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Prevalence and Associated Factors of Intestinal Parasites among Pregnant Women at Odoakpu, Anambra State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Author CAI designed the study, collected samples and carried out the laboratory analyses of the study. Author JCO performed the statistical analysis, wrote and proof-read the manuscript. Authors IN, OPO and CUU managed the literature searches and wrote the protocols. All authors thoroughly proof read and approved the final manuscript.

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ABSTRACT

Aim: This present study was undertaken to determine the prevalence of intestinal parasites among pregnant women at Odoakpu, Onitsha North Local Government Area of Anambra state, Nigeria.
Methodology: A total of 200 pregnant women were examined between October and December, 2021. Pregnant women between the age groups of 20 -35 years were observed in this study with their consent being obtained. Stool samples were examined for intestinal parasites using routine parasitological methods. Data obtained was analyzed using SPSS version 20 statistical software package. The resulting outputs were presented in tables and level of significance set at $P < 0.05$.
Result: Out of 200 pregnant women examined, a total of 57 were positive and found to be infected with various intestinal parasites giving an overall prevalence of 28.5%. The intestinal parasites identified are *Ascaris lumbricoides, Trichuris trichuria, Strongyloides stercoralis, Enterobius vernicularis,* Hookworm (*Necator americanus and Ancylostoma duodenale*), *Giardia lambia and*

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Entamoeba histolytica. The prevalence with respect to age groups considered showed that the highest prevalence was seen among aged group 30 -35 years (42.31%) and the least prevalence was among the age group 25 - 30 years with 20%. The prevalence of intestinal parasites with respect to the type of toilet facility used, showed that those that used open defecation had the highest prevalence (67.65%) and the least prevalence (18.18%) was observed among pregnant women using water closet. Similarly the prevalence of intestinal parasite with respect to source of drinking water, indicated that the highest prevalence was seen among pregnant women using river water (57.14%) and the least was observed among those using public water supply (22.5%). Furthermore, the prevalence of intestinal parasites with respect to trimester indicated that the highest prevalence was seen in second trimester (39.02%) and the least prevalence seen among third trimester (21.43%). Finally, the prevalence of intestinal parasites with respect to gravidity indicated that the highest prevalence was seen in primigravida (38.71%) and the least in secungravida (18.57%).

Conclusion: Intestinal parasites are quite prevalent among pregnant women at Odoakpu therefore policies targeted at improving parasitic infection consciousness among pregnant women during antenatal care are essential. This should include health education and proper hygienic practices to reduce the prevalence of intestinal parasites among pregnant women.

Keywords: Prevalence; intestinal parasites; age; gravidity; trimester; toilet facility; water source.

1. INTRODUCTION

Human intestinal parasite infection are regularly seen all over people in emerging nations [1]. These infections are largely owing to inadequate water supply, poor sanitation, poverty and illiteracy. It is estimated that approximately one billion persons are infected yearly with human intestinal helminthes worldwide [2,3]. It was noted that populated areas with strong physical and intellectual evolution displays a more inclined disposition to getting these infections and such group comprise school children, women of child-bearing age, adolescent girls and pregnant women [4]. Pregnancy drains the body physically, physiologically and immunologically, this is worsened when parasitic infection is added to it [5]. Helminths of significance to man comprise; *Enterobius vermicularis*, *Ascaris lumbricoides*, *Trichuris trichiuria*, *Necator americanus*, *Ancylostoma duodenale* and *Strongyloides stercoralis*. Protozoan intestinal parasites comprise *Entamoeba histolytica* and *Giardia duodenalis* while *Cryptosporidium sp* and *Isopora sp* become vital in causing protracted diarrhoea in immuno-compromised patients [6]. Environmental influences play significant part in the incidence of intestinal parasite infection as hot and humid tropical climate favour amplified parasite prevalence [7]. Intestinal parasite infection can cause nausea, vomiting, diarrhoea, mal-absorption, malaise, fatigue, depression, weight loss, fever and gastrointestinal obstruction. Parasite specific presentations are seen in *Ancylostoma duodenale infection* and can suck approximately 0.25ml of blood every day which causes microcytic hypochromic anaemia [8]. Giardiasis can cause severe mal-absorption syndrome and *Entamoeba histolytica* infection if not treated can cause intestinal and extra intestinal manifestations [9]. Large helminthic parasites can precipitate intestinal obstruction and other related complications [4]. Many cases of inexplicable pregnancy losses are owing to undiagnosed tropical infections in pregnancy.

