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# Parasitic Disease Burden of Pregnant Women

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**ABSTRACT:** A preliminary survey of intestinal and haemoparasitic infection was studied in pregnant women attending the University of Calabar Teaching Hospital (UCTH) Maternity annex. The parasites were identified in the pregnant women through various parasitological techniques including wet preparation, fomiol-ether concentration technique, thin and thick blood films stained with. Giemsa stain, Knott's concentration technique Of the 300 pregnant women examined for the presence of intestinal and haemo-parasites in Calabar, 94 (31.3%) had single infection of one of the parassites identified in the course of in the estimation, 146 (48.7%) of the pregnant women had mixed infection (infection from more than one parasite), while 60(20.0%) had no infection. The results revealed the following parasite prevalences: Plasmodium falciparum (52.0%), R histolytica (35.0%), R coli (22.7%), A lumbricoides (19.3%), hookworm (17.0%) CL lamblia (0.3%). Infection is more prevalent in pregnant women within the age limit of 18-22years (33.4%). However, no microfllaria or trypanosomes were seen.

**KEY WORDS:** haemoparasitic infection, prevalence, pregnant women

## INTRODUCTION

Despite stunning development in the fields of medicine and sciences, mankind is unable to straighten-out many of its age-old problems. This has been true of efforts to subdue parasitic diseases [1].

During the million of years that animals and plants have competed among themselves for food-and space, parasites have invaded practically every kind of living body. These bodies, called host, generally provide food and shelter, and because hosts furnish different kinds of space in the form of external surface, organs,tissues and fluids, they usually acquire more than one kind of parasite
[2]. Today, most animals including man, have on or within their bodies several species of parasites, sometimes totaling hundreds or even thousands of individuals. There are therefore, more kinds and numbers of animal parasites than free living animals [3].Parasitic diseases remain among the major causes of human misery and death in the world today, and as such, are obstacles to the development of the economically less favoured nations [4]. The prevalence of parasitic infection of man among different groups of people is regarded as a health or clinical problem in both tropical and subtropical countries of the world [5]. This is so because, despite remarkable improvement in medical service in the present century, these parasitic diseases still remain the potent cause of morbidity and mortality in the developing countries of the world.

Iron deficiency has been shown to be the commonest cause of anaemia in the whole world. Anaemia, whatever the cause, is associated with significant morbidity and mortality particularly in developing countries where the deficiency is aggravated by blood loss due to parasitic disease [5].

Malaria, one of the parasitic diseases, has been shown to constitute major impediment in the improvement of the quality of life in our part of the world. It has also been responsible for major causes of depressed immunity leading to poor antibody responses and increased susceptibility to other infections [6]

Many decades ago, malaria which is the most important parasitic disease of was responsible in rendering the whole of the southern coast of West Africa impregnable to early colonialist so much that the zone became designated as the "White man's grave". Today, malaria is still widespread in Africa and its entire population is exposed to the parasitic infections with no seasonal variations [7]

Typically, nematodes parasites -of humans infect enormous numbers of hosts. More than one billion persons are hosts for Ascaris Lumbricoides, the giant round worms of humans;' 600-800 million have hookworm (Ancyclostoma duoderiale or Necator americanus) [8]

A number of parasites whose predilection site are in the small intestine are implicated directly or indirectly with anaemia, the most important of these are the hookworm infections in man. Infection patterns vary widely. Human intestinal nematodes infect via food-borne, water-borne and soil-borne routes [9]. On the otherhaiid, apart from transplacental transmission of malaria, natural infection is through the blood sucking bite of an infected Anopheles mosquito of various species [10].

According to the World Health Organization (WHO), an estimated 200 to 400 million individuals world-wide contract malaria each year, making it the most common severe parasitic disease. In Africa alone, it is annually responsible for the death of one million children under five years of age [11]

Intestinal helminth especially hookworm causes anaemia. Besides hookworm, identified Ascaris Lumbricoides, Enterobius vermicularis, Trichuris trichuria and strongyloides stercoralis. In conclusion, he stated that helminthiasis is very common in rural areas because of poor sanitory and environmental conditions as well as over crowding of the inhabitants. He said that due to immune depression of the pregnant women and lactating mothers, worms are not readily lost and as such incidence and intensity of infection should be high [12].

