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Prevalence of Helminthic Infection and its association with the Nutritional Status of Rural Primary School Children in Osun State, Nigeria

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Abstract

Helminthic infection, which has been reported to be highly prevalent in Nigeria, has also been reported to contribute to the high prevalence of malnutrition. This study therefore aimed to find the prevalence of helminthic infection and its association with the nutritional status of rural primary school children in Osun State, Nigeria. Respondents were selected from rural communities in Osun State using multi-stage sampling technique. The stool samples of the children were collected and analysed for the presence of ova of intestinal parasites. Information from respondents was obtained using pre-tested semi-structured questionnaires and their weights and heights were measured and used to calculate their Body Mass Index (BMI). Of the 245 respondents, 112 (45.7%) were 6 to 9 years of age, and others (133, 54.3%) were 10 to 12 years of age with a mean age of 9.31 ± 1.97 years. Using the World Health Organization growth reference for school-age children, 106 (43.3%) of the respondents were underweight, 139 (56.7%) were of normal weight and none were neither overweight nor obese. After the stool analysis, 75 (30.6%) had helminthic infection as evidenced by the presence of ova of intestinal parasites in their stool, while the others (170, 69.4%) had no evidence of helminthic infection. There was a statistically significant relationship between helminthic infection and the nutritional status of the respondents, their age groups, school types, fathers' occupation, mothers' occupation and their family settings. The prevalence of intestinal helminthic infection in this study (30.6%) was high and children with helminthic infections were more likely to be underweight.. There is the need for regular de-worming of school-age children, especially those living in the rural communities.

Keywords: School-Age; Children; Rural; Helminthic infection; Nutritional Status

1. Introduction

1. Introduction

Intestinal Parasitic infections are among the most prevalent of human parasitic infections worldwide.(Toriola, 1990) Helminthic infection, which has been reported to be highly prevalent in Nigeria, has also been reported to contribute to the high prevalence of malnutrition.(Meremikwu, Antia-Obong, Asindi, & Ejezie, 2000; Runsewe-Abiodun & Olowu, 2008) According to Runsewe-Abiodun and Olowu, frequent helminthic infections put a very heavy toll on the nutritional status of children through increased metabolic rate, anorexia and diarrhoea among other things.(Runsewe-Abiodun & Olowu, 2008)

Studies have shown that malnutrition remains the world's most serious health problem and the single biggest contributor to child mortality.(Bhoite & Iyer, 2011) Garrow et al in 2000 reported that about half of the world's children suffer from stunting (height-for-age criteria) and 10%-15% of them from wasting (weight-for-height criteria).(Garrow, James, & Ralph, 2000) The United Nations Children's Fund (UNICEF) in the State of the world's children, 2005 estimates that about 90 million children suffer from severe malnutrition.(United Nations Children's Fund(UNICEF), 2005)

This study therefore aimed to find the prevalence of helminthic infection and its association with the nutritional status of rural primary school children in Osun State, Nigeria.

2. Methodology

This was a descriptive cross sectional study, carried out among school-age children attending primary schools in rural communities of Osun State, Southwestern Nigeria. Children attending primary schools in the rural communities who were 6 to 12 years of age were included in the study, and children who had acute illnesses like gastroenteritis or chronic illnesses like sickle cell anaemia were excluded from the study. Using Leslie Fisher's

formula with a prevalence of 70.5% from a previous study,(Oninla SO, Owa JA, Onayade AA, & Taiwo O., 2007) the minimum sample size calculated was 319. The sample size was increased to 351 to cater for an anticipated 10% non-response. The multi-stage sampling technique was used to select the respondents from selected rural communities in Osun State, and data was collected with pre-tested, semi-structured questionnaires which were interviewer administered. The instruments for anthropometric measurements were the electronic bathroom weighing scale for measuring weight in kilograms (kg). Height was measured with a standiometer. From these, the Body Mass Index (BMI) was calculated, defined as body weight in kilograms divided by the square of height in meters (kg/m^2), and used as the measure of nutritional status in this study using the growth references by World Health Organization (WHO).(de Onis Mercedes, Onyango, Borghi, Siyam, & Siekmann, 2007) Stool samples were collected by the parents/guardians the morning of the collection day just before the child left for school, so that the research team collected them within 30 – 45 minutes of its collection. All returned stool specimen were collected and transported to the Microbiology department of LAUTECH Teaching Hospital. A senior laboratory scientist was arranged to examine the stool samples for ova of parasites (includes all common intestinal parasites like Ascaris lumbricoides and Hook worm) within one hour. The results were recorded in the questionnaire.

