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Full Length Research Paper

Assessment of the knowledge, attitude and awareness of residents of Jos, Plateau State, Nigeria, towards worm infestation and de-worming

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Due to the poor socioeconomic conditions and severe lack of good hygienic living conditions in developing countries of the world, worm infestation has become widely prevalent and is a major public health problem. The purpose of this study was to assess the knowledge, attitude and practice of residents of Jos towards worm infestations and de-worming. This involved a cross-sectional study in urban slum of Jos North L.G.A of Plateau State, North Central Nigeria. The Yamane method was used to randomly select 399 residents of Jos, which included adults from age 15 to 60 years of both sexes. The results obtained were analyzed using Chi-square test and descriptive statistics. Most respondents (about 50.0%) had moderate level of knowledge about worm infestation, which was only associated with educational level (*p*-value = 0.034) and age group (*p*-value = 0.0021). Attitude towards worm infestation was good, while that towards de-worming was very poor. However, since attitude towards de-worming was poor, only knowledge provision is inadequate, hence attitudinal change must be imbibed to reduce risk and incidence of worm infestation.

Key words: Assessment, worm infestation, de-worming, knowledge, attitudes.

INTRODUCTION

Worm infestations are very common in developing countries of which Nigeria is one, causing much diseases in both humans and domestic animals. A parasite is any living organism that lives on a host without benefiting the host in return and in most cases, causes damage to the host in the process (Centre for Disease Control, 2000). Parasites occur in two distinct forms: single-celled protozoa and multicellular metazoan also called helminths or worms. Metazoa are further subdivided into two phyla: the platyhelminthes (flatworms) and the nemathelminthes (roundworms and nematodes). The phylum platyhelminthes contains two medically important classes; cestoda (tapeworms) and trematoda (flukes) (Warren, 2002). Helminths are the largest intestinal human parasites and are usually long-lived, increasing the chance of re-infection and chronic disease course. For example, in the epidemiology of schistosomiasis, over 200 million people are said to be affected in the tropics and subtropics, mostly concentrated in the sub-Saharan region of Africa (Kumar and Clark, 2005).

A person or object from which the infectious agent passes to a host is known as the source of the infection and this source of infection may or may not be a portion of the reservoir. For example, humans are the reservoir of shigella infection; a cook who is a carrier may infect food that is served at a party; that item of food, rather than the reservoir is the source of infection in that particular outbreak (Adetokumbo et al., 2003). The infectious agent may be transmitted from one person to another or from the reservoir to a new host through different mechanism

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such as: Penetration of skin, Ingestion, and Contact. Many research results have shown relationship between certain dietary intake and worm infestations (Taweesak, 2002).

De-worming (sometimes known as worming or drenching) is the giving of an anthelmintic drug (a wormer, de-wormer, or drench) to an animal or human being to rid it of intestinal parasites such as roundworm and tapeworm (Wikipedia, 2010). De-worming, being a preventive and curative form of therapy for helminthiasis has been extensively carried out in various public health campaigns. However, there still exists the need for better and effective implementation of community directed treatment in areas endemic for worm infestation. It is in this respect that it was documented that community-directed treatment with ivermectin (CDTi) was very successful among 60 million Africans in rural African communities. The CDTi experience prompted the board of the African Programme for Onchocerciasis Control (APOC) to commission a study, to examine an expanded strategy of community directed interventions. In 2005, the 3-year multi-country study was launched, examining to what extent the CDI process could be used for the integrated delivery of other health interventions with vary degrees of complexity, alongside ivermectin (Community Directed Interventions, 2008).

In a related study in Kwanji district, Kebbi State, North-Eastern Nigeria, infection rate was comparatively lower than in some other endemic villages in Nigeria. This was attributed to a programme of community directed mass treatment of onchocerciasis with Mectizan which had been underway in the area (Ameh et al., 2008). In low and middle-income countries where de-worming policies have been adopted, it has generally proven to be a highly effective and economically efficient public health intervention. Due to its proven effectiveness and the relatively low cost of intervention, de-worming has attracted the attention of public health officials, developmental experts, and others concerned with global health. Chemotherapy, therefore, provides the single most efficient practical and inexpensive strategy to control helminthic infections (Hardman et al., 2001).