Mal-nutrition or anemia triggered by intestinal worms could be worsened by pregnancy and make the pregnancy unsuccessful [10]. In Nigeria, studies have been done on prevalence of intestinal parasites in general population but there is paucity of studies on prevalence of intestinal parasites in pregnant women. The present study was carried out to determine the prevalence of intestinal parasites in pregnant women and its relationship with various factors such as age, gravity, trimester, toilet facility used and source of water at Odoakpu, Onitsha North Local Government Area of Anambra.

2. MATERIALS AND METHODS

2.1 Study Area

A hospital based cross-sectional study using convenient sampling was carried out on pregnant women attending City Hospital and Maternity, Odoakpu, Onitsha Anambra State. City Hospital and maternity is a private hospital which was established in the year 1999 and located at Odoakpu, Onitsha North Local Government Area of Anambra. The hospital specializes in different

care giving such as Gynecology, ultrasound care, medical laboratory test etc.

2.2 Study Design and Population

The study was a cross-sectional, hospital based study to investigate the prevalence of intestinal parasite among pregnant women attending City Hospital and Maternity in Odoakpu Anambra State. The study employed tools such as public awareness on the importance of the study, administration of questionnaire and parasitological examination of the parasite. Two hundred (200) pregnant women were used for this study.

2.3 Administration of Questionnaire

A structured questionnaire was administered to the pregnant women throughout the study. The questionnaire sought information on age, toilet facility used, gravidity, trimester, source of drinking water etc.

2.4 Sample Collection

The hospital used was purposefully selected for the study based on the availability of active antenatal clinic. Pregnant women within the ages of 20-35 were selected for this study and 200 stool samples were collected. Pregnant woman who have been on anti-helminthic therapy were exempted from the study. Clean screw plastic stool containers with wide neck were given to each of the study participants. The stool samples were identified by pre-labelling them with identification numbers. The study participant was requested to provide about 2g of stool specimen for examination.

2.5 Parasitological Techniques

All stool specimen were examined to detect the presence of adult worms or segment, the consistency, colour, presence of mucus and blood was also noted [14]. Microscopic examination technique was employed in the microscopic examination of the samples with optical microscopic technique. The stool sample was examined using direct wet mount method. About half of the 2g stool sample was processed by emulsifying the stool with normal saline. A drop of the emulsified stool sample was then placed on a labelled grease free slide and covered with a coverslip. The preparation was first examined under x10 objective lens and then x40 for identification of the parasites under low light intensity.

2.6 Data Analysis

Data obtained was analyzed using SPSS version 20 statistical software package. Chi-square test tool was employed and cross tabulations where applicable was used to compare the differences in prevalence with regards to age groups, toilet facilities used, source of drinking water used, gravidity and trimester. The resulting outputs were presented in table and level of significance set at $P < 0.05$.

3. RESULTS

A total number of 200 pregnant women were examined, 57 were positive for some intestinal parasites, giving an overall prevalence of 28.6%. The intestinal parasites seen were; *Ascaris lumbricoides, Trichuris trichuria, Strongyloides stercoralis, Enterobius vernicularis, Hookworm (Necator americanus and Ancylostoma duodenale)*, *Giardia lambia and Entamoeba histolytica.* The highest prevalence were seen among the age group 30 -35 years (42.31%) while the least infected age group is 25-30 years (20%). Pregnant women infected with *Ascaris lumbricoides* were 14(7%), *Trichuris trichuria* 8(4%), *Strongyloides stercoralis* 3(1.5%), *Enterobius vernicularis* 4(2%), Hookworm 13(6.5%), *Giardia lambia* 5(2.5%) and *Entamoeba histolytica* 10(5%). Those whose source of drinking water was river had the highest prevalence of intestinal parasites (57.14%) while those whose source of drinking water was public water supply had least prevalence (22.5%). The pregnant women who made use of open defecation had the highest prevalence (67.65%) while those that used water closet system had least prevalence (18.8%). Similarly, pregnant women in their third trimester had the least prevalence (21.43%) while those in their first trimester had 30.67% whereas pregnant women in the second trimester had the highest prevalence (39.02%).

