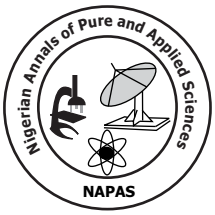

Parasitic infections and risk factors associated with Amoebiasis among pregnant women attending antenatal clinics in primary health care centres in Lagos Mainland, Lagos, Nigeria

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Abstract

The prevalence of amoebiasis was investigated among pregnant women using a gold standard microscopy method. Stool samples were collected from pregnant women, from two primary health care centers (Iwaya and Ebute-metta). The study involved 203 pregnant women during their visits to the antenatal clinic in Primary health centres at Lagos Mainland from June – October, 2016. Each participant was interviewed using questionnaires to relate prevalence and risk factors to their socio-demographic characteristics. Among these pregnant women, 120 respondents provided their stool samples and this was parasitologically screened with 0.8% prevalence of *Entamoeba histolytica* infection, 7.5% with *Entamoeba Coli*, 0.5% with *Ascaris lumbricoides*, and 0.8% infection with Hookworm. A prevalence of 0.8% for the mixed infection of *Ascaris lumbricoides* with *Entamoeba histolytica*, and a prevalence of 1.7% for the mixed infection of *Entamoeba coli* and *Entamoeba histolytica* was recorded. Significant association ($p<0.05$), was established between infection and diarrhoea, and the residence of the pregnant women.Socio - demographic factors like age, sex, socio-economic status, type of toilet, source of drinking water ($p>0.05$) showed no significant association with amoebiasis prevalence. In conclusion, *E. histolytica* infection is generally low in Lagos state owing to good environmental sanitation within Lagos metropolis.Efforts should therefore be geared towards its elimination by provision of water for Lagos residents.

Key words: *E. histolytica*, Antenatal, helminths, Pregnant women.

Introduction

In the developing world, it has been reported that millions of people are being affected by neglected tropical diseases and protozoan parasites due to poor hygienic practices and sanitation (Hotez *et al*., 2007) .Amoebiasis is a disease caused by *Entamoeba species*. These include: *Entamoeba histolytica, Entamoeba dispar, Entamoeba coli, Entamoeba hartmani, Entamoeba polecki, and Entamoeba gingivalis*. *E. histolytica* is globally considered as a leading parasitic cause of human mortality besides malaria and schistosomiasis (Walsh *et al.,* 1986). *Entamoeba histolytica* is an enteric parasite that colonizes the human intestinal lumen and has the capacity to invade the epithelium. Amoebic dysentery occurs when *E. histolytica* trophozoites invade the walls of large intestines and multiply in the mucosa, forming ulcers. Most frequent manifestations of infection are dysentery, colitis, flatulent stomach, weight loss, fatigue and abdominal pain. A common outcome of invasion of the amoeba into tissues is liver abscesses which can be fatal. The pathogen secretes histolysin, which digest the gut of the infected individual hence the Latin name, histo (tissue) lytica (destruction) (Stanley, 2003). An estimated 50 million cases of invasive infection occur annually (Sateriale *et al.,* 2011). Morbidity and mortality are primarily seen in the developing countries. In developed countries, amoebiasis tends to be more common in older individuals and occurs mostly among homosexual men or in institutions (Hung *et al.,* 2008). However, in tropical regions, the epidemiology of amoebiasis is completely different and is more common among the general population and particularly among patients presenting with diarrhoea at health care centres (Haque *et al.,* 2006). Amoebiasis is prominent in areas where there is poor sanitation and very poor personal hygiene. It is estimated that up to 10% of the world's population may be infected with either *E. histolytica* or *E. dispar* (or both) and in many tropical countries the prevalence may approach 50%.

Studies have identified inadequately treated drinking water and ingestion of raw vegetables as risk factors for infection in addition to failure to wash hands before eating and low socio-economic status (Benetton *et al.,* 2005; Rinnes *et al.,* 2005). Generally, the risk of infection is highest in areas of poverty and in settings with poor sanitation where barriers between human faeces, food and water are inadequate (Stanley, 2003).

