

**NEUROCYSTICERCOSIS: KNOWLEDGE, ATTITUDES AND PRACTICE OF
EPILEPTIC PATIENTS IN NORTHERN NAMIBIA**

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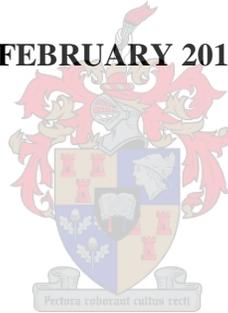
**This research assignment is submitted in partial fulfilment of the requirements for the
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DECLARATION:

I, Ogunsina Jacob Taiwo, the undersigned, hereby declare that the work contained in this assignment is my original work and that I have not previously submitted it, in its entirety or in part, at any university for a degree. I also declare that ethical approval for the study was obtained from Health Research Ethics Committee of Stellenbosch University. (Reference number: S13/11/233)

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ABSTRACT

Background:

The incidence of epilepsy continues to rise worldwide, particularly in developing countries, and studies have shown that most cases of epilepsy are associated with neurocysticercosis. Proper knowledge and the adoption of a hygienic life style could help in preventing the spread of taeniasis infection in developing countries. However, the knowledge, attitudes and practices of epileptic patients regarding neurocysticercosis have been inadequate.

Aim: This study sought to establish the knowledge, attitudes and practices regarding neurocysticercosis in epileptic patients in northern Namibia.

Methods: A cross-sectional study was done using a questionnaire to interview 120 epileptic patients seen in the medical outpatient department of Oshakati Hospital in Namibia. Demographic characteristics of the participants were obtained, and their knowledge, attitudes and practices regarding neurocysticercosis were assessed.

Results: Out of the 120 participants in the study, 60% were female and the majority (81.7%) were pork eaters. A high percentage (61.8%) of the participants practised free-range pig husbandry, and the majority (72.8%) and their pigs (83.9%) were not treated for worm infestation.

Conclusion: There were considerable gaps in the knowledge and healthy practices of epileptic patients regarding neurocysticercosis in northern Namibia. The participants still have behaviours that may favour the continued spread of neurocysticercosis in the community. Therefore, there is need for educational intervention or campaign to reduce the incidence of the infection in the community.

INTRODUCTION

Neurocysticercosis (NCC) is a major public health problem in northern Namibia, which reflects a more rural setting. The prevalence of this problem could not be determined, due to poor documentation. The same prevalence applies in most endemic regions of the world, particularly in Africa.¹ Neurocysticercosis, which is one of the major causes of epilepsy in developing countries,² is a neglected disease, and its prevalence is largely underestimated.³

Studies reveal that most cases of epilepsy in sub-Saharan Africa, Asia and Latin America are associated with neurocysticercosis.¹⁻⁴ Neurocysticercosis occurs when larval forms of *Taenia solium* lodges in human brain tissues, sometimes resulting in headaches, epileptic seizures, blindness, mental disturbances and even death.⁴

It has been established that there is a significant association between porcine cysticercosis and access to human faecal matter by pigs.⁵ Pigs are allowed to roam freely in most parts of Africa,

probably due to the inability of the pig farmers to provide adequate feeding for the pigs when confined. In this process, pigs have access to waste as feeds, including human waste.⁶

Human behaviours like eating habits, lack of sanitation and close contact with animals are among some of the most important factors that influence the transmission of this parasitic disease.⁷ These above mentioned factors are nearly always associated with poverty. That is why *Taenia solium* infection is associated with poverty, the absence of latrines and free access by scavenging pigs to human faeces deposited indiscriminately on fields, farmlands and backyard premises.⁸⁻¹⁰

Knowledge about neurocysticercosis is generally limited among the populace in most parts of the world, especially in the regions affected most by the infection. The high level of ignorance of this infection has negatively influenced the attitudes and practices of the affected population towards neurocysticercosis.¹¹

