PREVALENCE OF HELMINTHES INFECTION AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC AT THE SUNNI HOSPITAL, MAIDUGURI, NIGERIA.

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ABSTRACT

Background: The burden of helminthes infections and their consequent morbidity and mortality continue to attract attention of global health expert and managers. The effect of helminthes infections among pregnant women contribute to increasing maternal and fetal morbidity and mortality.

Aim: The prevalence of intestinal nematode infection was studied among 405 pregnant women attending antenatal clinic at the Sunni Hospital Maiduguri, Maiduguri, over a period of 3 months, from March 2012 to May 2012.

Study design: It was a hospital based cross sectional study. Macroscopic, wet preparation and the 2 methods of concentration, i.e., brine (floatation) and formol-ether (sedimentation) concentration methods were used to examine the stool for ova and the larvae of intestinal parasites.

Results: Of the 405 samples examined, one hundred and two (25.2%) women were found to be infected with one helminthes or another. Mean age of participants was 25.3 years. Ascaris infection was found to be most infecting helminthes. The prevalence tended to be more in the age bracket 16 to 30 years, multi-gravidas, and in 2nd trimesters. Although businesswomen were more affected, the effect was not statistically significant.

Conclusion: The study indicated that intestinal helminthiasis was more prevalent among multiparas, aged 16-30 years and in the second trimester of pregnancy. Hence, routine administration of antihelminthics to pregnant women during antenatal visits is recommended.

KEYWORDS: Intestinal helminthes, Prevalence, Pregnant women, Maiduguri, Nigeria.

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INTRODUCTION

Helminthes are parasitic worms from the phyla Nematoda (roundworms) and platyhelminthes (flatworms). Helminthes are the most common infectious agents of human in developing countries. The most common human helminthes include *Ascarislumbricoides, TrichurisTrichura, Necatoramericanus*and *Ancylostomaduodenale*. They are transmitted by eggs present in human faeces, which contaminate the soil in areas where sanitation is poor – hence called Soil-transmitted helminthes (STH) infections[1].

The intolerable burden of STH was first highlighted by Norma Stoll in 1914[1]. It is estimated that approximately 2 billion people are infected with soil-transmitted helminthes worldwide. According to estimates, 1,221 - 1,472 million people are infected with

roundworms, 795 – 1,050 million with whipworm and 740 – 1,300 million with hookworms. In addition, 30 100 million people are infected with threadworms [2].

In a recent systematic review and geostatistical meta-analysis, Karagiannis-Voules and colleagues stated that the highest prevalence of helminthes infection is in West Africa, and estimated the Population-adjusted prevalence of STH infections in Nigeria to be 26.7%. They also opined that 20% of the world treatment of helminthes infection is required in Nigeria alone[3].

The worms nourish on host tissues, including blood, which leads to a loss of iron and protein. Couple with that, the worms increase malabsorption of nutrients – leading to malnutrition. Also, roundworm may possibly compete for vitamin A in the intestine. Some soil-transmitted helminthes also cause loss of appetite and, consequently, a decline in nutritional intake and physical fitness. In particular, *T. trichiura* can cause diarrhoea and dysentery. Moreover, the helminthes infections may heighten the effect of other major pathogens such as Malaria and HIV, and attenuate the response to a range of vaccines [4].

A woman's immune system has a sagacity of intricacies during pregnancy. Placental immune responses are defined on a case by case basis. These cases depend on the amount of microphages, regulatory T-cells, and natural killer cells being produced. When these responses to specific diseases are low it creates a high risk of many mothers becoming infected. These immune-regulatory mechanisms have been proposed in pregnant women acquiring some infective agents. STH infections encourage T-cell hypo-responsiveness, down-modulating immunity to Malaria as well as other antigens[5].

Hookworm infects approximately 44 million pregnant women each year[6]. Helminthes are usually isolated from women of younger age, with fewer educational opportunities, lower socioeconomic backgrounds, and baseline anemia and malnutrition[7].

Worldwide, an estimate of 300 million people suffers from severe morbidity that result in 10,000 – 135,000 death annually[4]. Helminth infections, such as hookworm, *trichuriasis*, and schistosomiasis, directly contributed to severe anemia in pregnant women through blood loss and micronutrient deficiencies. And anemia in pregnancy has been associated with stillbirth, prematurity and low birth weight. In the Entebbe Mother and Baby Study (EMaBS) cohort in Uganda, it was discovered that women with symptomatic and asymptomatic hookworm parasitemia during their second or third trimesters had increased likelihood of childhood malaria[8].

In response to the growing evidence showing the devastating impact of STH infection – including other Neglected Tropical Diseases (NTDs), the World health Assembly (WHA) has adopted several resolutions calling for the control or elimination of these diseases, and for the implementation of a number of large scale control and elimination programs. On the basis of researches and operational studies, periodical mass-examination using cellophane thick smear (Kato technique) and selective mass-treatment targeted at school children were employed as the most useful control measure. Sub-Saharan Africa is among the regions with the highest prevalence of STH infections, but progress to reduce the burden has been slower than in any other region of the world[9].