Maternal infection during pregnancy, in man and animals may affect fetal development in a number of ways or have no effect [13] These include abortion, fetal death, congenital anomalies, mental retardation, perinatal diseases [14]. Placental malaria is one of the most common protozoal infections associated with low birth weight. The investigation of parasitic infections forms the major part of district laboratory practice. The lesson for developing nations such as Nigeria is wherever parasitic infection posses serious health and socio economic problems and remains the main cause of death, development of medical services must go hand in hand with economic development and public health programme [15].

Depending on the parasitic diseases found locally and their importance among pregnant women, this study is mainly concentrated only to parasitic infections that pose as a burden to pregnant women.

## MATERIALS AND METHODS

STUDYAREA

This study was conducted amongst pregnant women who attended ante-natal clinic at the University of Calabar Teaching ttospfcaa. >tatermx^ Aaaex, Calabar. The climate of the areas is characteristic of the Nigerian rain forest belt-high temperature (25-30°C), with annual rainfall of 127-199cm and high relative humidity (77-84%)

BLOOD SAMPLE COLLECTION

Blood samples were collected through vene puncture after taking aseptic measures, from the most prominent veins, and poured into Ethylene diamine tetra acetic acid (EDTA) bottle.

PROCESSING OF SAMPLE

Thick and thin blood films were made on clean grease free and scratch free slides . They were allowed to air-day. The thin films were fixed in alcohol (etnyl alcohol) for 1-2 minutes.Then followed by staining in 2% Giemsa working stain (prepared from the stock-see appendix) for 30-45 minutes. The stain was rinsed with buffer of pH 7.2,

The slides were allowed to dry and then examined with the x 100-oil immersion objective lens for malaria parasites.

WET BLOOD FILM

Wet blood films were made and examined systematically under the microscope (X 10 and X 40 objective lenses with reduced condenser aperture) for trypanosomes or microfilariae indicated by its rapid movement among red cells.

KNOTTS CONCENTRATION METHOD FOR THE

DEMONSTRATION OF MICROFILARIAE

1 ml of the venous blood was added to 9ml of 2% formalin; and allowed to stay for 5 minutes for the red cell to haemolyse, and centrifuged at high speed.

The supernatant fluid was poured off, and the tube tapped to mix the deposit. A drop of the deposit was placed on a slide and sprayed to form a thin film, allowed to dry and stained immediately with Giemsa stain for 30 minutes.

The slides were allowed to dry, and examined under the microscope for microfilaiae.

STOOL SAMPLE COLLECTION

The pregnant women were given specimen containers, and asked to pass their faeces into the containers, and should not be contaminated with urine which is lethal to the parasitic trophozoites.

PROCESSING OF SAMPLE

Macroscopic appearance of the fresh unpreserved specimens were first observed and their consistency, colour and presence or
absence of blood, and, or mucus recorded.

MICROSCOPIC EXAMINATION

DIRECT WET-MOUNT

A drop of fresh saline was placed on one end of clean slide drop of iodine on *the other end. Using an applicator stick*, a small amount of specimen about 2mg was mixed in the saline and a small amount in the iodine, then smooth thin preparations were made. Each preparation was covered with slip and examined systematically.

Formol ether concentration technique procedure

10ml of 10°/o formalin (see appendix) was added to approximately Ig of faeces and stirred using an applicator stick, until a slightly cloudy suspension was formed. A gauze filter was fitted into a funnel, and the funnel placed on top of the centrifuge tube.

The faecal suspension was passed through the filter into the centrifuge tube until the 7cm mark was reached.

The filter was removed and discarded with the lumpy residue. 3ml of ether was added and mixed well for one minute, and centrifuged for one minute.

The fatty plug (debris) was loosened with an applicator stick supernatant poured away by quickly inverting the tube.

The tube was put in its rack and fluid on the sides of the tube allowed to drain down to the sediment. This was mixed well and a drop transferred to a slide for examination under a cover slip.

Iodine stained preparation was also made and examined using the x 10 and x40 objective for ova, cyst and larvae of parasites.