In Nigeria, amoebiasis is prevalent and widespread which has been attributed to quite a number of multiple environmental sources of transmission (Inabo *et al.,* 2014; Ajero *et al.,* 2008). This study was carried out to determine the epidemiology and risk factors of amoebiasis in pregnant women in Lagos mainland, using the microscopy method.

Materials and methods

Study Area

Lagos is, the smallest of Nigeria's 36 states but the most populous state. (Fig 1)Lagos State is located in the southern-western part of Nigeria is a major financial centre, it occupies an area of 3,345 sq. km, 22% or 787 sq. km of which is the lagoons and creeks. In the south, it stretches over 180km along the coast of the Atlantic Ocean. Lagos 2017 population is now estimated at 14,234,000. It shares boundaries with Ogun State both in the North and East and is bounded on the west by the Republic of Benin.

Figure 1: Map of Lagos Showing Study Area

Research Design

A cross-sectional survey was carried from June to October 2016 at two different primary health care centres located in Lagos Mainland Local Government, Lagos, Nigeria. Pregnant women attending primary health care facilities in Lagos mainland who consented to participate in the study were recruited during visit to the health care. The study participants were given survey numbers and personal identifiers was removed to ensure confidentiality and after which questionnaire were administered to each participant and universal bottle was given with the survey number written on it for ease of identification during the collection of stool sample during their next visit. Parasitological analyses was conducted on 120 pregnant women.

Ethical clearance

Ethical approval was obtained to undertake the study from the Ethical Committee of the Nigerian Institute of Medical Research. Written informed consent from all the participating pregnant women was obtained. The participants were informed that participation in the research is voluntary and they could opt out if unwilling to participate further at any stage during the research. Data collected during the survey from each study participant and results of laboratory tests was kept confidential. Results of participants with parasitic *E. histolytica* were revealed as soon as possible, to nearby health facilities for treatment and medical consultation in their respective clinics.

Collection of samples

The sample size was determined by the method as used by Wayne (2010) .Well labeled universal specimen bottles that had numbers of the participants were given out for the collection of their stool samples. The stool samples were collected and preserved in 10 % formol ether and immediately taken to the laboratory for microscopy. For the microscopic examination, both saline and iodine preparations of the stool were examined. The former was used for the identification of the trophozoites while the later was used for the identification of cysts.

Wet preparation using 3 % iodine was the method used. This is because iodine stains the nucleus of *E.histolytica* properly, thus allowing for easy identification of the cyst. A little portion of the formed stool specimen was collected and mixed with the 3 % iodine solution to form a smear. This was covered with a cover slip and viewed under the microscope using x10 objective for examination and x40 for identification of the parasite (Aribodor *et al.,* 2012). Another stool specimen was also prepared using a drop of physiological saline. A cover slip is applied before examining the preparation microscopically. The presence of ingested red blood cells and the characteristic directional movement are diagnostic of *E.histolytica*. The cyst of *E. histolytica* was identified with the diagnostic features as described by Cheesbrough, 1998.

Questionnaires survey

A structured-questionnaire was administered to identify the possible risk factors of amoebiasis and was distributed to the two sampled primary health care facilities where the pregnant women were required to fill the questionnaires. The questionnaire took into account several aspects but only data on socio-demographic information, source of drinking water, hygienic situation at home, presence, use of latrines and diarrheal conditions.

Data analysis

Data was entered in Microsoft excel 2010 and was cross-checked in order to ensure that data were entered correctly. Statistical analysis was performed using the SPSS version 20 (SPSS, Chicago, IL, USA). For descriptive analysis, rate (percentage) was used to describe the characteristics of the studied population, including the prevalence of *E. histolytica*. Chi square (Fischer's exact test) was used to test for the associations between infection and its variables.