It can be seen from the above references that intestinal helminthic infestations among others, is one of the commonest cause of chronic infection in humans in the developing countries. The impure drinking water, low socio-economic state, poor sanitation coupled with low literacy levels are some of the major causes. The socio-economic peculiarity of Jos North as an urban slum and its positioning in the tropics makes it vital to this study. Jos as a town is known for the production of a variety of arable vegetable crops which are potent sources for worm infestations, considering the fact that most farmers use very contaminated water from rivers as source of irrigation. The poor hygiene and inadequacies associated with solid waste disposal (including faecal matter) is also an implicating factor for high chances of worm infestation. Over the past four (4) years, water supply in many parts of Jos-Bukuru metropolis had been in a deplorable state, leaving people with the only option of buying water from tanks that feed from dams, which have been linked to schistosomiasis (Kumar and Clark, 2005), while those in inner rural areas even drink from direct ground water.

The objective of this work was to access the current level of awareness, knowledge and attitude regarding worm infestations and to evaluate how effective residents of Jos carry out de-worming programme on themselves.

METHODOLOGY

This cross sectional study was conducted to assess the knowledge, attitude and practice towards worm infestation and de-worming using quantitative survey interview forms (questionnaires) which were pre-tested before the commencement of survey.

Population and sample group

The cosmopolitan population of Jos was the target population; people of both sexes within the age range of 15 to 60 years were used. Estimated population of Jos in year 2010 from 1996 census result was calculated according to the National Population Commission guideline of 1996 at an average growth rate of 2.8%, using the following formula:

$$\text{Population (2010)} = \text{Population (1996)} \left[1 + \frac{R}{100}\right]^T$$

Where R is the average population growth rate and T is the time interval from 1996 to 2010, which is 13 years. Using the population of 1996 (526,676 people), the estimated population could be calculated as:

$$\text{Population (2010)} = 526{,}767\left(1 + \frac{2.8}{100}\right)^{13}$$

Hence, the population for 2010 is equal to 754,200 people.

Sample size and selection

Sample size was calculated according to Yamane, with an alpha error of 0.05 and a precision of 5% thus:

$$N = \frac{n}{1 + ne^2}$$

Where N is the sample size, n is the population and e is the alpha error (0.05).

$$\therefore N = \frac{754{,}200}{1 + [754{,}200 \times (0.05)^2]}$$

Thus, N = 399 people. With this sample size, Jos was randomly zoned into four zones: Zone A (Terminus/Farin Gada), Zone B(Angwan Rukuba), Zone C (Rayfield/Hwolshe) and Zone D (Miango/Bukuru).

Procedure of the study

First, we co-ordinated with concerned sectors, e.g. National Population Commission, state coordinating office which provided population data for Jos. Next, questionnaires where pre-tested among five (5) respondents. These questionnaires were then dispatched within the zones for a period of 7 weeks running. Finally, the filled questionnaires were then retrieved and coded for analysis.

Data analysis

After a concise rechecking procedure, questionnaires were then encoded and analysed on Microsoft Excel, 2003. Comparison between variables was done using Chi-square test. A *p*-value of less than 0.05 was considered statistically significant. Descriptive statistics (percentages) were used to describe the frequency.

RESULTS

Three hundred and ninety-nine (399) residents of Jos were assessed during the study, out of which 56% (n = 226) were males and 43.6% (n = 173) were females. Minimum age was 15 years, while maximum age was 60 years. Age group between 15 – 35 years were the highest contacted, 85.20% (n = 340). Age between 36 - 50 years constituted 13.30% (n = 53), while 51 - 60 years group were the least. Overall, 94.70% of the respondents were Christians, while 5.30% were Muslims. About 66.2% (n = 264) of the respondents were ethnic groups from the North Central zone of the country, while the core North and South East were in the proportion of 3.5 and 15.0%, respectively. The South-South ethnic groups made up 5.8%, while those from the South-West were 9.5%. Moreover, 77.70% (n = 310) were single, while 20.3% (n = 81) were married. Only 2% were either widows/widowers.

In addition, the educational status showed 2.68% to have had only primary school education, while 28.32% had secondary school education as their highest qualification. Also, 69.0% of the population comprises those that had passed through tertiary institution. Furthermore, 5.8% were unemployed, 54.4% were students, especially of higher institution, 19% were civil servants, 10% were into businesses and 16.6% were into other occupations; 73.43% reside in Zone A (Terminus/Farin Gada), 19.80% reside in Zone B (Angwan Rukuba), Zone C (Rayfield/Hwolshe) had 3% while Zone D (Miango/Bukuru) comprised 3.77%.