The questionnaires were sorted out, entered into a computer and the obtained data was analyzed using Statistical Package for Social Sciences (SPSS) version 16. Frequency distribution tables were generated from variables while cross-tabulations using chi-square for bivariate analysis were done as applicable. T-test, Analysis of Variance (ANOVA), regression and correlation were also used in the analysis of continuous variables as appropriate. Level of significance was set with p-value less than 0.05. Ethical clearance for the study was obtained from the Ethical Review Committee of LAUTECH Teaching Hospital.

3. Results

Of the 245 respondents, 112 (45.7%) were 6 to 9 years of age, and others (133, 54.3%) were 10 to 12 years of age with a mean age of 9.31 ± 1.97 years. Majority of the respondents were females (133, 54.3%), Muslims (132, 53.9%) and were from monogamous family settings (145, 59.2%) as shown in Table 1.

Using the World Health Organization growth reference for school-age children, 106 (43.3%) of the respondents were underweight, 139 (56.7%) were of normal weight and none were neither overweight nor obese. Forty (16.3%) of the school children had been de-wormed in the 6 months preceding the study, 93 (38.0%) were not, while the remaining 112 (45.7%) did not know if they had been de-wormed or not. After the stool analysis, 75 (30.6%) had helminthic infection as evidenced by the presence of ova of intestinal parasites in their stool, while the others (170, 69.4%) had no evidence of helminthic infection. (Table 2)

Table 3 shows the relationship between helminthic infection among respondents, their socio-demographic characteristics and their nutritional status There was a statistically significant relationship between helminthic infection and the nutritional status of the respondents ($p = 0.017$), such that those who had helminthic infections were more likely to be underweight than those who had no helminthic infections. There were also significant relationships between helminthic infection and age groups ($p = 0.032$), school types ($p = 0.022$), fathers' occupation ($p = 0.026$), mothers' occupation ($p = 0.001$) and their family settings ($p < 0.001$).

4. Discussion

Ova of parasites were found in the stool samples of about 3 out of 10 respondents in the rural communities. The prevalence of intestinal helminthic infection in this study (30.6%) is higher than what was found by Uneke et al in South-Eastern Nigeria,(Uneke, Eze, Oyinbo, Azu, & Ali, 2007) but lower than the 44.2% which was reported by Adekunle(Adekunle, 2002), 43.0% that was reported by Adeyeba and Tijani,(Adeyeba & Tijani, 2002) and the 52% reported by Adefioye et al.(Adefioye et al., 2011) This difference may be due to the fact that many of these studies were carried out more than 5 years ago. It however still shows a high level of intestinal heminthic infection especially among the rural dwellers. This is similar to the finding of a study carried out in Ogun State, Nigeria.(Runsewe-Abiodun & Olowu, 2008) This may generally reflect the relatively poorer level of hygiene associated with the rural dwellers,(Bamidele & Adebimpe, 2009) which may not be unconnected with the low educational and socioeconomic status of majority of the rural dwellers.(Fotso JC, 2007)