Results

Prevalence of Intestinal Parasites using Microscopy Test

Out of 120 stool samples collected, 23% were infected with various parasites. *Entamoeba histolytica* 1 (0.8%), *Entamoeba coli* 9 (7.5%), *Ascaris lumbricoides* 6 (0.5%), Hookworm 1 (0.8%).A prevalence of 0.8% (1) was observed for the mixed infection of *Ascaris lumbricoides* and *Entamoeba histolytica ,* mixed infection of *Ascaris lumbricoides* and *Entamoeba coli* and a prevalence of 1.7% (2) for the mixed infection of *Entamoeba coli.* and *Entamoeba histolytica. Schistosoma mansoni* was found during the study with a prevalence of 0.8% (1). (Table 1)

Table 1: Prevalence of intestinal parasites in stool of pregnant women receiving treatment in primary health care facilities, Lagos mainland, Lagos.

Intestinal parasites	Number examined (n = 120)	Prevalence (%)
E histolytica	1	0.8
E. coli	9	7.5
A. lumbricoides	6	5.0
S. mansoni	1	0.8
Hookworm	1	0.8
A.lumbricoides + E.histolytica	1	0.8
A.lumbricoides + E.coli	2	1.7
E.histolytica + E.coli	2	1.7
Total	23	19.1

**E. histolytica* confirmed by Microscopy; n, sample size; %, percentage

Association of *E. histolytica* infection in pregnant women according to Age

Age related prevalence was subhected to Fisher's Exact Test (0.899>0.05), the result shows that *E. histolytica* infection was not prevalent in all age groups; prevalence of *E. Histolytica* was only observed in pregnant women between ages 24-29 (0.8%). (Table 2)

Table 2: Association of intestinal parasites according to age among pregnant women receiving treatment in primary health care facilities, Lagos mainland, Lagos.

Intestinal Parasites	18-23	24-29	30-35	36-41	Total
E. histolytica	0 (0%)	1 (0.8%)	0 (0%)	0 (0%)	1 (0.8%)
E. coli	1(0.8%)	4 (3.3%)	3 (2.5%)	1 (0.8%)	9 (7.5%)
A. lumbricoides	0 (0%)	3 (2.5%)	3 (2.5%)	0 (0%)	6 (5.0%)
S. mansoni	0 (0%)	1 (0.8%)	0 (0%)	0 (0%)	1 (0.8%)
Hookworm	1(0.8%)	0 (0%)	0 (0%)	0 (0%)	1 (0.8%)
A.lumbricoides + E. histolytica	1(0.8%)	0 (0%)	0 (0%)	0 (0%)	1 (0.8%)
A.lumbricoides + E.coli	1(0.8%)	1 (0.8%)	0 (0%)	0 (0%)	2 (1.7%)
E.histolytica + E.coli	1(0.8%)	1 (0.8%)	0 (0%)	0 (0%)	2 (1.7%)
Total	5 (4.0%)	11(41.7%)	6 (5.0%)	1 (0.8%)	23 (19.1%)

From the Fisher's Exact Test (0.899>0.05), There was no significant association between *E. histolytica* infection and age

Association of *E. histolytica* infection in pregnant women according to Education

Table 3 shows the association of *E. histolytica* infection in pregnant women according to their educational levels; primary, secondary and tertiary.

From Fisher's Exact Test (0.018<0.05), there was significant association between infections (*E. histolytica* infection with mixed infection) and education level.

Table 3: Association of intestinal parasites according to education among pregnant women receiving treatment in primary health care facilities, Lagos mainland, Lagos.