**RESULTS**

**TABLE 4.1. PREVALENCE OF INFECTION BY INDIVIDUAL SPECIES OF PARASITES IN THE SAMPLE OF PREGNANT WOMEN**

(N = 300)

| Parasite | No of positive samples | prevalence (%) |
|---|---|---|
| E histolytica | 105 | 35.0 |
| E Coli | 68 | 22.7 |
| A Lumbricoides | 58 | 19.3 |
| Hook worn | 51 | 17.0 |
| G Lamblia | 1 | 0.3 |
| P falciparum | 156 | 52.0 |
| Microfilaria | 0 | - |
| Tryparnosomes | 0 | - |

**TABLE 4.2 PREVALENCE OF MIXED INFECTION BY SELECTED PARASITES THE SAMPLE OF PREGNANT WOMEN**

| **PARASITES** | NO. OF POSITIVE SAMPLE | PREVALENCE (%) |
|---|---|---|
| E coli & A. Lumbricoides | 11 | 3.7 |
| A lumbricoides & hook worm | 12 | 4.0 |
| A lumbricoides & Ehistolytica | 25 | 8.3 |
| E histolytica & hook worm | 15 | 5.0 |
| E coli & P Falciparum | 32 | 10.6 |
| A lumbricoides & P falciparum | 40 | 13.3 |
| E histolytica & P falciparum | 61 | 20.3 |

| | | |
|---|---|---|
| Hookworm & P falciparum | 24 | 8.0 |
| E Coli & E histolytica | 25 | 8.3 |

**TABLE 4.3. PARASITES DISTRIBUTION AMONG GROUP OF THE POPULATION SAMPLE**

| | Age Group (years) | | | total |
|---|---|---|---|---|
| Parasites | 18 – 22 | 23 – 27 | 28 – 32 | 33 – 37 |
| A lumbricoides | 21(35.6%) | 21(35.6%) | 10(16.9%) | 7(11.9%) 59 |
| Hookworm | 17(33.3%) | 16(31.4%) | 10(19.0%) | 8(15.7%) 51 |
| E histolytica | 41(39.0%) | 28(26.7%) | 20(19.0%) | 16(15.2%) 105 |
| E Coli | 22(32.4%) | 8(24.5%) | 16(23.5%) | 12(17.6%) 68 |
| G lamblia | - | - | - | 1 1 |
| P falciparum | 46(29.5%) | 40(2.5.6) | 41(26.3%) | 29(18.6%)156 |
| Microfiloria | - | - | - | - |
| Trypanosomes | - | - | - | - |
| Total | 147(33.4%) | 123(28.0%) | 97(22.0%) | 73(16.6%)44O |

**TABLE 4.4. SHOWING THE NO OF PREGNANT WOMEN WITH SINGLE, MIXED INFECTIONS AND NUMBER FOUND TO BE NEGATIVE**

| Total no. of Women Sampled | No with single infection | mixed infection | samples | No. with | No. of negative total no infected 300 |
|---|---|---|---|---|---|
| 94(31.3%) | 146(48.7%) | 60(20.0%) | | 240(80.0%) | |

4.5 **RESULT**

Of the 300 samples examined, 240 (80.0%) harhoured one or more parasites, 94 (31.3%) had single infection (infection from one parasite), 146 (48.7%) had mixed infections (infection from more than one parasite) while 60 (20.0%) had no infection (TABLE 4.4). However, the highest prevalence of mixed infection was recorded by E histolytica and Plasmodium falciparum (20.3%), followed bymixed infection by E coli and Plasmodium falicparum (13.3%), A lumbricoides and P. falciparum (10.6%) and equal prevalence (8.3%) of mixed infections by A. lumbricoides and E. histolytica. and E coli and E. histolytica as shown in table 4.2.

The prevalence of infection by individual species of parasites in the sample of pregnant women as revealed by the survey is as follows: Plasmodium falciparum (52.0%). E histoiytica (35.0%), E coli (22.7%), A lumbricoides (19.3%), hookworm (17.0%, G lamblia (0.3%) (TABLE 4.1). No microfilaria or trypanosomes were seen parasitic infection was more prevalent in pregnant women within the age limit of 18-22 (33.4%) as shown in table 4.3

**DISCUSSION**

Most intestinal and haenio parasitic infection of man, whether soil transmitted, vector transmitted, water-borne or resulting from particular social habits, provide some of the public health problems encountered in Calabar municipality in particular and the tropics and subtropics in general. These parasites cause many diseases to those harbouring them.

A number of studies on the prevalence of intestinal parasites of man have been reported. The findings of the present investigation confirm the earlier investigations by [16] that the commonly encountered intestinal parasites are: Entamoeba colj Entamoeba histolytica, Giardia lamblia and Endolimax nana. Besides the parasitic protozoans are helminth parasites such as hookworm (Necator americanus and Ancyclostoma duodenaleX Ascaris lumbricoides, Trichuris trichuria Schistosomia mansoni.

