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Assessment of Mothers' Knowledge, Attitudes, and Practices toward Preventing and Controlling Intestinal Helminths in Maiduguri Metropolis, Borno State

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Abstract

Soil-transmitted helminthiasis (STH) is a parasitic disease caused by nematodes acquired through feces-contaminated soil, affecting nearly 2 billion people globally. Understanding maternal knowledge, attitudes, and practices is crucial for effectively preventing and controlling intestinal helminths. This study was carried out to assess mothers' knowledge, attitudes, and practices in Maiduguri Metropolis, Borno State, regarding the prevention and control of intestinal helminths. A cross-sectional survey was conducted among 153 mothers in Maiduguri using a structured questionnaire. Participants were categorized based on age, education, and occupation. Knowledge was assessed using a Guttmann Scale, with scores classified as knowledgeable (below the median score) or non-knowledgeable (above the median). Descriptive statistics were used to summarize the findings. In terms of practices, a significant proportion of mothers demonstrated awareness of basic hygiene and preventive measures, such as handwashing and ensuring proper sanitation. However, 21.6% of participants lacked sufficient knowledge, reflecting gaps in understanding critical aspects of intestinal helminth prevention. While 93.4% of respondents correctly identified symptoms such as vomiting, diarrhea, and abdominal discomfort, 5.3% admitted unawareness of any symptoms, highlighting the need for further education. Community health programs should target the identified gaps through tailored health education initiatives. Efforts should prioritize improving awareness of symptoms, infection sources, and the importance of consistent hygiene practices. This would ensure better preventive behavior and reduce intestinal helminths' prevalence in the region.

Keywords: knowledge, helminthiasis, Maiduguri, malnutrition, Neglected Tropical Diseases.

INTRODUCTION

The term "solubilized tremors of helminthiasis" (STH) refers to a class of parasitic diseases caused by nematode worms that are spread to humans through feces-contaminated soil. Approximately 2 billion people worldwide are infected with STH (Nazir *et al.*, 2021). The majority of STH patients are school-aged children (5–14 years old), with preschoolers being affected to a lesser extent (Nazir et al., 2021). According to estimates, roundworm infections (Ascaris lumbricoides; approximately 820 million) are the most common, followed by hookworm infections (Necator americanus and Ancylostomaduodenale; approximately 460 million) and whipworm infections (Trichuris trichuria; approximately 440 million) (Rajoo et al.2017).

Neglected tropical diseases (NTDs) impact at least 1.7 billion people worldwide in 185 countries; to reduce the burden, NTDs must be treated and cared for either widely or personally. Five NTDs affect at least 1.1 billion (65%) of them, who live in low- and middle-income countries (Nazir et al., 2021). According to Cox (2016), 3.3 million disability-adjusted life years are attributed to STH worldwide. The illness could affect about 600 million school-age children (SAC) and 270 million preschool-aged children (PSAC).

According to Odinaka et al. (2015), Nigeria has the largest load and highest endemicity of soil-transmitted helminths. Children aged 5 to 14 who reside in rural regions and some who come from urban slums make up a bigger portion of those affected (Oluwole et al., 2015). Cultural, social, and environmental factors are among the elements that contribute to the persistence of infection (Eke et al., 2018).

There are still regions in Nigeria, including Maiduguri, where epidemiological data on STH infections are either nonexistent or very scarce. Most of the people in Borno State are farmers, so children in these areas are constantly at risk of contracting helminths. Children and adults in agricultural communities engage in activities such as open defecation, barefoot strolling, and eating raw, unwashed fruits and vegetables, which might put one at risk of contracting STH infection (Naish, 2014). Many people in rural areas of low- and middle-income nations, such as those in sub-Saharan Africa, still face significant obstacles in getting access to health interventions because these regions have weak health systems and insufficient means of providing essential medical care to those who need it most (Makaula et al., 2022). The World Health Organization (WHO) has identified the primary interventions for the prevention and control of non-transformed disease (NTD) as mass drug administration (MDA) preventive chemotherapy, case management, vector management, environmental improvement initiatives, and health promotion (Makaula *et al.* 2022). According to Sanchez *et al.* (2013), children who contract parasitic infectious agents run the risk of experiencing growth retardation due to compromised nutritional utilization, hepatomegaly, splenomegaly, weakened immune systems, and decreased IQ. (Sanchez *et al.*, 2013).