Underweight is used as a composite indicator to reflect both acute and chronic undernutrition, although it cannot distinguish between them.(Bose, Bisai, Chakraborty, Dutta, & Banerjee, 2008) About two-fifths of the children in this study were found to be underweight. This rate is similar to what was reported by Goon et al(Goon et al., 2011) in 2011 who reported 43% to be underweight in Benue State and Meremikwu et al(Meremikwu et al., 2000) who reported 37.9% in the year 2000, although these other studies were not restricted to rural communities. Higher rates of underweight were however reported by Oninla et al(Oninla SO et al., 2007) in rural communities of Osun State who reported 70% in the year 2007. This may generally reflect the nutritional transition being reported in developing countries, where underweight rates are taking a downward turn.(Doak CM, Adair LS, Bentley M, Monteiro C, & Popkin BM, 2005; FAO, 2006) This may be the probable reason why

the prevalence rate of underweight that was reported by Oninla et al(Oninla SO et al., 2007) in the same Osun State six years ago nearly doubles the finding of this study. It however, may just be a reflection of the socio-economic status of the different study areas.(Doak CM, Adair LS, Monteiro C, & Popkin BM, 2000; Wang & Lobstein, 2006)

According to the World Health Organization, undernutrition contributes to a downward spiral to a poor state of health that is fuelled by an increased burden of disease, stunted development and reduced ability to work. There is therefore the need for more to be done in ensuring food security and adequate nutrition education, especially for the rural dwellers.

Intestinal helminthic infection was found to be significantly associated with the nutritional status of the children, such that significantly more of the children who had helminthic infection had higher rates of underweight children. Previous authors have similarly reported an association between nutritional status and intestinal helminthic infection.(Adeyeba & Tijani, 2002; Bamidele & Adebimpe, 2009; Meremikwu et al., 2000; Runsewe-Abiodun & Olowu, 2008; Sur, Saha, Manna, Rajendran, & Bhattacharya, 2005; Uneke et al., 2007) Intestinal helminthic infection is related to various factors ranging from poverty to poor hygiene.(Bamidele & Adebimpe, 2009) Intestinal helminthic infections have been said to put a very heavy toll on the nutritional status of children through increased metabolic rate, anorexia and diarrhoea among other things hence contributing to undernutrition,(Runsewe-Abiodun & Olowu, 2008) therefore health education on the need for personal and environmental hygiene is necessary, especially for the rural dwellers. There is also the need for regular de-worming of school-age children, especially those living in the rural communities.

The socio-economic status of the parents of the children could not be directly measured as many of the children could not give accurate information about their parents' educational status and income. However, the occupations of the parents and the type of schools the children attended could act as proxy to their socio-economic status and all these were significantly associated with helminthic infection in the children. It was such that children with unskilled/semi-skilled parents and children attending public schools were more likely to have helminthic infections than the others. This similar to the findings of other authors,(Bamidele & Adebimpe, 2009; Runsewe-Abiodun & Olowu, 2008) who have also observed a relationship between helminthic infections and the socio-economic status of respondents. The government and other Non-governmental organizations (NGOs) involved in development should however design relevant policies or review existing ones in order to bridge the rural-urban gap and provide the necessary environment for rural dwellers to live healthy and productive lives, especially as a greater proportion of the population still live in rural communities.(Federal Republic of Nigeria Official Gazette, 2009; The Osun State Ministry of Information and Women Affairs, 2006)

5. Conclusion and Recommendation

The prevalence of intestinal helminthic infection in this study (30.6%) was high and was significantly associated with the nutritional status of the respondents. it was such that children with helminthic infections were more likely to be underweight when compared with those with no helminthic infection. There is the need for regular de-worming of school-age children, especially those living in the rural communities.