Studies conducted among rural communities and forty teachers in Mexico and Delhi, India respectively showed that none of the participants knew pork tapeworm as the causative agent of neurocysticercosis.^{12, 13} Only partial or improper knowledge of the life cycle of *Taenia solium* was displayed by the majority of the participants in studies conducted in Kilolo District, Iringa region, Tanzania and Andagova, Colombia among smallholder farmers and village members respectively.¹⁴

Studies carried out among households involved in the semi-intensive raising of pigs in the Zuru area of Kebbi state in Nigeria showed that the risk factors that could have influenced the transmission of neurocysticercosis in the area were defecation by humans in the environment, pigs roaming freely and a contaminated environment.¹⁵ A study among farmers in Western Kenya showed that half of the pig farmers in the study had proglottids in their stools, revealing the prevalence of *Taenia solium* infection in the area.¹⁶

A study done over a period of nineteen months (August 2012 till March 2014) at the Intermediate Hospital in Oshakati revealed that, of 177 epileptic patients sent for computer tomography (CT) scanning of the brain, ninety-six (96) had evidence of neurocysticercosis on brain CT scan, representing a prevalence of 51.41%.¹⁷

In Namibia, most people in urban areas have access to safe water (drawn through a pipeline or underground source), but this is not so in rural areas. In the north, particularly in the Kunene, Omusati, Oshana, Oshikoto, Ohangwena, Kavango and Caprivi regions, water is drawn from an open river, making it unsafe.

In Namibia's rural areas, 13% of the population have more than basic sanitation, up from 8% in 1990. Many of Namibia's inhabitants have to resort to "flying toilets", plastic bags to defecate in, which are flung into the bush after use.¹⁸ The use of open areas close to residential land to urinate and defecate is very common.¹⁹

The northern region of Namibia is said to be the least developed, with the highest poverty rate in the country. About 70% of the population live in rural areas, and about 60% are concentrated in the seven northern regions, where they typically are undereducated, with limited access to health care, adequate sanitation and gas and electricity supplies.²⁰

The people engage in pig farming and the pigs found in these areas are variously referred to as native, scavenging, indigenous, and local or village pigs and vaccination is nonexistent, mainly because of lack of knowledge of its importance. Some respondents were even surprised that pigs could be vaccinated.²¹

Poverty is associated with poor access to clean water and water borne sanitation. Pigs are often farmed in the community and are allowed to roam about freely. These factors combine to perpetuate the parasitic infestation by *Taenia solium* that causes neurocysticercosis.

Therefore, it could be expected that the *Taenia solium* infection rate will be high. There is no data on the burden and aetiology of epilepsy in this region of the country; hence the need to assess the knowledge, attitudes and practices of epileptic patients with regard to neurocysticercosis in the northern regions of Namibia.

Aim and Objectives

The primary aim of this study was to assess the knowledge, attitudes and practices of adult patients with seizures regarding neurocysticercosis infection and prevention in northern Namibia. This is for the purpose of establishing the community's level of understanding of neurocysticercosis infection as a cause of epilepsy and to have an impact in creating appropriate education intervention towards eradicating neurocysticercosis in the community.

The specific objectives were:

- To identify key demographic characteristics (age, gender and education) of adult patients with seizures.
- To investigate the knowledge level with regard to neurocysticercosis among adult patients with seizures.
- To determine the attitude of adult patients with seizures towards neurocysticercosis and
- To assess the current practices of adult patients with seizure regarding neurocysticercosis.

METHODS

Study design

A quantitative, cross-sectional study design was used in the medical outpatient department of Oshakati Hospital. It aimed to determine the patients' levels of knowledge of neurocysticercosis and relate this to their attitude, health-seeking practice and socio demographic characteristics.

The setting

The population studied consisted of epileptic patients attending the medical outpatient department of Oshakati State Hospital, Oshakati. Oshakati State Hospital is an 885-bed public hospital, which serves about 750,000 Namibians and some patients from Angola. Patients are referred to the hospital from local primary care clinics and district hospitals in the Omusati, Kunene, Ohangwena, Oshikoto and Oshana regions. Patients seen in the medical outpatient department are local patients, and are all referrals from these five regions and, to some extent, from southern Angola. It is expected that patients seen at this department represent patients in the northern parts of Namibia.