Intestinal Parasites	Primary	Secondary	Tertiary	Total
E. histolytica	0 (0%)	0 (0%)	1 (0.8%)	1 (0.8%)
E. coli	4 (3.3%)	5 (4.2%)	0 (0%)	9 (7.5%)
A. lumbricoides	3 (2.5%)	2 (1.7%)	1 (0.8%)	6 (5.0%)
S. mansoni	0 (0%)	0 (0%)	1 (0%)	1 (0.8%)
Hookworm	0 (0%)	1 (0.8%)	0 (0%)	1 (0.8%)
A.lumbricoides + E. histolytica	0 (0%)	1 (0.8%)	0 (0%)	1 (0.8%)
A.lumbricoides + E.coli	1 (0.8%)	0 (0%)	1 (0.8%)	2 (1.7%)
E.histolytica + E.coli	0 (0%)	2 (1.7%)	0 (0%)	2 (1.7%)
Total	8 (6.6%)	11 (9.2%)	4 (2.4%)	23(19.1%)

From Fisher's Exact Test (0.018<0.05), there was significant association between infections (*E. histolytica* infection with mixed infection) and education level.

Assocation of *E. histolytica* infection in pregnant women according to the type of residential apartment

Table 4 shows the association of *E. histolytica* infection in pregnant women according to their type of residential apartment.

From Fisher's Exact Test (0. 145>0.05), the result shows that there was no significant relationship between *E. histolytica* infection, mixed infection and type of accommodation (Table 4).

Table 4: Association of intestinal parasites according to type of accommodation in stool of pregnant women receiving treatment in primary health care facilities, Lagos mainland, Lagos.

Intestinal Parasites	Room and Parlour	Self-contain	Apartment flat	Total
E. histolytica	0 (0%)	1 (0.8%)	0 (0%)	1 (0.8%)
E. coli	8 (6.7%)	1 (0.8%)	0 (0%)	9 (7.5%)
A. lumbricoides	4 (3.3%)	2 (1.7%)	0 (0%)	6 (5.0%)
S. mansoni	0 (0%)	0 (0%)	1 (0.8%)	1 (0.8%)
Hookworm	1 (0.8%)	0 (0%)	0 (0%)	1 (0.8%)
A.lumbricoides + E. histolytica	0 (0%)	1 (0.8%)	0 (0%)	1 (0.8%)
A.lumbricoides + E.coli	2 (1.7%)	0 (0%)	0 (0%)	2 (1.7%)
E.histolytica + E.coli	0 (0%)	1 (0.8%)	1 (0.8%)	2 (1.7%)
Total	15 (12.5%)	6 (4.9%)	2 (1.6%)	23 (19.1%)

From Fisher's Exact Test (0.145<0.05), there was significant association between infections (*E. histolytica* infection with mixed infection) and type of accommodation.

Association of *E. histolytica* infection in pregnant women according to source of drinking water

Table 5 shows the association of *E. histolytica* infection in pregnant women according to the source of drinking water.

From Fisher's Exact Test (0.504>0.05), the result shows that there was no significant relationship between *E. histolytica* infection, mixed infection and source of drinking water.

Table 5: Association of intestinal parasites according to source of drinking water among pregnant women receiving treatment in primary health care facilities, Lagos mainland, Lagos.

Intestinal Parasites	Tap water	Other	Total
E. histolytica	1 (0.8%)	0 (0%)	1 (0.8%)
E. coli	1 (0.8%)	8 (6.7%)	9 (7.5%)
A. lumbricoides	1 (0.8%)	5 (4.2%)	6 (5.0%)
S. mansoni	0 (0%)	1 (0.8%)	1 (0.8%)
Hookworm	0 (0%)	1 (0.8%)	1 (0.8%)
A.lumbricoides + E.histolytica	0 (0%)	1 (0.8%)	1 (0.8%)
A.lumbricoides + E.coli	0 (0%)	2 (1.7%)	2 (1.7%)
E.histolytica + E.coli	1 (0.8%)	1 (0.8%)	2 (1.7%)
Total	4 (3.2%)	19 5.8%)	23 (100.0%)

From Fisher's Exact Test (0.504<0.05), there was significant association between infections (*E. histolytica* infection with mixed infection) and source of drinking water.