Paucity of data from northern Nigerian women on helminthes infections, couple with marked variations in the prevalence and distribution of STH infections among pregnant women in other parts of Nigeria[10, 11, 12] with the additional challenge of excluding pregnant women in the deworming programs without considering the risks-benefits ratio, we determined the level of intestinal parasitic infection among pregnant women attending a sub-urban, under-privileged community

health facility – the Sunni Hospital, with the aim of advancing appropriate recommendations in reducing the burden of infection and its possible consequences.

MATERIALS AND METHODS:

Study site

Sunni Hospital Maiduguri is an Islamic faith-based non-governmental, not-for-profit making health facility based in Maiduguri, the capital of Borno state Nigeria. The twenty four (24) bed-capacity hospital was established in 1994 by the Islamic Medical Association of Nigeria. The Hospital has the mission of providing accessible, affordable and acceptable standard health care services to the community especially to the less privileged. The Hospital operates as a secondary health care facility. Even though the hospital is not in the rural area, it serves predominantly the poor suburban populace. The Hospital operates antenatal care services twice in a week; Wednesdays and Thursdays, and has an average of one thousand new ANC clients and six hundred deliveries annually.

Borno State is one of the six states in the north-eastern Nigeria. The state covers a land mass area of about 69,436 sq km. The state occupies a large part of the Chad Basin and the population of the state stands at 5, 195, 581[13]. The vegetation is a mixture of Sudan Savannah and Sahel savanna The state is dominated by the Kanuris (mostly Muslims) who have dominated the area for over a millennium, but also has the Buras (Christian/Muslim), Baburs, Marghis among many other Nigerian ethnicities, Borno inhabitants engage mainly in agriculture and trading, Maiduguri city sits along the seasonal Ngadda River which disappears into the *Firki* swamps in the areas around Lake Chad.

Study Design

It was a Cross-sectional analytical study

Sample Size Determination

The required sample size for this study was calculated based on 95% confidence level and 5% marginal error; sample size was determined using the formula as described by Mugenda and Mugenda[14]. The minimum sample size (384 plus 17% attrition = 405) was calculated using the estimated prevalence of 52% according to Biu et al 2012[15]

Sample Selection

Four hundred and five (405) pregnant women attending Antenatal care services at the Sunni Hospital Maiduguri were selected by simple random sampling. Selection criteria was voluntary consenting to participate, no history of pregnancy complications such as bleeding per vagina and no use of antihelminthes in the last one month prior to the study.

Collection of specimens

The selected subjects were given dry, clean bottle for faeces and were instructed to collect in the morning of the clinic day. A total of four hundred and five (405) stool samples of pregnant women were collected and examine for the presence of larvae, cysts or ova of parasites.

Macroscopic Examination

These were direct wet-mount, formaldehyde-ether sedimentation method and modified acid-fast staining techniques[16]. The WHO Bench aids for the diagnosis of intestinal parasites (1994) was used as an identification reference[17].

Data analysis

All data were collected with a structured interviewer administered questionnaire; Differences concerning parameters were evaluated using the chi-squared test. Data were analyzed by SPSS for Windows 10.0 and Epi Info v.6.0. All tests were two-sided with differences considered significant at $P < 0.05$

Ethical clearance

Ethical clearance for the study were obtained from the Ethical Committees of the Sunni Hospital and the University of Maiduguri

Teaching Hospital, Maiduguri, for confidentiality all records were exclusively stored in Sunni Hospital. The records were accessible to the Medical Director, the Hospital Secretary and the Matron –in- charge only. After explaining the study to the participant, consent was obtained from each participant.

Results:

Samples of fresh stool were collected from 405 pregnant women during the period of study and one hundred and two (25.2%) women were found to be infected. Age ranged from16 to 41 years with mean age of 25.3 years. Two hundred and seventy eight (68.6%) were primigravidas, 120 (30%) were multigravidas while 7 (1.7%) were grandmultigravidas. *AscarisLumbrcoides* is the most prevalent infecting helminthes as showed on Table 1.

The prevalence is more among the multigravid women (> 60.0%), in second trimester (33.7%) and Business women (45.2%) as showed on Table 2.