The WHO has strongly recommended the regular mass administration of anthelmintic medicines outside of healthcare settings as one of the preventative initiatives (Imam *et al.* 2019). Anti-helminth treatment has been administered to millions of school-age children (Tchuem Tchuenté, 2011). However, due to inadequate sanitation, a lack of clean water, and low levels of education, the control measures are limited in their ability to be entirely successful in developing nations (Truscott *et al.*, 2014). The primary causes of the high prevalence of intestinal parasites in tropical and sub-tropical regions are inadequate sanitation, contaminated drinking water, and a lack of restroom facilities (Ziegelbauer *et al.* 2012). From the foregoing, a deeper understanding of the key factors influencing intestinal parasite infections, including social, cultural, and behavioral aspects, is essential for eliminating STHs, and community awareness of the impact of these parasites plays a crucial role in shaping effective control strategies. By identifying how these elements affect the epidemiology and management of intestinal helminths, targeted interventions can be developed to reduce their prevalence and associated health burdens. This is what the current study aims to achieve (Sharma *et al.*, 2020).

MATERIALS AND METHODS

Study Area

The study was conducted in Nigeria's Borno State, in the Maiduguri Metropolis. Borno, referred to as yerwa by the indigenous population, is a state located in the northeast region. Its headquarters and main city is Maiduguri. The Kanem-Bornu Empire is headquartered at Maiduguri, which the British established in 1907 as a military garrison. Most of the population comprises Fulani, Hausa, Shuwa, Bura, Marghi, Chibok, and Kanuri ethnic groups. The Boko Haram insurgency has affected Borno State, and over 40% of the local government districts have moved into the metropolitan regions, one of which being Maiduguri. The internally displaced people are staying in camps with insufficient communal facilities.

Research Design

The study is a descriptive, cross-sectional study. The study was designed to obtain information using a survey questionnaire. The questions are categorized into three sections to obtain information on demography, knowledge, attitude, and practice, the questionnaire was designed in such a way that the different section was analyzed separately. Five items were included in the questionnaire used to gather the knowledge data. Unfavorable questions received a point if they were erroneous and a zero if they were correct while entering and assessing the knowledge data using the Guttmann Scale grading system. There were several answers to those five questions. Out of the several alternatives, option "I don't know" received a score of 1, while all other options received a score of 0. To receive 0, the participants had to select at least one right response from the available options. As a result, 5 and 0 would be the highest and lowest possible scores. It was determined that the mean and median were 2.97 and 2.0, respectively. Following the central tendency calculation, the median was used to classify the data into knowledgeable and non-knowledgeable categories.

Population of the Study

The study focused on mothers/caregivers in the Maiduguri metropolis, including Jere, Konduga, Mafa local government areas, and Maiduguri metropolitan council with a population of more than 822,000 (National Population Commission, 2022). Seven questions were included in the questionnaire used to collect the attitude data. According to the Likert Scale, four points were given for "extremely disagree," three for "disagree," two for "extremely agree," and one point for "agree." As a result, 28 was the highest score possible, and 7 was the lowest. The median value was used to classify a set of favorable and negative attitudes. The results were regarded as a positive attitude if the score was less than the median. Conversely, when the score exceeded the median, a negative attitude was taken into account. The attitude scale had a mean of 6.05 and a median of 6.00.

Sample and Sampling Techniques

All Mothers who fulfilled the inclusion criteria were recruited consecutively until the minimum sample size was attained.

Inclusion Criteria

Mothers with their children, whose age were between 2 and 6 years and who had lived in Maiduguri town for at least 6 months, were included

Exclusion criteria

1. Mothers/caregivers with children aged 2-6 years and do not live or are visitors to Maiduguri
2. Mothers who refuse to consent

Data Analysis

A computer program was created using the data from the patient questionnaire as well as additional pertinent information from this investigation. The Statistical Package for Social Sciences (SPSS) version 23 computer program from the United States was used to analyze the data, and the results are shown in tables and percentages. Data descriptive statistics were summarized using frequency and cross-tabulation. Tables were used to display the percentage of mothers' knowledge, attitudes, and practices.

Ethical Consideration

Ethical approval was sought for and obtained at Borno State Ministry of Health with a reference number SHREC no. 077/2024.

Consent

Each participant provided their signed or thumb-printed informed consent, with the option to withdraw or opt out anytime.