Table 1. Overall prevalence of intestinal parasites among pregnant women

Parasite	Negative	%	Positive	%
Ascaris lumbricoides	186	93	14	7
Trichuris trichuria	192	96	8	4
Strongyloides Stercoralis	197	98.5	3	1.5
Hookworm	187	93.5	13	6.5
Enterobius Vernicularis	196	98	4	2
Giardia lambia	195	97.5	5	2.5
Entamoeba Histolytica	190	95	10	5
Total			57	28.6

Table 2. Prevalence of intestinal parasite in relation to age groups

Age	Number examined	*Ascaris Lumbricoides*	*Trichuris Trichuria*	Hookworm	*Enterobius Vernicularis*	*Strongyloides Stercoralis*	*Entamoeba Histolytica*	*Giardia Lambia*	Total
20-25	88	7(7.95)	2(2.27)	-	1(1.14)	1(1.14)	7(7.95)	5(5.68)	23(26.14)
25-30	60	4(6.67)	2(3.33)	3(5)	-	-	2(3.33)	1(1.67)	12(20)
30-35	52	2(3.84)	3(5.77)	6(11.54)	2(3.85)	2(3.85)	1(1.92)	6(11.54)	22(42.31)
Total	200	13(6.5)	7(3.5)	9(4.5)	3(1.5)	3(1.5)	10(5)	12(6)	57(28.5)

Figures under each parasite seen represents number positive (prevalence) for each age group

Table 3. Prevalence of intestinal parasite in relation to toilet facilities used

Toilet	Number Examined	*Ascaris lumbricoides*	*Trichuris trichuria*	Hookworm	*Enterobius vernicularis*	*Strongyloides stercoralis*	*Entamoeba histolytica*	*Giardia Lambia*	Total
w/c	88	4(4.55)	-	2(2.27)	2(2.27)	3(3.41)	3(3.41)	2(2.27)	16(18.18)
Pit	78	6(7.69)	6(7.69)	1(1.28	1(1.28)	-	3(385)	2(2.56)	18(23.08)
Open Defecation	24	3(8.82)	3(8.82)	6(17.65)	-	2(5.88)	6(17.65)	2(5.88)	23(67.65)
Total	200	13(6.5)	9(4.5)	9(4.5)	3(1.5)	5(2.5)	12(12)	6(3)	57(28.5)

Figures under each parasite seen represents number positive (prevalence) for each toilet facility

Table 4. Prevalence of intestinal parasite with respect to the source of drinking water

Source of Drinking water	Number examined	*Ascaris lumbricoides*	*Trichuris trichuira*	Hookworm	*Enterobius vernicularis*	*Strongyloides stercoralis*	*Entamoeba histolytica*	*Giardia Lambia*	Total
Borehole	76	2(2.63)	1(1.32)	5(6.48)	2(2.63)	1(1.32)	7(9.21)	-	18(23.68)
Well	52	2(3.57)	3(5.36)	3(5.36)	1(1.79)	-	2(3.57)	3(5.36)	14(25)
River	28	6(21.43)	2(7.14)	1(3.57)	1(3.57)	1(3.57)	5(17.86)	-	16(57.14)
Public Water	40	2(5)	-	-	2(5)	-	3(7.5)	2(5)	9(22.5)
Total	200	12(6)	6(3)	9(4.5)	6(3)	2(1)	17(8.5)	5(2.5)	57(28.5)

Figures under each parasite seen represents number positive (prevalence) for each age group

Table 5. Prevalence of intestinal parasite with respect to trimester

Trimester	Number Examined	*Ascaris lumbricoides*	*Trichuris Trichuria*	Hookworm	*Enterobius vernicularis*	*Strongyloides Stercoralis*	*Entamoeba Histolytica*	*Giardia lambia*	Total
First	75	6(8)	2(2.67)	5(6.67)	1(1.33)	3(4)	4(5.33)	2(2.67)	23(30.67)
Second	41	3(7.32)	4(9.76)	-	4(9.76)	1(2.44)	3(7.32)	1(2.44)	16(39.02)
Third	84	5(5.95)	2(2.38)	3(3.57)	7(8.33)	-	-	1(1.19)	18(21.43)
Total	200	14(7)	8(4)	8(4)	12(6)	4(2)	7(3.5)	4(2)	57(28.5)

Figures under each parasite seen represents number positive (prevalence) for each age group

Table 6. Prevalence of intestinal parasite with respect to gravidity

Gravity	Number Examined	*Ascaris lumbricoides*	*Trichuris Trichuria*	Hookworm	*Enterobius vernicularis*	*Strongyloides stercoralis*	*Entamoeba histolytica*	*Giardia lambia*	Total
Primigravidae	62	2(3.23)	3(4.84)	1(1.61)	4(6.45)	5(8.07)	4(6.45)	5(8.07)	24(38.71)
Secungravidae	70	2(2.86)	1(1.430	3(4.29)	2(2.86)	2(2.86)	1(1.43)	2(2.86)	13(18.57)
Multigravida	68	3(4.41)	2(2.94)	5(7..35)	2(2.94)	3(4.41)	2(2.94)	3(4.41)	20(29.41)
Total	200	7(3.5)	6(3)	9(4.5)	8(4)	10(5)	7(3.5)	10(5)	57(28.5))