Table 1: Prevalence of helminthes among 102 infected pregnant women attending ANC services at Sunni Hospital

Helminthes	Number (%)
AscarisLumbricoides	59 (57.8)
Entoamibahystolytica	18 (17.7)
Hymenolepis nana	11 (10.8)
Schistosoma mansoni	8 (7.8)
TaeniaSpp	4 (3.9)
Strongeloides	2 (2.0)
Total	**102 (100)**

Table 2: Prevalence of helminthes parasites based on age, parity trimester and occupation of pregnant women

Age (years)	Number tested	Number infected	Percentage
16 – 20	112	30	26.8
21 – 25	110	25	22.7
26 – 30	118	30	25.4
31 – 35	54	14	25.9
36 – 40	11	3	27.3
>40	2	0	0
Parity			
Primigravidas	278	58	20.9
Multigravidas	119	42	35.3
Grand multigravidas	8	2	25.0
Trimesters			
First	83	15	18.1
Second	202	68	33.7
Third	120	19	15.8
Occupation			
Housewives	297	64	21.6
Students	24	4	20.0

Civil servants	22	6	27.3
Business	62	28	45.2

The prevalence tend to be more in the age bracket 16 to 30 years (P - 0.00), multigravidas (P - 0.04) and in 2nd trimesters. Although businesswomen were more affected, the effect was not statistically significant as indicated on Table 3.

Table 3: Analysis of Prevalence of helminthes parasites

Age (years)	Number tested	Number infected	$\chi 2$	P - value
16 – 20	112	30	94.1	<0.0001
21 – 25	110	25		
26 – 30	118	30		
31 – 35	54	14		
36 – 40	11	3		
>40	2	0		
Parity				
Primigravidas	278	58	4.3	0.040
Multigravidas	119	42		
Grand multigravidas	8	2		
Trimesters				
First	83	15	8.6	0.003
Second	202	68		
Third	120	19		
Occupation				
Full time Housewives	297	64	3.5	0.060
Students	24	4		
Civil servants	22	6		
Business	62	28		

DISCUSSION

This study showed that the prevalence of STH among pregnant women is 25.2%, and it is common among young primigravidas in their second trimester. *Ascaris lumbricoides* is the commonest infecting STH, followed by *Entamoeba Hystolytica* and *Hymenolepis nana.* Concurrent multiple infections with STH was not found in this study.

The prevalence rate of 25.2% found in this study is much lower than what was obtained by Biu in 2008 (51.7%). Also improvement on socio-economic conditions may have played a role in reducing the prevalence. It is also lower than that obtained in Ibadan (43.4%) South Western Nigeria[18], 56.8% in Makurdi North Central Nigeria[19], and 76.2% in Western Kenya[20]. Our study is higher than what was obtained in Enugu South Eastern Nigeria (16.3%)[21], Ghana (17.6%)[22] and Southern Thailand (17.9%)[23]. These differences can be attributed to various factors including sanitary conditions, poor water supply, contamination of food stuffs and climate.

Ascaris infection is found to be most infecting helminthes. This predominance of *Ascaris lumbricoides* than any other intestinal nematode agreed with some previous reports[20, 23,24]. The high prevalence of *A. lumbricoides* reported in this study may be due to faecal pollution of the soil/environment of our study population. Soil pollution is a major factor in

the epidemiology of human ascariasis. Infection with *A. lumbricoides* could also be spread through eggs, which are swallowed as a result of ingestion of contaminated soil or contact between the mouth and the various objects carrying the adherent eggs. River Ngadda which passes through Maiduguri metropolitan serves as source of irrigation of vegetables, for washing as well as for drinking to some people in the study area. *Entoamiba hystolytica* which is the second most prevalent infection, was the most prevalent in the earlier study conducted by Biu et al in the same environment.

The high occurrence of *E. histolytica* found in the present study may have been possibly related to the poor hygienic conditions and its transmission may have been through the ingestion of contaminated food and water. *E. histolytica* infection in pregnant women may impede their nutritional status and their general health through morbid processes such as colitis, diarrhoea, lactose intolerance, malabsorption and dehydration. Episodes of this type reduce the nutrients available to the fetus, with consequent reduced intrauterine development[25].

Even though age of the pregnant mothers is not attributed to the prevalence of the infection with STH, yet the prevalence is seen more in multi-gravid women and also second trimester of pregnancy contribute significantly to the prevalence of the infections. The finding of high frequency in the second trimester corroborated with the findings of Ali et al in Ibadan Nigeria[18], Obiezue et al in Enugu[21], and Baidoo in Ghana[22]. This shows the need for early deworming of pregnant women early in their second trimester to avoid anemia and micronutrients deficiencies, which will affect the pregnancy outcomes.

In conclusion, this study has indicated that the prevalence of intestinal helminthiasis is common among pregnant women, with the rate more among multigravidas aged 16 to 30 years, and in their second trimester. These findings may contribute negatively to both maternal and fetal outcome of pregnancies. These findings, therefore, underscore the need for routine deworming of all our antenatal clients, but more emphasis on multigravidas.

Limitations

Limitations of our study include the small sample size and use of a single stool specimen to assess infection status, which may have underestimated geohelminth burden in the study population. Also, the study was a hospital based study and might not be representation of what is in the community.

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