Study population

The study population consisted of people who visited the medical outpatient department of Oshakati State Hospital for their antiepileptic drugs and those who newly came for their epilepsy treatment. An average of seventy (70) epileptic patients is seen in the medical outpatient department every week making a total of 3,360 patients annually.

Sample size

The statistician at Stellenbosch University suggested a sample size of 110 patients based on my questionnaire and the number of patients visiting the clinic. This would allow me a 7.5% precision in my calculations at a 95% confidence level for binary proportions. The sample size was inflated by 10 patients for possible dropout.

Exclusion from the study

The following patients were omitted from the study population: patients with seizure disorders confirmed to be secondary to meningitis, brain trauma, toxoplasmosis or cerebrovascular accident through computer tomography scan of the brain, and patients residing in Angola.

Data collection

Data were collected using a questionnaire (Appendix 1A and B) from previous studies, which was modified to suit the local socioeconomic circumstances of the community.¹¹⁻¹³ The questionnaire was validated by the research team using 10 patients. We made few necessary changes in the questionnaire based on the pretesting. The questionnaire included information on demographic features such as age, marital status and education level. It also included questions on individual patients' knowledge, attitude and practices regarding neurocysticercosis.

A sample size of 120 patients, which represented 3.57% of the yearly average number of patients attending the medical outpatient department, were selected through a random sampling of every fifth patient attending the clinic every Wednesday of the week over the period of the study.

Literate patients completed the questionnaire themselves, while illiterate participants were interviewed one to one in English and Oshiwambo, over a period of 24 weeks from August 2014 till February 2015. Passports (hospital cards) of the participants interviewed were marked with symbols to avoid them being re-interviewed at their next clinic follow up.

The questionnaire was administered by the researcher and two registered nurses who understood Oshiwambo language among the nursing staff working in medical outpatients department. The nurses were used as research assistants. The nurses, having acknowledged the increase in the number of epileptic patients coming to the clinic and shown the evidence of neurocysticercosis among the epileptic patients by the researcher as seen in the result of their brain CT scan, developed a very strong interest in the study when it was discussed in the clinic by the principal researcher. We later agreed to work together as a research team.

We developed the questionnaire together with their opinions taken into consideration. However, in order to overcome any language barrier the research assistant explained each question in

English and the local language so that the patients could understand and answer correctly. We later collated the data and checked for accuracy.

Our gold standard for the diagnosis of neurocysticercosis (NCC) was the presence of lesions highly suggestive of NCC on brain (CT scan). The participants were sent for brain CT scan at no cost to me or the participants. Seventy (70) of the participants had evidence of neurocysticercosis on brain CT scan, representing a prevalence 58.33%.

Ethical considerations

The study was submitted to the Health Research Ethics Committee of Stellenbosch University, for approval and it was granted (reference number S13/11/233). The study was also approved by the Oshakati Intermediate Hospital ethics committee. Final approval for the project was given by the Ministry of Health and Social Welfare, Namibia (reference number 17/3/3). Written consent was also obtained from each of the respondents before administration of the questionnaire.

Data analysis

All data were captured on a form designed in Microsoft Access and this programme was subsequently used to produce a data spreadsheet in Microsoft Excel. Data were cleaned and verified to minimise entry errors and missed values. Frequencies and percentages were calculated for the categorical data. Statisticians at the Centre for Statistical Consultation of Stellenbosch University were consulted for inferential data analysis. Inferential data analysis was done using the Statistical Package for Social Scientists (SPSS) software. The chi-square test was used to analyse the association between the variables.