Association of *E. histolytica* infection in pregnant women according to treatment of water

Table 6 shows the association of *E. histolytica* infection in pregnant women according to method of treatment of water

Out of 120 stool samples that were collected, 13 of the respondents indicated that they boil their water before usage, 3 of the respondents indicated that they use water guard as their treatment for water, 85 of the respondents do not treat their water and 19 respondents uses other kind of treatment for water. From Fisher's Exact Test (0.432>0.05), the result shows that there was no significant relationship between *E. histolytica* infection, mixed infection and treatment of water.

Table 6: Association of intestinal parasites accordi ng to treatment of water among pregnant women receiving treatment in primary health care facilities, Lagos mainland, Lagos.

Intestinal Parasites	Boiling	Water guard	Nothing	Other	Total
E. histolytica	0 (0%)	0 (0%)	1 (0.8%)	0 (0%)	1 (0.8%)
E. coli	0 (0%)	0 (0%)	9 (7.5%)	0 (0%)	9 (7.5%)
A. lumbricoides	0 (0%)	0 (0%)	6 (5.0%)	0 (0%)	6 (5.0%)
S. mansoni	0 (0%)	0 (0%)	0 (0%)	1 (0.8%)	1 (0.8%)
Hookworm	0 (0%)	0 (0%)	1 (0.8%)	0 (0%)	1 (0.8%)
A.lumbricoides + E. histolytica	0 (0%)	0 (0%)	0 (0%)	1 (0.8%)	1 (0.8%)
A.lumbricoides + E.coli	0 (0%)	0 (0%)	2 (1.7%)	0 (0%)	2 (1.7%)
E.histolytica + E.coli	1 (0.8%)	0 (0%)	1 (0.8%)	0 (0%)	2 (1.7%)
Total	1(0.8%)	0 (0%)	20 (16.6%)	2 (1.6%)	23(100%)

From Fisher's Exact Test (0.432<0.05), there was significant associati on between infections (*E. histolytica* infection with mixed infection) and treatment of water.

Association of *E. histolytica* infection in pregnant women according to washing of hands before eating.

Table 7 shows the association of *E. histolytica* infection in pregnant women according to the washing of hands before eating.

Among pregnant women that indicated that they do not wash their hands regularly before eating, 7 of them were not infected whereas 2 of them were infected with various diseases having the various prevalence respectively; *Entamoeba coli* 1 (0.8%) and a prevalence of 0.8% (1) was observed for the mixed infection of *Entamoeba coli.* and *Entamoeba histolytica*

Table 7: Association of intestinal parasites according to washing of hands regul arly before eating among pregnant women receiving treatment in primary health care facilities, Lagos mainland, Lagos.

Intestinal Parasites	Yes	No	Total
E. histolytica	1 (0.8%)	0 (0%)	1 (0.8%)
E. coli	8 (6.7%)	1 (0.8%)	9 (7.5%)
A. lumbricoides	6 (5.0%)	0 (0%)	6 (5.0%)
S. mansoni	1 (0.8%)	0 (0%)	1 (0.8%)
Hookworm	1 (0.8%)	0 (0%)	1 (0.8%)
A.lumbricoides + E. histolytica	1 (0.8%)	0 (0%)	1 (0.8%)
A.lumbricoides + E.coli	2 (1.7%)	0 (0%)	2 (1.7%)
E.histolytica + E.coli	1 (0.8%)	1 (0.8%)	2 (1.7%)
Total	21 (17.4%)	2 (1.6%)	23 (19.1%)

From Fisher's Exact Test (0.018<0.05), there was significant association between infections (*E. histolytica* infection with mixed infection) and education level.

Association of *E. histolytica* infection in pregnant women according to type of toilet use.

Table 8 shows the association of *E. histolytica* infection in pregnant women according to the type of toilets they use in their homes.

Entamoeba histolytica 1 (0.8%), *Entamoeba coli* 9 (7.5%), a prevalence of 0.8% (1) was observed for the mixed infection of *Entamoeba coli.* and *Entamoeba histolytica*. and a prevalence of 1.7% (2) was observed for the mixed infection of *Entamoeba coli.* and *Entamoeba histolytica*.