The occurrence of intestinal -parasites in pregnant women in Calabar was confirmed by this survey. Since this survey was conducted in the dry season , the prevalence of the parasites especially that of the helminthic parasites should be expected to be low as their prevalence rates are affected by weather conditions such as moisture and temperature [17].

The high prevalence of protozoan parasites such as E. histolytica and E. coli during the survey might be due to poor living standard as reported by [18].The pregnant women sample might have been infected with the E. histoytica through contaminated broken water pipes and streams.

Similarly, the high prevalence of ova of A lumbricoides in the pregnant women in Calabar was probably due to sanitary

conditions and poor personal hygiene [19]. The general habit of most people not washing and cooking their food properly, indiscriminate habits as well as drinking contaminated water from broken pipe and streams might have been some of the ways through which some of the pregnant women had been infected by the parasites [20, 21].

*On* the other hand, the findings of the present investigation also confirm the earlier investigation by [22] in Calabar-Nigeria, that malaria is a significant cause of morbidity but was only held responsible for 3.5% of the deaths that occurred during the period of *investigation. The high* prevalence rate of malaria might be attributed to poor sanitary and environmental conditions, immune depression of the pregnant women, low socio-economic status, ignorance of the dangers of infection as well as absence of preventive and curative facilities. Furthermore, non detection of mierofilaria or trypanosome could be attributed to lack of exposure to the causative agents and other epidemiological factor^ which influence the prevalence of infection such as climate, topography, as well as economic and social conditions of the people and availability of source of mosquito-infection, in other words close mosquito-man contact must be maintained [23,24].

Following the results of the survey, one can safely deduce that the investigation has confirmed the presence of parasitic infection in pregnant women in Calabar. Since there is high prevalence of these parasites in these pregnant women, I would recommend that they should carry out routine blood and stool examinations at least twice during pregnancy. For effective control and/or elimination of intestinal and haemo-parasites of pregnant women in calabar , the development of medical services must go hand in hand with mass education of the people on how these parasites are transmitted and the danger of infection. And also provision of adequate sterile drinking water, the protection of barefoot from any contact with infective larvae through the use of shoes, improved hyginic conditions, will help in reducing the prevalence of intestinal and haemoparasites in pregnant women in the state.

As the information provided by this survey may not be adequate, I suggest that continuing multifactorial surveys in carried out in other maternities in the state in order to locate measure the true prevalence of parasitic infection in pregnant women in the state. When this is done, it should then be possible to plan on effective strategy for control and eradication of parasitic infections in Calabar and the state in general.

**REFERENCES**


1. Tefera G(2014). Determinants of anemia in pregnant women with emphasis on intestinal helminthic infection at Sher-Ethiopia Hospital, Ziway Southern Ethiopia. Immunol Infect Dis. 2(4):33–9.
2. Shiferaw MB, Zegeye AM, Mengistu AD (2017). Helminth infections and practice of prevention and control measures among pregnant women attending antenatal care at Anbesame health center Northwest Ethiopia. BMC Res Notes. 10(1):1–5.
3. Salawu MM, Salawu AH, Ogunfunmilayo TA, Nwadike VU, Adebayo AS (2020). Predictors of soil-transmitted helminthic infection among pregnant women attending antenatal clinic at the Federal Medical Center, Abeokuta, Nigeria. Trop J Obstet Gynaecol. 37(1):27–32.
4. Obiezue NR, Okoye IC, Ivoke N, Okorie JN (2013). Gastrointestinal helminth infection in pregnancy: disease incidence and hematological alterations. Iran J Public Health. 42(5):497.
5. Ojurongbe O, Okorie PN, Opatokun RL, Ojurongbe TA, Mabayoje VO, Olowe OA, (2018)Prevalence and associated factors of Plasmodium falciparum and soil transmitted helminth infections among pregnant women in Osun state Nigeria. Afr Health Sci.18(3):542–51.
6. Getachew M, Tafess K, Zeynudin A, Yewhalaw D (2013). Prevalence Soil Transmitted Helminthiasis and malaria co-infection among pregnant women and risk factors in Gilgel Gibe dam Area Southwest Ethiopia. BMC Res Notes. 6(1):1–7.
7. Aranzales AFE, Radon K, Froeschl G, Rondón ÁMP, Delius M (2018). Prevalence and risk factors for intestinal parasitic infections in pregnant women residing in three districts of Bogotá Colombia. BMC public health. 18(1):1–15.
8. Dimejesi IB, Umeora OU, Egwuatu VE (2014). Prevalence and pattern of soil-transmitted helminthiasis among pregnant women in a tertiary health facility, Southeast Nigeria. Afr J Med Health Sci. 13(1):56.
9. Yadav K, Prakash S, Yadav BK (2020). Characterization of Intestinal Parasitosis in Pregant Women at Ram Janaki Hospital Janakpurdham Tribhuvan University. J Microbiol. 7:91–103.
10. Ndamukong K, Asoba G, Achidi E (2011). Intestinal helminth infections among pregnant cameroonian women. East Afr Med J. 2011;88(11):377–83.
11. Supriya Paranjpe NR, Koticha Avani, Nataraj Gita, Mehta Preeti (2020). Prevalence of intestinal parasites in pregnant women. Indian Journal of Microbiology Research. 7(4): 8-12.
12. Mengist HM, Zewdie O, Belew A (2017). Intestinal helminthic infection and anemia among pregnant women attending ante-natal care (ANC) in East Wollega, Oromia. Ethiopia BMC Res Notes. 10(1):1–9.