RESULTS

General characteristics of the study participants

One hundred and twenty people consented to participate in the study. Table 1 shows the age distribution of the participants. The majority of the participants (n = 88, or 73.3%) fell in the 20 to 39 year age group. It also shows that the majority of the participants were female (n=72, 60%), and that a high proportion of the participants had secondary education (n = 77, 64.7%). Table 1 summarises the characteristics of the study population.

TABLE 1: Demographic characteristics of sample (n = 120) of epileptic patients from the medical outpatient department (MOPD) of Oshakati Hospital.

	n	%
AGE		
20-39	88	73.34
40-59	23	19.16
60-79	6	5
80-100	3	2.5
GENDER		

Male	48	40
Female	72	60
REGION		
Oshana	75	62.50
Omusati	21	17.50
Oshikoto	7	5.83
Ohangwena	16	13.33
Kunene	1	0.83
LIVING AREA		
Urban	39	33.33
Rural	78	66.67
EDUCATION		
None	14	11.76
Primary	28	23.53
Secondary	77	64.71

n = number of respondents

Knowledge of neurocysticercosis

The majority of the participants had poor knowledge of the causative agent of neurocysticercosis, as shown in Table 2, with 50 (46.3%) participants stating that their epilepsy was from God and 81(67.5%) did not believe it was from taeniasis infection.

Knowledge of prevention of the neurocysticercosis was also poor amongst the respondents. A total of 72.9% of the participants and 83.9% of their pigs had not been treated for worm infestation, as shown in Table 2.

TABLE 2: Knowledge of neurocysticercosis transmission, prevention and treatment among epileptic patients attending the MOPD of Oshakati Hospital.

Variables	Yes	No	Unknown
	n (%)	n (%)	n (%)
Knowledge			
Does anyone in your household have epilepsy due to pork tapeworm?	21 (18.50)	95 (81.90)	4 (3.33)
Do you think epilepsy due to pork tapeworm is a contagious disease?	33 (29.20)	80 (70.80)	7 (5.83)
Have you ever been treated for worm infestation?	32 (27.12)	86 (72.88)	2 (1.67)
Has your family been dewormed?	22 (18.97)	94 (81.03)	4 (3.33)
Are your pigs dewormed?	18 (16.07)	94 (83.93)	8 (6.67)
What do you think is the cause of epilepsy			12 (10)
From God	50 (46.30)	70 (58.33)	
Witchcraft	19 (17.59)	101 (84.17)	

Someone with pork tapeworm	39 (36.11)	81 (67.50)	
What treatment options will you recommend?			2 (1.67)
Doctor	101 (84.17)	17 (14.41)	
Traditional healer	11 (9.17)	107 (90.68)	
Church healing session	6 (6.67)	112 (94.92)	

n = number of respondents

Attitude of respondents towards neurocysticercosis

Of the 120 patients interviewed, 74 (62.7%) mentioned that they would allow their child to play with a patient who is epileptic secondary to pork tapeworm (Table 3), and 99 (82.5%) will allow a child with epilepsy due to pork tapeworm to attend school.

The majority of the participants, 70 (59.3%) agreed to the thinking that there is discrimination against people with epilepsy that may be secondary to pork tapeworm and 63(53.4%) of the respondents has a negative attitude towards marriage of their daughters or sons to someone whose epilepsy is as a result of pork tapeworm as shown in Table 3.

TABLE 3: Attitude of respondent towards neurocysticercosis.

Variables	Yes	No	Unknown
	n (%)	n (%)	n (%)
Attitudes			
Will you allow your child to play with someone who has epilepsy due to pork tapeworm?	74 (62.71)	44 (37.29)	2 (1.67)
Will you allow your daughter to marry someone whose epilepsy is due to pork tapeworm?	55 (46.61)	63 (53.39)	2 (1.67)
Do you think there is discrimination against people whose epilepsy is due to pork tapeworm?	70 (59.32)	48 (40.68)	2 (1.67)
Will you allow a child with epilepsy due to pork tapeworm to attend school?	99 (82.50)	21 (17.50)	
What do you do when you see someone with pork tapeworm having an epileptic seizure?			
Run away	24 (20.34)	96 (80.00)	2 (1.67)
Carry to the hospital	94 (79.66)	26 (21.67)	

Lifestyle practices towards the prevention of neurocysticercosis

About 22% of the interviewed participants had no latrine at their homestead, while 61.8% of the participants practised free-range pig farming. The results in Table 4 show that most of the respondents (79.6%) slaughtered their pigs at home instead of at a slaughter slab.