RESULTS

Out of the 153 respondents who participated in this survey, the majority of the respondents in this study were within the age range 28-37 years with 56.2% (86) followed by the age greater than 37 years with 30.7% (47), lastly 18-27 years with 13.1% (20). For the level of education, 83% (127) of the respondents have tertiary education, while 3.9% (6) and 13.1% (20) have primary and secondary education, respectively. About 24.8% (38) of the respondents are businesswomen, 51.6% (79) are civil servants, 12.4% (19) are farmers, and 11.2% (17) are housewives. (Table 1) The majority of the mothers, 43.1% of moms, had values above the median based on the data and were considered as having a negative attitude, while 56.9% of mothers had values below the level of the median and were considered as having a positive attitude.

The outcomes were considered knowledgeable if the actual score was lower than the median and categorized as non-knowledgeable if the calculated score was higher than the median. According to the median value, 21.6% of the women scored above the median value and were considered non-knowledgeable, and 78.4% of mothers scored below the median value and were considered knowledgeable about soil-transmitted helminths and its prevention and control methods in Maiduguri town.

Table 2 shows respondents' knowledge of intestinal helminths. About 86.3% (132) of the respondents know that intestinal worms are harmful, while 10.5% (16) of the respondents believe worms are not harmful, and 3.3% (5) did not know. Most respondents, 90.2% (138), agreed to have heard about intestinal worms, while 9.8% (15) stated that they had not heard of intestinal worms. A good number of the respondents, 50.9% (78), stated that the source of infection is soil and feces, while 39.9% believe the source is from soil only, and a minority, 9.2% (14), do not know the source of intestinal worm. A total number of 93.4% (143) of the respondents believed that abdominal pain, diarrhea, and vomiting as signs of intestinal worm, and 3.3 %(5) of the respondents stated weight loss as a sign, while 3.3% (5) said that they don't know the sign of intestinal worms. The majority of the participant, 73 %(112), believed that malnutrition and growth retardation as some of the complications of intestinal worms, while a few numbers, 20.3 %(31), had Anemia, and about 6.5% (10) did not know any complications.

Table 1: Socio-demographic Characteristics of Respondents

Variables	Frequency	Percentage (%)
Age (years)		
18 - 27	20	13.1
28 - 37	86	56.2
>37	47	30.7
Marital status		
Divorced	4	2.6
Married	113	73.4
Single	27	17.5
Widowed	9	5.8
Educational status		
Non or primary	6	0.6
Secondary	20	16.9
Tertiary	127	82.5
Occupation		
Business	38	24.8
Civil servant	79	51.6
House wife	17	11.2
Farmer	19	12.4

Table 2: Knowledge of intestinal helminths among respondents in Maiduguri

Question	Frequency (N=153)	Percentage (%)
Are intestinal worms harmful?		
Yes	132	86.3
No	16	10.5
I don't know	5	3.3
Have you heard about intestinal worms		
Yes	138	90.2
No	15	9.8
What is the source of intestinal worm infection		
Feces and soil	78	50.9
Soil	61	39.9
I don't know	14	9.2
What are the symptoms of infection with intestinal worms		
Abdominal pain, vomiting and diarrhea	143	93.4
Weight loss	5	3.3
I don't know	5	3.3
What are the complication of intestinal worm infection		
Aneamia	31	20.3
Malnutrition and growth retardation	112	73.2
I don't know	10	6.5

Out of the 153 respondents in the survey, 75.1% (115) agreed that lack of hygiene is associated with intestinal helminths, while 6.6% (10) of the participants strongly disagreed. However, a good number of the respondents, 18.3% (28), were neutral. From the study, 92.2% (141) of the respondents settled that intestinal worms can be treated, while none of the respondents disagreed, and a minority, 7.8 % (12) of the respondents were neutral. The majority of the respondents, 87.6% (134), agreed that health education could reduce intestinal helminths, 0.7% (1) of the respondents disagreed, while the minority of the respondents, 11.7 % (18), were neutral.

The majority of the respondents, 83.7% (128), agreed to hand washing as a preventive measure of intestinal helminths, while 8.5% (13) disagreed, and 7.8% (12) were neutral. (Table 3)

The data regarding practice were acquired using 8 "yes" and "no" questions, where the highest and lowest scores were 8 and 0 points (Ordinal Scale), respectively. One mark was awarded for 1 correct answer and 0 for a wrong answer. A group of good and poor practices was categorized based on the median. The result was considered good practice if the score was higher than the median value and poor practice if the score was lower than the median.