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Table 1: Socio-demographic characteristics of respondents

Variables	Frequency	Percentage
Age group (in years)		
6 – 9	112	45.7
10 – 12	133	54.3
School type		
Public	120	49.0
Private	125	51.0
Gender		
Male	112	45.7
Female	133	54.3
Religion		
Christianity	113	46.1
Islam	132	53.9
Father's occupation		
Unemployed	6	2.4
Skilled	41	16.7
Semi-skilled	124	50.6
Unskilled	74	30.2
Mother's occupation		
Unemployed	3	1.2
Skilled	25	10.2
Semi-skilled	158	64.5
Unskilled	59	24.1
Family setting		
Monogamous	145	59.2
Polygamous	100	40.8

Table 2: Helminthic infection among respondents

Variables	Frequency	Percentage
De-wormed in the last 6 months		
Yes	40	16.3
No	93	38.0
Don't know	112	45.7
Helminthic infection		
Yes	75	30.6
No	170	69.4

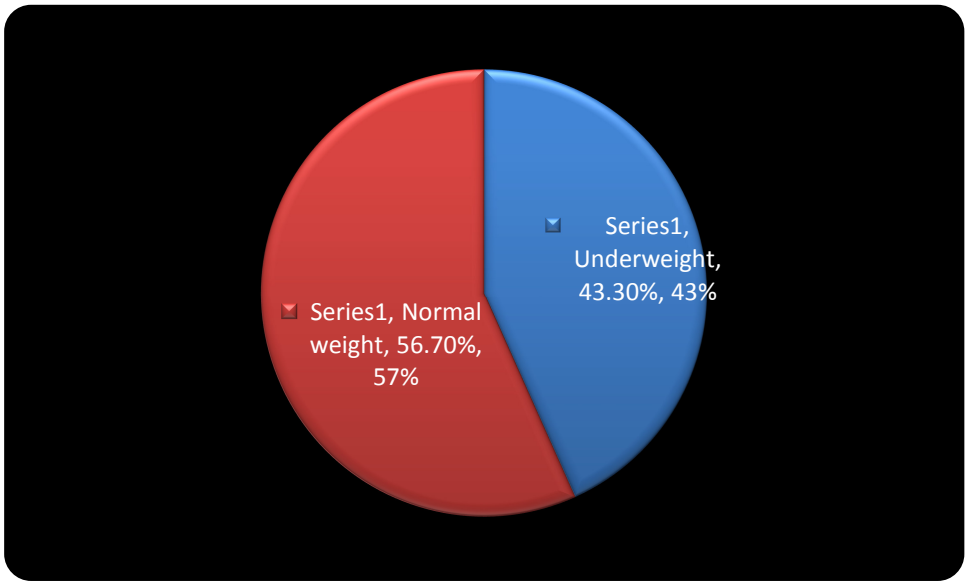

Figure 1: Nutritional status of respondents using the WHO classification

Table 3: Relationship between helminthic infection among respondents, their socio-demographic characteristics and their nutritional status

Variables	Helminthic infection (%)		Chi-square	p-value
	Yes	No		
Age group (in years)				
6 – 9	42 (56.0)	70 (41.2)	4.61	0.032*
10 – 12	33 (44.0)	100 (58.8)		
School type				
Public	45 (60.0)	75 (44.1)	5.25	0.022*
Private	30 (40.0)	95 (55.9)		
Gender				
Male	39 (52.0)	73 (42.9)	1.72	0.190
Female	36 (48.0)	97 (57.1)		
Religion				
Christianity	33 (44.0)	80 (47.1)	0.20	0.658
Islam	42 (56.0)	90 (52.9)		
Father's occupation				
Unemployed	0 (0.0)	6 (3.5)	9.25	0.026*
Skilled	6 (8.0)	35 (20.6)		
Semi-skilled	43 (57.3)	81 (47.6)		
Unskilled	26 (34.7)	48 (28.2)		
Mother's occupation				
Unemployed	0 (0.0)	3 (1.8)	17.13	0.001*
Skilled	0 (0.0)	25 (14.7)		
Semi-skilled	60 (80.0)	98 (57.6)		
Unskilled	15 (20.0)	44 (25.9)		
Family setting				
Monogamous	57 (76.0)	88 (51.8)	12.65	<0.001*
Polygamous	18 (24.0)	82 (48.2)		
Nutritional status				
Underweight	41 (54.7)	65 (38.2)	5.72	0.017*
Normal weight	34 (45.3)	105 (61.8)		

* Statistically significant

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