Figures under each parasite seen represents number positive (prevalence) for each age group

Table 2 shows the prevalence of intestinal parasite in relation to the age groups of the pregnant women. Age group 30 -35 years showed the highest prevalence (42.31%) while the lowest prevalence was observed among age group 25-30 years (20%).

Table 3 above showed the prevalence of intestinal parasite with respect to the type of toilet facility used by the pregnant women. Pregnant women who used open defecation had the highest prevalence (67.65%) whereas those that used water closet had the least prevalence (18.18%).

Table 4 shows the prevalence of intestinal parasite with respect to source of drinking water of pregnant women. Pregnant women whose source of drinking water was river had the highest prevalence (57.14%), followed by those whose source of drinking water was well (25%), borehole (23.68%) and public water supply (22.5%).

Table 5 shows the prevalence of intestinal parasite with respect to trimester. Pregnant women who were in their second trimester had the highest prevalence (39.02%) whereas those who are in their third trimester had the least prevalence (21.43%).

Table 6 shows the prevalence of intestinal parasite in relation to gravidity. Pregnant women who were in primigravida had the highest prevalence (38.71%) whereas those in secungravida had the least prevalence (18.57).

4. DISCUSSION

The overall prevalence of intestinal parasite as observed in this work is 28.5%. The intestinal parasites identified were *Ascaris lumbricoides, Trichuris trichuria, Strongyloides stercoralis, Enterobius vernicularis,* Hookworm, *Entamoeba histolytica* and *Giardia lambia*. This is in agreement with earlier report in various parts of Nigeria [15]. However, higher prevalence of 43.4% was previously reported by [16] in Nigeria among 350 pregnant women. This higher prevalence maybe as a result of differences in environmental condition of the sftudy areas.

Among the selected intestinal helminths detected in this study, *Ascaris lumbricoides* was the most predominant (7%) followed by Hookworm (6.5%), *Trichuris trichuria* (4%), *Enterobius vernicularis* (2%), and *Strongyloides stercoralis* (1.5%) while the most predominant protozoan intestinal parasite was *Entamoeba histolytica* (5%) and *Giardia lambia* (2.5%). The greatest concern from the selected intestinal parasite were loss of blood, mal-nutrition and vulnerability to other infection [15]. This may result in both decreased appetite, lowered aerobic and physical capacity in pregnant women which affects their daily activities. The high prevalence among pregnant women in this study could be due to faecal pollution of soil and domestic water supply around homes in the study area [15,11,12]. In a related study an author reported a lower prevalence (18.6%) of intestinal helminthic infection among pregnant women in Ebonyi State [11]. Our present study agreed with the overall prevalence reported by [17] where an overall prevalence of 23.6% with intestinal parasitic infection was reported in south-East Nigeria. In relation to age groups, 30 - 35 years had the highest prevalence followed by 20 -25 years and then 25 -30 years. This is not in agreement with [17]; who found highest prevalence in age group 15 - 20yrs. In this study, pregnant women in 2nd trimester had the highest prevalence followed by 1st trimester and then 3rd trimester. This is in agreement with [12] who reported higher prevalence among pregnant women in 2nd trimester for malaria parasites. Also in this study in relation to gravidity, primigravidae had the highest prevalence and this is not in agreement with work done by [11] who reported no significant association between gravity and parasite prevalence and [12] who reported higher prevalence for malaria parasite in multigravidae.

Finally, in this study pregnant women whose source of drinking water was river had higher prevalence followed by borehole, well and public water supply, which could be attributed to untreated water system. Pregnant women whose toilet facility was open defecation had the highest prevalence followed by pit and then water closet, this could be due to the varying predisposing influence of the different toilet facilities to parasite infection.

5. CONCLUSION

This study showed that intestinal parasites are still prevalent among pregnant women at Odoakpu, Onitsha, Anambra State, Nigeria. Proper screening of stool specimens for intestinal parasites should be considered as part of the routine antenatal care with strong emphasis on deworming pregnant women. Public enlightenment should be intensified with

emphasis on regular hand washing habits, boiling of drinking water as well as proper sewage disposal.