Among pregnant women that indicated that they use no latrine in their home, 3 of them were not infected; 2 of them that they uses other type of toilet were not infected.

Table 8: Association of intestinal parasites according to type of toilet use among pregnant women receiving treatment in primary health care facilities, Lagos mainland, Lagos.

Intestinal Parasites	Pit latrine	Flush toilet	No latrine	Other	Total
E. histolytica	0 (0%)	1 (0.8%)	0 (0%)	0 (0%)	1 (0.8%)
E. coli	0 (0%)	9 (7.5%)	0 (0%)	0 (0%)	9 (7.5%)
A. lumbricoides	0 (0%)	6 (5.0%)	0 (0%)	0 (0%)	6 (5.0%)
S. mansoni	0 (0%)	1 (0.8%)	0 (0%)	0 (0%)	1 (0.8%)
Hookworm	0 (0%)	1 (0.8%)	0 (0%)	0 (0%)	1 (0.8%)
A.lumbricoides + E. histolytica	0 (0%)	1 (0.8%)	0 (0%)	0 (0%)	1 (0.8%)
A.lumbricoides + E.coli	0 (0%)	2 (1.7%)	0 (0%)	0 (0%)	2 (1.7%)
E.histolytica + E.coli	0 (0%)	2 (1.7%)	0 (0%)	0 (0%)	2(1.7%)
Total	0 (0%)	23 (19.1%)	0 (0%)	0 (0%)	23(19.2%)

From Fisher's Exact Test (1.000>0.05), There was no significant association between infections (*E. histolytica* infection & other infections) and type of toilet use.

Association of *E. histolytica* infection in pregnant women according to close contact with domestic animals

Table 9 shows the association of *E. histolytica* infection in pregnant women according to close contact with domestic animals.

From Fisher's Exact Test (0.828>0.05), the result shows that there was no significant relationship between *E. histolytica* infection, mixed infection and close contact with domestic animals.

Among pregnant women that indicated that that they do have close contact with domestic animals, 7 of them were not infected while 1 of them was infected with *Entamoeba Coli* 1 (0.8%) and they were no mixed infection

Among pregnant women that indicated that they do not have close contact with domestic animals, 112 of them were not infected while 13 of them were infected with various diseases having the various prevalence respectively; *Entamoeba histolytica* 1 (0.8%), *Entamoeba Coli* 8 (6.7%) a prevalence of 1.7% (2) was observed for the mixed infection of *Ascaris Lumbricoides* and *Entamoeba histolytica* with *Entamoeba Coli.* and *Entamoeba histolytica*.

Table 9: Association of intestinal parasites according to close contact with domestic animals among pregnant women receiving treatment in primary health care facilities, Lagos mainland, Lagos.

Intestinal Parasites	Yes	No	Total
E. histolytica	0 (0%)	1 (0.8%)	1 (0.8%)
E. coli	1 (0.8%)	8 (6.7%)	9 (7.5%)
A. lumbricoides	0 (0%)	6 (5.0%)	6 (5.0%)
S. mansoni	0 (0%)	1 (0.8%)	1 (0.8%)
Hookworm	0 (0%)	1 (0.8%)	1 (0.8%)
A.lumbricoides + E. Histo	0 (0%)	1 (0.8%)	1 (0.8%)
A.lumbricoides + E.coli	0 (0%)	2 (1.7%)	2 (1.7%)
E.histolytica + E.coli	0 (0%)	2 (1.7%)	2 (1.7%)
Total	1 (0.8%)	22 (18.3%)	23 (19.1%)

From Fisher's Exact Test (0.828<0.05), there was si gnificant association between infections (*E. histolytica* infection with mixed infection) and education level.

Association of *E. histolytica* infection in pregnant women according to diarrheal conditions

Table 10 shows the association of *E. histolytica* infection in pregnant women according to diarrheal conditions.

