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PREVALENCE OF PARASITIC AGENTS ASSOCIATED WITH DIARRHOEA IN CHILDREN LESS THAN 5 YEARS OLD IN LAGOS, NIGERIA

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ABSTRACT

Aim: Diarrhoea has been a common cause of morbidity and mortality in children less than 5years old. This work was intended to see if the level of hygiene is a reflection of the type of water taken by children.

Methods: One hundred and five stool samples were collected from children in two health facilities in Lagos: Ajegunle (52) and Surulere (53) from April to July 2012. The samples from children who had diarrhoea were examined using direct microscopy to detect ova, cysts and motile parasitic agents. Positive samples were further examined using WHO method as detailed in Kato-Katz cellophane technique.

Results: A total parasite prevalence of 51.4%, with 37.1% in males and 14.3% in females was observed. Specific prevalence of individual parasites is as follows, Entamoeba histolytica (32.4%); Ascaris lumbricoides (24.3%); Entamoeba coli (18.9%); Gardia lamblia (10.4%); Hookworm (8.1%) and Trichuris trichura (2.7%). Children that consumed water from open wells were more infected with parasites (17.1%). Lack of deworming programmes and routine clinical check-ups were seen to be significant for parasitic infection and diarrhea in the children in the study.

Conclusion: The study showed that Entamoeba histolytica has contributed more to the cause of diarrhoea in children less than 5 years than other parasites.

Key words: Diarrhoea, Parasites, Children

INTRODUCTION

Diarrhoeal disease has been described as far back as the ancient Greek civilization between 460-370 BC. It was referred to as abundant liquid stool at short intervals (Lanata, 2003). World Health Organization defined diarrhoea as having three or more loose or liquid stool per day or as having more stools than is normal for that person (WHO, 2002). This condition has been one of the leading causes of infant morbidity and mortality in sub-Saharan Africa, a region where unique geographic, economic political, socio-cultural and personal factors interact to create destructive challenges to its prevention and control. The childhood mortality rates from diarrhoea are expected to decrease by 30-50% in most areas of the world, while the decline in sub-Saharan Africa is estimated to be only 3% (Bern et al., 1992). About 1.8million children died worldwide from diarrhoeal disease in 2009, with 21% deaths occurring in children under 5 years (Murray et al., 2002). Thebacterial and viral aetiology of diarrhoea have been well described. However, there is dearth of data on the parasitic agents of this disease as about seven out of ten child deaths are due to just five preventable and treatable conditions: pneumonia, diarrhoea, malaria, measles and malnutrition, and often to a combination of these (WHO, 2006). Diarrhoea has been estimated to be responsible for 25 to 75% of all childhood illnesses in Africa (Kirkwood et al., (1991). The onset of diarrhoea leads to about 14% of outpatient visits, 16% of hospital admissions, and accounts for an average of 35 days of illness per year in children less than five years old (Huttly et al., 2011). About 40% of childhood deaths from diarrhoea worldwide occurred in sub-Saharan Africa in the year 2000 but only 19% of the world's population under

the age of 5 years survived in this region. This is in line with the recent global estimates where it was observed that 22% of childhood deaths among children under 5 years in sub- Saharan and 23% in South Asia were caused by diarrhoeal diseases (Bryce, et al., 2005). This continuing epidemic calls for sustained pragmatic and research attention to challenge newer issues in infectious diseases and the challenging burdens associated with demographic transition (Mathers et al., 2002). Morbidity and mortality from childhood diarrhoea, whether due to bacteria such as Shigella or more common place rotavirus, are further compounded by inappropriate house hold case management and frequent misuse of antibiotics (Jonathan et al., 1998). There is a clear need for vigorous efforts to implement the new Integrated Management of Childhood Illness (IMCI) approach to improve diarrhoea case management (Murray and Lopez, (2002). The changing socio-economic and policy of the various government agencies in Nigeria has impacted negatively on the standard of living of the people, resulting in poverty and poor living standard, particularly in the rural and peri-urban areas together with lack of education which still make diarrhea an important public health problem in Nigeria (Nwolisa et al., 2005).The information on the species composition of the parasites associated with human diseases is an important yardstick in understanding the epidemiology of parasitic infections. There must also be an insight, vision and genuine concern of dedication by proposing a frame work that will effectively manage the scourge (POLICY Project/Nigeria, 2002). In Nigeria, fever from malaria, diarrhoea and vaccine preventable diseases are the major causes of mortality in children under 5 years, but this study is to investigate the intestinal parasitic agents of diarrhoea in children less than 5 years in Lagos metropolis, Nigeria.