CONSENT

Voluntary informed-consent was gotten after each pregnant woman was given information concerning the aim of the study and guarantee of confidentiality. The subjects for this study are pregnant women attending antenatal at City hospital, Odoakpu, Onitsha, Anambra State.

ETHICAL APPROVAL

The study protocol was approved by the Department of Parasitology and Entomology, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria. The aim of the research was well elucidated to the pregnant women after which their consent was obtained before samples were taken. Ethical clearance was obtained from the ethical committee of City Hospital and Maternity in Odoakpu Anambra State. The clearance was on the agreement that patient anonymity must be maintained, good laboratory practices will be adhered to, information must be treated with utmost confidentiality and for the purpose of research only [11,12]. The research study was conducted with strict adherence to the ethical standards and procedures for research with human participants [13].

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Elom MO, Alo MN, Ugah UI, Ibiam GA. Intestinal helminths associated with geography in pregnancy in Afikpor North Ebonyi State. World Journal of Medicine and Medical Science. 2013;1(5): 92–97.
2. Brooker S. Estimate the global distribution and disease burden of intestinal nematode infections: Adding up the member- A review. International Journal of Parasitology. 2010;40:1137 – 1144.
3. Ajayi MB, Gbadeyan MS, Avwioro GO, Idowu ET, Adedire AO. A study of intestinal helminthes in patients in Lagos University Teaching Hospital, Nigeria. International Journal Advances in Bioscience. 2013;1:24–27.
4. World Health Organization. Preventive chemotherapy in human helminthiasis: coordinated use of anthelminthic drugs in control interventions. A Manual for Health Professionals and Programme Managers; 2006
5. Tsoka-Gwegweni JM, Ntombela NP. A Double Load to Carry: Parasites and Pregnancy. South African Journal Infectious Disease; 2014; 29: 52 – 5.
6. Norhayati M, Fatmah MS, Yusof S, Edariah, AB. Intestinal parasitic infections in man; a review. Med. J. Malaysia. 2003;58(2):296–305.
7. Pillai DR, Kain, KC. Common intestinal parasites. Curr Treat Opt Infect Dis. 2003;5:207 – 217.
8. Rzepecka J, Siebeke I, Coltherd JC, Kean DE, Steiger CN. The helminthic product, ES-62, protects against airway inflammation by resetting the Th cell phenotype. International Journal for Parasitology. 2013;43(3 -4):211 – 223.
9. Nematian J, Nematian E, Gholamrezanezhad A, Asgari AA. Prevalence of intestinal parasitic infections and their relation with socio-economic factors and hygienic habits in Tehran primary school students. Acta Trop. 2004;92(3):179–186.
10. Narasimha RY, Prasada RM, Supriya A. Preliminary phytochemical analysis and anthelmintic activity of ethanolic extract of *Portulaca quadrifida* whole plant. *International journal of current research in life sci.,* 2018; 7(6): 2173 – 2175.
11. Imakwu CA, Ozougwu JC, Eyo JE, Okeke OP, Amana GU, Eziuzor SC, Ekeleme JE, Aniekwe MI. Prevalence and Intensity of Helminths among Pregnant Women Attending Antenatal in Ebonyi state Nigeria. *Asian Journal of Pregnancy and Childbirth*; 2020; 3(3):18-30
12. Ozougwu JC, Imakwu CA, Ekeleme JE, Okeke OP, Amana GU, Eziuzor SC, Ogbodo JC. Prevalence of falciparum malaria in relation to age, gravidity, trimester, blood group and genotype among pregnant women. *Asian Journal of Pregnancy and Childbirth*, 2020; 3(4): 1 – 7.
13. World Health Organization: World Malaria Report (2018). World Health Organization, Geneva; 2018.
14. Cheesbrough M. District laboratory practice in tropical countries part 1. Cambridge University, New York; 2005.

15. Mordi RM, Ngwodo POA. A study of blood and gastro-intestinal parasites in Edo State. African Journal of Biotechnology. 2007;6(19):2201–2207.
16. Alli JA, Okonko IO, Kolade AF, Nwanze JC, Dada KK, Ogundele M. Prevalence of intestinal nematode infection among pregnant women attending antenatal clinic at the University College Hospital, Ibadan, Nigeria. Advances in Applied Sciences Research. 2011;2(4): 1–13.
17. Ozumba UC, Ozumba NA, Anya A. Helminthiasis in pregnancy in Enugu, Nigeria. Journal of Health Science. 2005;51(3):291–293.

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