Table 3: Participants attitude towards prevention of intestinal helminths

Questions	Frequency (N=153)	Percentage (%)
Lack of hygiene is associated with intestinal helminths		
Strongly disagree	3	2.0
Disagree	7	4.6
Neutral	28	18.3
Agree	83	54.2
Strongly agree	32	20.9
Intestinal worms can be treated		
Strongly disagree	0	0
Disagree	0	0
Neutral	12	7.8
Agree	85	55.6
Strongly agree	56	36.6
Health education can reduce		
Strongly disagree	0	0
Disagree	1	0.7
Neutral	18	11.7
Agree	91	59.5
Strongly agree	43	28.1
Hand washing		
Strongly disagree	1	0.7
Disagree	12	7.8
Neutral	12	7.8
Agree	76	49.8
Strongly agree	52	33.9
Eating unwashed raw fruits		
Strongly disagree	0	0
Disagree	11	7.2
Neutral	12	7.8
Agree	87	56.9
Strongly agree	43	28.1

Table 4: Practice of mothers towards prevention of intestinal helminths among respondents in Maiduguri

Question	Frequency (N=153)	Percentage (%)
Have your child ever been diagnosed with intestinal worms?		
Yes	39	25.5
No	112	73.2
May be	2	1.3
Do you often cut your child's nail?		
Yes	134	87.6
No	18	11.7
May be	1	0.7
Do you wash your child's hands before and after meals?		
Yes	136	88.9
No	16	10.4
May be	1	0.7
Does your child have any stool examination before?		
Yes	55	35.9
No	98	64.1
Do you wash your child's hand after playing with sand?		
Yes	129	84.3
No	20	13.1
May be	4	2.6
Do you use chemically treated or tap water?		
Yes	114	74.5
No	31	20.3
May be	8	5.2
Do you give drugs to your child to prevent intestinal worms?		
Yes	109	71.2
No	39	25.5
May be	5	3.3
Have your child ever been diagnosed with intestinal worms?		
Yes	39	25.5
No	114	74.5

DISCUSSION

In Maiduguri town, the median result showed that 73.9% of the women were thought to be informed of soil-transmitted helminths and their prevention and control measures, whereas 26.1% of the women did not know anything about them. One reason for this could be that many operational definitions have been used. Although the comparative operationalized as good knowledge, fair knowledge, and low knowledge, the operational definition of this study was classified as knowledgeable and non-knowledgeable. The total of one's fair and decent knowledge counts as knowledge. This could have raised the degree of knowledge and strayed from the lower border. A prior Ibadan research also demonstrated a knowledge of 43.2%, which is less than what this study discovered. Nonetheless, the fact that both males and females participated in the study could account for the poor awareness (Oyebamiji *et al.*, 2018). This study's findings were greater than another conducted in South Africa by Gwebu et al., who reported that 79.2% of respondents were aware of soil-transmitted helminths. This discrepancy could be the result of a concentrated group discussion and simultaneous assessments of STH and schistosomiasis knowledge. However in this

investigation, just STH was evaluated, and a self-administered questionnaire was employed.

Contaminated food, contaminated water, raw veggies, dirty fruits, and uncooked vegetables were all listed as key factors in this study, comparable to a study done in Ethiopia (Kassaw *et al.*, 2020).

Similar to a study where mothers reported that intestinal parasites manifested as diarrhea, vomiting, loss of appetite, abdominal discomfort, and an enlarged abdomen, mothers also mentioned anorexia, diarrhea, abdominal cramps, and vomiting as the main signs and symptoms of intestinal parasites (Nyentekyi *et al.*, 2019). Mothers cited growth retardation, anemia, and malnourishment as the main intestinal parasite complications; these findings are consistent with a study that found intestinal parasites could lead to serious health issues, such as malnourishment and growth retardation, if left untreated (Nyentekyi *et al.*, 2019).

Childhood infections caused by intestinal helminths are common. In this study, mothers' positive knowledge, attitude, and practice regarding STH prevention were found to be 78.4%, 56.9%, and 62.1%, respectively, while those with negative or poor knowledge, attitude, and practice were 21.6%, 43.1%, and 37.9%, respectively. Compared to 45.2% of positive knowledge discovered in Ethiopia, this study found a higher level of positive knowledge. This disparity could be the result of using a different population. While moms and caregivers are included in this study, mothers of children under five are used in the Ethiopian study (Mesfin *et al.*, 2020).

In conclusion, Community health programs should target the identified gaps through tailored health education initiatives. Efforts should prioritize improving awareness of symptoms, infection sources, and the importance of consistent hygiene practices. It is recommended that this would ensure better preventive behavior and contribute to reducing the prevalence of intestinal helminths in the region.

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