MATERIALS AND METHODS

Ethical Approval

Ethical approval was obtained from the Hospital Management and Institutional Review Board Committee (IRBC) of the Nigerian Institute of Medical Research (N.I.M.R.) Yaba, Lagos.

Study Design/Area

A total of 105 samples were collected from children less than 5 years attending two health centers, Randle General Hospital in Surulere Local Government Area and St. Matthew's Catholic Children's Hospital in Ajegunle, Ajeromi Local Government Area, Apapa in Lagos State and diagnosed of having diarrhoea were recruited into this study.

Direct Microscopy

The technique of WHO 1987, 1993, and 1998 were used for examination of the samples. Here, faecal samples were fixed in 10% formal saline, re- suspended in peptone water (1:5g/v), shaken to mix; filtered and stained in Nigrosin 10% w/v-Methylene blue 1w/v.The stained filtrate was mounted on a slide, stained further with 1 drop of 2% iodine solution and examined microscopically at low and high powers. Ova and cysts were identified using WHO microscopic standard technique. Quantitative analysis was carried out on positive samples using Kato-Katz technique cellophane faecal thick smear method of WHO, 1987, 1993 and 1998.

Data Analysis

Data collected were analyzed using Epi-Info version 6.0. Result was considered statistically significant at p –value of < 0. 005.

RESULTS

Table 1: Prevalence of parasites in relation to site

SITE	PARASITES		TOTAL
AJEGUNLE	SURULERE		
Negative	33(63.5%)	35(66%)	68(64.8%
Positive	19(36.5%)	18(34%)	37(35.2%)
TOTAL	52(100%)	53(100%)	105(100%)

P=0.783

Table 2: Prevalence of parasites in relation to sex

	Positive	Negative	Total
Males	39(37.1%)	22(20.9%)	61(58.!%)
Females	15(14.3%)	29(27.6%)	44(41.9%)
Total	54(51.4%)	51(48.6%)	105(100%)

Table 3: Prevalence of parasites in relation to age

Age group	A. lumbricoides	E. coli	E. histolytica	Enterobius	G. lamblia	Hookworm	T. trichura	Total
a) 1-12	0(0%)	1(25%)	2(50%)	0(0%)	1(25%)	0(0%)	0(0%)	4(100%)
b) 13-24	1(14.3%)	3(42.9%)	2(28.6%)	0(0%)	1(14.3%)	0(0%)	0(0%)	7(100%)
c) 25-36	3(20%)	3(20%)	6(40%)	0(0%)	2(13.3%)	0(0%)	1(6.7%)	15(100%)
d) >36	5(45.5%)	0(0%)	2(18.2%)	1(9.1%)	0(0%)	3(27.3%)	0(0%)	11(100%)
TOTAL	9(24.3%)	7(18.9%)	12(32.4%)	1(2.7%)	4(10.4%)	3(8.1%)	1(2.7%)	37(100%)

Chi-square=22.0744, df=18, p=0.2287

In table 3, Ascaris lumbricoides had the highest prevalence of 45.5% among agerange>36 months while E.coli, E histolytica, Enterobius vermicularis, G. lambia and Hookworm had 42.9%, 40%, 9.1% 14.3% and 27.3% in age groups 13-24, 25-36,>36,13-24 and>36 months respectively.