DISCUSSION

From Table 1, most respondents like and consume vegetables often (62.3%), which are often bought from the market of which most of the farm are irrigated with contaminated water placing the consumers at risk of worm infestation if not properly prepared before consumption. The result also showed that most respondents only treat their water sometimes (n = 216, at 54.10%), while 21.80% (n = 87) do not treat water at all, leaving only 24.10% who do it always. Of these individuals, most of them drink tap water from dams, 43.4% (n = 173), which have been linked to spread of schistosomiasis (Kumar and Clark, 2005). It was also seen that 49.6% (n = 198) of the respondents consume beef, fish 49.1% (n = 196) and snail (45) which have been linked to taeniasis and even schistosomiasis, respectively. Moreover, about 1.80% (n = 7), consume pork which has been linked with trichinosis. Though a majority claimed they prepare their meat well cooked (98.50%), barbecue and grills sellers by the road side only prepare beef to undercooked level, increasing risk for taeniasis because they are highly patronised.

Table 2 showed that about 87.5% (n = 293) believed they could be infected by worms which was quite high. However, 62.70% (n = 210) of the people did not go for periodic medical check-up to know their worm status, while 28.90% (n = 97) normally did it sometimes. A few proportion, 12.50% (n = 92) did not think they could be infected by worms because of religious belief and their self acclaimed sense of good hygienic practice.

As regards knowledge, most respondents have heard about worm infestation, and knew that they were the largest intestinal human parasites. However, 47.80% (n = 160) provided correct response on occupational or lifestyle risk for worm infestation; 43.30% (n = 145) did not know, while 8.9% (n = 36) provided a wrong response like eating overripe fruit and drinking alcohol. Similar study have been done on knowledge, attitude and practice regarding liver fluke (Taweesak, 2002), which showed that 63% provided correct response on foods containing liver fluke and 37% with incorrect responses. Food sources for worm infestation in this study had 65.10% correct response, 12.2% incorrect response and 22.7% for those that do not know such foods. In the same study, 79% provided correct response about severe symptoms of liver fluke infection, while only 21% gave incorrect response. In this survey in Jos, 78.8% provided correct response on manifestations of worm infestation. Wrong response came up to 11.0%, while 10.2% did not know of any such manifestations. Table 3 shows that the respondents had good knowledge about de-worming, but attitude was generally poor. About 70% knew about de-worming, providing correct idea to the tone of 81.60%. Concerning attitude however, 75.3% respondents had carried out de-worming before but 55.0% (n = 117) could not remember the last time they did it.

From Table 4, it can be observed that more females were at risk for worm infestation than males. The proportion of males at low risk was higher (48.70%) than those at low risk for females (45.67%) at *p*-value = 0.025. This was contrary to study on knowledge, attitude and practice by Taweesak (2002) who found that more males were at risk due to high rate of consumption of half-cooked or raw fish than with females. However, the results agree with a study reported by Taweesak (2002)

Table 1. Food selection habit and general hygiene.

Variable	N	Percentage (%)
How often do you eat vegetables?		
(a) Very often	149	37.70
(b) Often	246	62.30
(c) Not at all	0	0.00
Preparation of vegetables before eating		
(a) Raw and wash	106	26.84
(b) Raw, wash and cook	229	58.00
(c) Raw or cook	60	15.16
Source of drinkable water		
(a) River	2	0.50
(b) Dam	4	1.00
(c) Well	60	15.00
(d) Borehole	105	26.30
(e) Tap	173	43.40
(f) Others	55	13.80
How often do you treat your water?		
(a) Always	96	24.10
(b) Sometimes	216	54.10
(c) Not at all	87	21.80
How do you treat your water?		
(a) Chemical	121	38.80
(b) Chemical and Boiling	56	18.00
(c) Boiling	135	43.20
What kind of meat do you eat?		
(a) Beef	198	49.60
(b) Goat	159	40.00
(c) Fish	196	49.10
(d) Chicken	156	39.10
(e) Snail	45	11.30
(f) Bush meat	12	3.00
(g) Pork	7	1.80
(h) Others	5	1.30
How do you prepare your meat?		
(a) Well cooked	393	98.50
(b) Undercooked	6	6.00
(c) Raw	0	0.00