Furthermore, the overwhelming majority of the participants (81.7%) were pork eaters, with most of the pork meat being sourced from local brew bars/ shops (23.7%).

TABLE 4: Healthy practices towards the prevention of neurocysticercosis among epileptic patients attending the MOPD of Oshakati Hospital.

	n	%
Variables		
Where is the toilet situated?		
Inside the house	41	35.34
Outside the house	49	42.24
In the country side/open field	26	22.41
What is your source of drinking water?		
Tap water	106	83.33
Stream/flowing water	5	4.17
Well/borehole	9	7.50
Do you boil your drinking water?		
Yes	32	27.12
No	86	72.88
Not always	2	1.67
Do you keep pigs in your homestead?		
Yes	65	54.17
No	55	45.83
Does your pig roam freely?		
Yes	68	61.82
No	42	38.18
Not sure	10	8.33
Do the pigs have access to human faeces as they roam about?		
Yes	68	61.82
No	42	38.18
Not sure	10	8.33
Do you eat pork?		
Yes	98	81.67
No	22	12.33
What is your main source of pork?		
Local brew bars/shops	27	23.68

Home	42	36.84
Butcher	44	38.60
All of the above	7	5.83
Where is your pig slaughtered?		
Home	90	79.65
Slaughter slab	23	20.35
All of the above	7	5.83
Do you eat raw/undercooked pork meat?		
Yes	31	73.50
No	86	26.50

Relationship between location of toilet and associated risk factors for neurocysticercosis

Table 5 shows that the respondents who have their toilet in the country side keep greater numbers of pigs (20; 61.5%) and are the highest consumers of pork. The table also shows that this group of respondents had a higher number of pigs roaming freely with access to human faeces (17; 68%). The majority (80.7%) of this group of patients were also not dewormed.

TABLE 5: Relationship between location of toilets and other variables.

VARIABLES	Toilet inside the house	Toilet outside the house	Toilet in the country side	Total	X ² , p-value
Keep pigs					
Yes	23(56.1%)	23(46.9%)	20(61.5%)	66	X ² = 1.64 P = 0.4404
No	18 (43.9%)	26 (53.1%)	10 (38.5%)	54	
Total	41	49	301	20	
Eat pork					
Yes	33 (80.5%)	39 (79.6%)	27 (90%)	99	X ² = 1.07 P = 0.5861
No	8 (19.5%)	10 (20.4%)	3 (11.5%)	21	
Total	41	49	30	120	
Pigs roaming freely					
Yes	24 (61.5%)	27 (60.0%)	16 (66.7%)	67	X ² = 0.31 P = 0.8585
No	15 (38.5%)	18 (40.0%)	8 (33.3%)	41	

Total	39	45	24	108	
Pigs having access to human faeces					
Yes	23 (58.9%)	26 (60.5%)	17 (68.0%)	66	$X^2 = 0.58$ $P = 0.7485$
No	16 (41.0%)	17 (39.5%)	8 (32%)	41	
Total	39	43	25	107	
Treated for worms					
Yes	15 (36.6%)	10 (20.8%)	5 (19.2%)	30	$X^2 = 3.58$ $P = 0.1672$
No	26 (63.4%)	38 (79.2%)	21 (80.7%)	85	
Total	41	48	26	115	

DISCUSSION

It can be seen that the average age of participants affected by neurocysticercosis in this study was 20-39 years, this can be compared to three other studies which showed that neurocysticercosis is the single most common cause of adult-onset epilepsy in developing countries, and the presence of new onset seizures in an otherwise healthy middle-age individual coming from an endemic area is highly suggestive of neurocysticercosis.²²⁻²⁴ However, Namibia is not an endemic area for neurocysticercosis.

