott S, Brennan A, Beeson J, Tadesse E, Molyneux M, *et al*. Placental malaria induces variant-specific antibodies of the cytophilic subtypes IgG1 and IgG3 that correlates with adhesion inhibitory activity. Infect. Immun 2005;73(9):5903-5907.
26. Adefioye OA, Adeyeba OA, Hassan WO, Oyeniran OA. Prevalence of malaria parasite infection among pregnant women in Osogbo, Southwest, Nigeria. American Eurasian Journal of Scientific Research 2007;2(1):43-45.
27. Killeen GF, Smith TA. Exploring the contributions of bed nets, insecticides and excite repellency to malaria control: a deterministic model of mosquito host-seeking behaviour and mortality. Trans R Soc Trop Med Hyg 2007;101(9):867-880.