13. Ahenkorah B, Nsiah K, Baffoe P, Ofosu W, Gyasi C, Owiredu E-W. (2020) Parasitic infections among pregnant women at first antenatal care visit in northern Ghana: A study of prevalence and associated factors. PLoS ONE.;15(7):e0236514.
14. Alli JAOI, Kolade AF, Nwanze JC, Dada VK, Ogundele M (2011). Prevalence of intestinal nematode infection among pregnant women attending antenatal clinic at the University College Hospital, Ibadan Nigeria. Adv Appl Sci Res. 2(4):1–13.
15. Gebrehiwet MG, Medhaniye AA, Alema HB (2019). Prevalence and associated factors of soil transmitted helminthes among pregnant women attending antenatal care in Maytsebri primary hospital North Ethiopia. BMC Res Notes. 12(1):1–6.
16. Akinbo FO, Olowookere TA, Okaka CE, Oriakhi MO (2017). Co-infection of malaria and intestinal parasites among pregnant women in Edo State, Nigeria. J Med Tropics. 19(1):43.
17. Yesuf DA, Abdissa LT, Gerbi EA, Tola EK (2019). Prevalence of intestinal parasitic infection and associated factors among pregnant women attending antenatal care at public health facilities in Lalo Kile district, Oromia Western Ethiopia. BMC Res Notes. 12(1):1–6.
18. Misikir SW, Wobie M, Tariku MK, Bante SA (2020). Prevalence of hookworm infection and associated factors among pregnant women attending antenatal care at governmental health centers in DEMBECHA district, north West Ethiopia, 2017. BMC Pregnancy Childbirth. 20(1):1–8.
19. Derso A, Nibret E, Munshea A (2016). Prevalence of intestinal parasitic infections and associated risk factors among pregnant women attending antenatal care center at Felege Hiwot Referral Hospital, northwest Ethiopia. BMC Infect Dis. 16(1):1–7
20. Guo F, Forde MS, Werre SR, Krecek RC, Zhu G (2017). Seroprevalence of five parasitic pathogens in pregnant women in ten Caribbean countries. Parasitol Res. 116(1):347–58.
21. Boel M, Carrara VI, Rijken M, Proux S, Nacher M, Pimanpanarak M, (2010) Complex interactions between soil-transmitted helminths and malaria in pregnant women on the Thai-Burmese border. PLoS Negl Trop Dis. 4(11):e887.
22. Tsoka-Gwegweni JM, Ntombela N (2014). A double load to carry: parasites and pregnancy. South Afr J Infect Dis. 29(2):52–5.
23. Bolka A, Gebremedhin S (2019). Prevalence of intestinal parasitic infection and its association with anemia among pregnant women in Wondo Genet district, Southern Ethiopia: a cross-sectional study. BMC Infect Dis. 19(1):1–8.
24. Sapkota L, Maharjan M (2017). Anaemia Association with Intestinal Parasitic Infection in Pregnant Women Attending Antenatal Clinic at Tribhuvan University Teaching Hospital. J Adv Coll Eng Manage. 2017;3:41–7.
25. Feleke BE, Jember TH (2018). Prevalence of helminthic infections and determinant factors among pregnant women in Mecha district, Northwest Ethiopia: a cross sectional study. BMC Infect Dis. 18(1):1–6.