Out of 120 stool samples that were collected, 78 of the respondents indicated that they have diarrheal conditions while 42 respondents indicated that they do not have diarrheal conditions. From Fisher's Exact Test (0.354>0.05), the result shows that there was no significant relationship between *E. histolytica* infection, mixed infection and diarrheal conditions.

Table 10: Association of intestinal parasites according to diarrheal conditions among pregnant women receiving treatment in primary health care facilities, Lagos mainland, Lagos.

Intestinal Parasites	Yes	No	Total
E. histolytica	1 (0.8%)	0 (0%)	1 (0.8%)
E. coli	7 (5.8%)	2 (1.7%)	9 (7.5%)
A. lumbricoides	5 (4.2%)	1 (0.8%)	6 (5.0%)
S. mansoni	1 (0.8%)	0 (0%)	1 (0.8%)
Hookworm	1 (0.8%)	0 (0%)	1 (0.8%)
A.lumbricoides + E. histolytica	0 (0.8%)	1 (0.8%)	1 (0.8%)
A.lumbricoides + E.coli	1 (0.8%)	1 (0.8%)	2 (1.7%)
E.histolytica + E.coli	0 (0%)	2 (1.7%)	2 (1.7%)
Total	16 (14.0%)	7 (5.8%)	23 (19.8%)

From Fisher's Exact Test (0.354<0.05), there was significant association between infections (*E. histolytica* infection with mixed infection) and diarrheal conditions.

Discussion

In this study, the prevalence of *E. histolytica* by microscopy was very low (0.8%). The results showed the occurrence of some other intestinal parasites of public health importance besides *Entamoeba histolytica* among the study group and evidence of mixed infections with *Entamoeba histolytica.* This prevalence fell below a similar study conducted by (Fuseni *et al.,* 2010) in Northern Ghana with a prevalence of 12.3% .Ellis *et al* (2007) reported that human susceptibility to co infection of helminth parasites may be due to aggregation at household level which may increase the transmission of the observed parasites. A prevalence of 0.8% in this study is slightly lower than a study conducted by (Egwunyenga *et al.,* 2001) in Nigeria which reported 3.4%.

The prevalence of amoebiasis among pregnant women in relation to types of toilet use was not significantly different and this was observed among pregnant women who uses flush toilet 1 (0.8%) and polyparasitism of *Ascaris lumbicoides* with *Entamoeba histolytica* 1 (0.8%) and *Entamoeba coli* with *Entamoeba histolytica* 2 (1.7%) suggesting that pregnant women have desame predisposition.Hand washing in this study play a significant role in the reduction of the parasitic infections(Ostan *et al* ., 2007).

Water is a major source through which amoebiasis is contracted. In this study, it was observed that there was no significant difference in the sources of drinking water to parasitic infections. Availability of portable drinking water however contributed significantly to reduction in parasitic infections (Cairncross *et al* ., 2010). Strung *et al* (2014) reported a reduction in parasitic infections with the availability of tap water. Many urban communities in South-west Nigeria have bore-hole usually left uncovered and are subject to contamination with cysts of *E. histolytica* which are the infective stage, from various types of wastes including human and animal faeces. Cysts are known to persist in water for weeks or months and in the dry season, are known to withstand desiccation and survive for a long period in the environment (Inabo *et al.,* 2000).

Entamoeba histolytica is well associated with diarrhoea and was observed in this study. The prevalence for pregnant women with diarrhoea was (0.8%). This implies that pregnant women have sufficient health awareness so it prompts them to immediately go and register for ante-natal on time. Diarrhoea has been considered to be the major contributor to mortality and morbidity in the developing world.

The prevalence of infection among the different occupational groups of the pregnant women in this study who were civil servants was (0.8%). This implies that the prevalence of *E. histolytica* infection in pregnant women cut across the socioeconomic background. This is contrary to epidemiological studies which show that low socioeconomic status is a risk factor for infection and that infection; particularly the parasitic ones, are seen in regions with low socioeconomic status (Aksoy *et al.,* 2007).

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