Table 4: Distribution of the parasites associated withdiarrhoea

Organisms	Frequency	Percent
E. histolytica	12	32.40%
A. lumbricoides	9	24.30%
E. coli	7	18.90%
G. lamblia	4	10.80%
Hookworm	3	8.10%
Enterobius spps	1	2.70%
T. trichura	1	2.70%
Total	37	100.00%

The frequency distribution of the parasites associated with diarrhea is shown in table 4, where E histolytica had the highest prevalence of 32.4% as against T. trichura having the lowest rate of 2.7% prevalence.

Table 5: Family size and parasite percentage

Organism	Family Size		TOTAL
	a <=3	b >3	
A. lumbricoides	4(57.1%)	3(42.9%)	7(100%)
E. coli	4(57.1%)	3(42.9%)	7(100%)
E. histolytica	7(63.6%)	4(36.4%)	11(100%)
Enterobius	1(100%)	0(0%)	1(100%)
G. lamblia	2(50%)	2(50%)	4(100%)
Hookworm	1(33.3%)	2(66.7%)	3(100%)
T. trichura	0(0%)	1(100%)	1(100%)
Total	19(55.9%)	15(44.1%)	34(100%)

Chi-square=3.0083df=6, P=0.8078

DISCUSSION

Diarrhoeal infection continues to be a source of morbidity and mortality in this vulnerable group. This study showed that parasitic infections is a major cause of diarrhoea in children in Ajegunle and Surulere Lagos, Nigeria with a total prevalence of parasitic agents of 35.20% among the infected children which include Entamoeba histolytica, Ascaris lumbricoides, Entamoeba coli, Gardia lamblia,hookworm,Enterobius vemicularis and Trichuris trichuria. This observation is very close to the work done by Idika et al., (2011) where they discovered a prevalence of 32%, the slight difference in these studies may be as a result of the numbers of the participants used in the two studies.Various studies in Nigeria and Sub-Saharan Africa have reported the increased incidence of parasitic diarrhoea disease globally. An earlier study carried out by Alabi et al., 1998 in Lagos showed that about 8.4% of children under 5 years with diarrhea were caused by parasitic agents with a prevalence of 26.8%. This study showed an increase in parasitic dearrheoal disease compared to some previously reported studies. This is an indication that control efforts towards diarrhoeal disease is not imparting positively or is lacking. In addition, to poor personal hygienic practices which are major risk factors for diarrhoeal disease. Ajegunle and Surulere are highly populated areas of Lagos with a large slum settlement, sloppy areas and dump sites. These factors obviously promote transmission of these parasites (Mac Dougall and McGahey, 2003). Poor environmental hygienic practices are major contributing factors as most houses in the areas visited were constructed along the water ways thus during the flood seasons most of this houses are sub merged in dirty flood water including wells and bore holes. The findings of Satyawisis et al., (1991) corroborated same findings and that of Rowland, (1996) and Tonnie et al., (2003) that contaminated water source is a common breeding ground for parasites and subsequent infection of children causing diarrhoeal. The WHO report on global water supply, showed that the proportion of population in Africa including Nigeria with access to safe water and sanitation is grossly limited. This study highlighted that the lack of

deworming exercise and routine health check for the children were significant risk factors for parasite infection and diarrhea (WHO, 2000). This study did not find any association between age of the children and type of parasite found in their stool but majority of diarrhoea occurred in children over 24 months (78.6%), this re-enforces the role of poor hygienic practices in parasite infestation because at this age, a child is learning to crawl or walk and thus is likely to put dirty hands in the mouth. The level of education and knowledge of the care givers may have played a role in the increase prevalence of diarrhoea disease by parasites in these children because most of the caregivers had no secondary school education and did not routinely take the children for checkup/clinical evaluation or deworm them. There is therefore the need for improvement in these areas as recommended by World Health Organization, the US Agency for International Development (USAID), UNICEF and other international organizations. The Ministry of Health should create more awareness to the public on how to eradicate the spread of the causative agents of diarrhea disease to achieve the Millennium Development Goal, 4 (MDG4)

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