The majority of participants (64.7%) had a secondary education that had been completed either half way or in full, indicating an average level of literacy in the area which can be built upon to eradicate neurocysticercosis in this community.

The overall knowledge of neurocysticercosis as a cause of epilepsy and of preventing the spread of taeniasis as a cause of neurocysticercosis was poor. This is similar to a study done in the Eastern Cape province of South Africa which illustrated that 100% of the participants (n = 2431) had no knowledge of neurocysticercosis, despite it being a common cause of epilepsy in the area.²⁵

Furthermore, findings from a study conducted in Northwest India among neurocysticercosis patients older than 16 years, showed that knowledge of the responsible causative agents and of the prevention of neurocysticercosis was very poor.²⁶

The majority of participants had a negative attitude towards their child marrying a person with epilepsy due to pork tapeworm, while a significant number of the patients had a positive attitude towards a person with epilepsy due to pork tapeworm being allowed access to education. This is similar to the study done among epileptic patients in Northwest India, where the overall attitudes of the participants were negative toward marriage and social life in the neurocysticercosis group and toward education in the control group.²⁶

A large percentage of participants (59%) agreed that they thought there was discrimination against people with epilepsy due to pork tapeworm this may be a possible reason why 53.4% of participants disagreed to allow their daughters marrying an epileptic patient due to pork tapeworm. This is similar to the findings of Preux et al,²⁷ that the segregation and discrimination experienced by epileptic people induced in them an inferiority complex that was the cause of their failure to live with their partners in marriage.

There are only two studies reported in the literature regarding knowledge, attitudes and practices with regard to neurocysticercosis. The first is a population- based study of a rural community in Mexico, evaluating health education before and after educational intervention.⁸ The authors interviewed 1931 persons in 386 households.⁸ The second study explored the awareness of taeniasis and neurocysticercosis among a very small sample of 40 teachers in Delhi, India.¹³ In these studies, numerous gaps were found in knowledge about various aspects of neurocysticercosis in both groups.

In the Mexican study, none of the participants knew what the causative agent was before the educational intervention, after which only 9.6% were aware.⁸ In the Indian study, none of the teachers knew about tapeworm as being the causative agent of neurocysticercosis.¹³

Approximately 17.6% of the participants living in the study area believed that the appearance of epileptic symptoms was associated with witchcraft, and 46% believed that it was God's wish. This promotes fear and increases the belief that epilepsy is incurable, leading people to seek help through prayers and traditional remedies. This corroborates the findings of Mwitwa Chacha et al,¹¹ who found in a study done among the Iringa rural community of Tanzania that (38.2%) cited evil spirits and/or witchcraft as causes of epilepsy.

Due to limited knowledge of the life cycle of *Taenia solium*, several practices that favour the continued existence of the infection were noted in the study area. Most of the participants had their toilets in the country side/open fields, which results in defecation in open fields and undeveloped land. More so, a large number of participants agreed that pigs roamed about freely and that they had access to human faeces, which enables the continued life cycle of *Taenia solium* and the spread of neurocysticercosis infections. Similar findings were reported by Pouedet et al,⁵ Shey-njila et al,²⁸ in Cameroon and Ngowi et al,⁶ in Northern Tanzania.

Most of the participants (79.7%) slaughtered their pigs at home instead of on a slaughter slab, a situation that leads to most of the carcasses not being inspected. The carcasses are then sold to neighbours and to people roasting pork in local brew bars/shops, and some of it will be consumed at home. The overwhelming majority of the participants (81.7%) were pork eaters, with the significant source of pork meat being local brew bars/shops (23.7%). In the local brew bars/shops, pork was usually sold as roasted meat which usually was consumed on the spot. The roasted meat, when not properly cooked, allows the parasites to be alive by the time the meat was consumed. This practice may expose the consumer to the risk of *Taenia solium* infection and can also maintain the transmission of the parasite.