that women were at more risk because they consumed rawer or half-cooked fish than males. On the other hand, Table 5 shows that knowledge about worm infestation does not mean low risk, because those at higher risk had better knowledge than those at low risk at *p*-value = 0.0184, which was highly significant. Those at low risk only had lower knowledge level because they felt they were not involved with foods and habits that would make them prone to worm infestation. This finding agrees with epidemiological survey on risk factors of liver fluke carried out by Kunjana which revealed that the higher the knowledge, the poorer the attitude due to high risk

Table 2. Information about worm infestation.

Variable	N	Percentage (%)
Have you ever heard about worm infestation?		
(a) Yes	335	84.00
(b) No	64	16.00
Mention three (3) human worms you know		
(a) Correct response	271	78.80
(b) Wrong response	97	11.00
(c) Do not know	31	10.20
Mention three manifestations of worm infection		
(a) Correct response	264	78.80
(b) Wrong response	37	11.00
(c) Do not know	34	10.20
Do you think you can be infected by worms?		
(a) Yes	293	87.50
(b) No	42	12.50
Do you go for periodic medical check-up to know your worm status?		
(a) Yes	28	8.40
(b) No	210	62.70
(c) Sometimes	97	28.90
(i) Have you ever been diagnosed of a worm infection?		
(a) Yes	113	33.70
(b) No	222	66.30
ii) If yes in (i), which worm was it?		
(a) Knows worm(s)	43	38.10
(b) Do not know worm(s)	70	61.90

Table 3. Knowledge on the concept of de-worming.

Variable	N	Percentage (%)
Do you know about the concept of de-worming?		
(a) Yes	283	70.90
(b) No	116	29.10
If 'yes' in 1, state a sentence about what you know?		
(a) Correct idea	231	81.60
(b) Wrong idea	52	18.40
Have you ever carried out de-worming?		
(a) Yes	213	75.30
(b) No	70	24.70
If yes in 3, when was the last time		
(a) 3 months ago and above	58	27.20
(a) 2 months ago and above	38	17.80
(b) Can not remember	117	55.00

Table 3. Contd.

How would you classify de-worming		
(a) Preventive	83	29.30
(b) Curative	30	13.80
(c) Preventive/curative	161	56.90
How often do you de-worm?		
(a) Daily	0	0.00
(b) Weekly	3	1.40
(c) Monthly	30	14.10
(d) Bi-monthly	24	11.30
(e) Quarterly	156	73.20
Who educated you on de-worming?		
(a) Self education	45	16.00
(b) Heal professional	162	57.20
(c) Non-health professional	76	26.80
What type of anthelmintic have you been taking?		
(a) Correct drug	150	70.40
(b) Can not remember	43	20.20
(c) Wrong drug	5	20.30
(d) Do not know	15	7.10
In what form does the anthelmintic exist?		
(a) Correct dosage form	205	96.20
(b) Wrong dosage form	2	0.94
(c) Do not know	6	2.86
How much of medicine do you take per dose and for how long?		
(a) Correct use	160	75.12
(b) Wrong use	53	75.12

Table 4. Association between gender and risk of worm infestation.

Characteristic		**Risk level**						**Total**	**X^2**	**df**	**p-value**
		Low		**Moderate**		**High**					
		n	**%**	**n**	**%**	**n**	**%**				
Gender	Male	110	48.70	116	51.30	0	0	226	0.118	2	0.025
	Female	79	45.67	94	54.33	0	0	173			

Table 5. Association between knowledge about worm infestation and risk for worm infestation.

Characteristic		**Level of knowledge**						**Total**	**X^2**	**df**	**p-value**
		Low		**Moderate**		**High**					
		n	**%**	**n**	**%**	**n**	**%**				
Risk level	Low	48	25.40	93	49.20	48	25.40	189	3.442	4	0.0184
	Moderate	38	18.10	118	56.20	54	25.70	210			
	High	0	0	0	0	0	0	0			

chances (Taweesak, 2002; Awasthi et al., 2008).

Conclusion

This study showed that the residence of Jos had good knowledge of worm infestation with females at higher risk of infection than males, although the females had a better knowledge and good attitude about de-worming than the males.

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