The study also found that the majority (72.8%) of participants and their household members were never treated for worm infestation, and even higher numbers (94%) of the pigs had not been dewormed. This shows that higher percentages of the participants did not know that being dewormed could prevent the spread of neurocysticercosis in this community. This is similar to a

study done which showed that a single carrier of the worm will continue to shed millions of eggs into the environment through defecation for up to a period of 30 years, as long as the worms remain active and the person remains untreated.²⁹ The low number of households that embarked on periodic deworming was of serious concern, because this leaves large numbers of households that serve as a source of worm infestation in the community.

LIMITATIONS OF THE STUDY

Some participants claimed to have secondary education, which may not have been completed, thereby giving a wrong impression of the level of education of the participants.

The study population was those visiting the hospital to collect their epileptic treatment and this may not be a true reflection of the epileptic patients in the community.

The study did not include relatives of the patients and large number people in the community who perhaps might be suffering from the disease.

RECOMMENDATIONS

From the above findings, the following recommendations are suggested for the primary health care sector of Northern Namibia:

1. Health promotion educational programme should consider enhancing the knowledge of the community on neurocysticercosis and epilepsy.
2. A secondary school-based and one to one awareness campaigns among pig farmers should be organised to promote a high standard of personal and environmental hygiene and to prevent pigs having access to human faeces.
3. Policy makers at the local and international levels need to play a role in ensuring proper pig husbandry in the community and possibly initiate a means of vaccinating the pigs.
4. Future and wider research could attempt to explore more quantitatively some of the findings uncovered in this survey in order to further assess the level of understanding of the community regarding neurocysticercosis as a cause of epilepsy in this region of the country.
5. In the absence of massive government intervention in terms of water, sanitation, food inspection and farming practices, a feasible and effective intervention would be to increase the number of people in this community who are dewormed regularly.

CONCLUSION

The study shows that majority of the participants are not dewormed and possibly going about with taeniasis infection which could lead to continued re-infection of the remaining population. Therefore to reduce the incidence of neurocysticercosis in the community an education campaign programme about deworming the community should be initiated.

More so, the national deworming programme for children under 5 years which has been put on hold should be revisited and possibly extended to adult age.

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APPENDIX 1A and B

Appendix 1A

QUESTIONNAIRE IN ENGLISH LANGUAGE

Questionnaire:

The knowledge, practice and attitude of people in Northern Namibian towards neurocysticercosis

Date of interview Study number

Name of person administering the questionnaire

A. Social Demographic Factors

Personal details of the subject

A1. Region: []

(Oshana = 1; Omusati = 2; Oshikoto = 3; Ohangwena = 4; Kunene = 5.

A2. Age: []

A3. Sex: []

Male = 1; Female = 2

A4. How long has the subject been living in the study area: []

(Transiently = 1; for one year = 2; between 1 and 5 years = 3; between 5 and 10 years = 4; for more than 10 years = 5; since birth = 6; Unknown = 9)

A5. Living Area: []

(In an urban area = 1; in a rural area = 2

A6. What is your level of education? []

None=1, Primary=2, Secondary=3, other =4

A7. Which kind meat do you eat? []

Beef =1; Lamb=2; Pig=3, All = 4

B. Questionnaire Assessing the Knowledge of the patients towards Neurocysticercosis:

B1. What do you think is the cause of epilepsy? []

Curse from God=1; Witchcraft=2; from someone with pork tapeworm =3

B2: Does anyone in your household have epilepsy due to pork tapeworm? []

Yes=1; No=2, Unknown =3

B3: What do you do when you see someone with pork tapeworm having epileptic seizure? []

Run away= 1; Carry to the hospital=2, others = 3

B4: Do you think epilepsy due to pork tapeworm is a contagious disease? []

Yes=1; No=2, Unknown =3

B5. Have you ever been treated for worm infestation? []

Yes=1; No=2, Unknown=3

B6. Have your family been dewormed? []

Yes=1, No=2, Unknown=3

B7. Are the pigs dewormed? []

Yes=1, No=2, Unknown =3

C. Questionnaire on Attitude of patients towards Neurocysticercosis:

C1. Will you allow your child to play with someone who has epilepsy due to pork tapeworm? []

Yes=1; No=2, Unknown = 3

C2. Would you allow your daughter or son to marry someone with epilepsy from to pork tapeworm? []

Yes=1; No=2, Unknown =3

C3. Do you think there is discrimination against people who has epilepsy from pork tapeworm?

[]

Yes=1; No=2, Unknown =3

C4. Will you allow a child with epilepsy from pork tapeworm to attend school? []

Yes=1; No=2, Unknown=3

C5. What treatment options will you recommend: []

Doctors = 1

Traditional healer = 2

Church healing season=3

D. Questionnaire assessing the Practice level of the patients towards Neurocysticercosis:

D1. Sanitation: []

Toilets situated in the house = 1; latrines outside the house = 2;

In the countryside = 3.

D2. What is your source of drinking water? []

Tap water = 1; Stream/flowing water = 2, well/borehole = 3.

D3. Do you boil your drinking water? []

Yes=1, No=2, Not always =3

D4. Do you keep pigs in your homestead? []

Yes = 1; No = 2.

D5. Do the pigs roam freely []

Yes =1, No =2.

D6. Do the pigs have access to human faeces as they roam? []

Yes =1, No=2, Unknown =3

D7. Do you eat pork? []

(Yes = 1; No = 2.

D8. What is your main source of pork? []

Local brew bars/shops =1, Home =2, Butcher =3

D9. Where is your pig slaughtered? []

Home = 1; slaughter slab = 2, Unknown =3

D10. Do you eat raw/undercooked pork meat? []

Yes = 1; No = 2.

D11. How is your pork meat prepared? []

Cooked=1; roasted = 2.

D12: Do you wash your hands after defecation? []

Yes=1; No=2, Not always=3

D13: Do you wash your hands before eating? []

Yes=1; No=2, Not always =3

D14: How many times do you wash your hands in a day? []

Once =1; many times = 2

D15: Do you have sufficient water to wash your hands? []

Yes=1; No=2, Not always=3

D16: What water do you use in washing your hand? []

Running tap water=1; standing bucket water=2

D17: Do you wash your fruits and vegetable properly before eating? []

Yes=1; No=2, Not always=3

Appendix 1B

QUESTIONNAIRE IN OSHIWAMBO LANGUAGE

Omapulaapulo:

Ontseyo, omukalo gokulongitha na euveko lyaantu moshitopolwa shukUumbangalantu wa Namibia shinasha nomukithi guuwehame womomadhiladhilo gwedhina neurocysticercosis
Esiku lyomapekapeko Onomola

Edhina lyomupakapeki

A. Omudhingoloko

Uukwatya wanakupekapekwa.

A1. Oshitopolwa: []

(Oshana = 1; Omusati = 2; Oshikoto = 3; Ohangwena = 4;

Kunene = 5.

A2. Oomvula: []

A3. Uukwashikekokantu: []

Omulumentu = 1; Omukiintu = 2

A4. Owaka lapo ethimbo lithike peni moshitopolwa moka?: []

(opo ndeyamo = 1; uule womvo odula yimwe = 2; pokati kodula yimwe sigo eedula ntano = 3;

pokati keedula ntano sigo eedula omulongo = 4; Eedula didule pomulongo = 5; okuza pevalo = 6; Kandishiwo = 9)

A5. Mpa hozi: []

(Omondoolopa = 1; Okomikunda = 2

A6. Onkatu meilongo lyoye? []

Inehita osikola nando=1, Eendondo dhopetameko=2. Okosekundosikola=3, Yilwe =4

A7. Onyama yini holi? []

Yongombe =1; oonyama dhiinamwenyo yoomweedhi ooshona =2; yOshingulu=3, Kehe onyama = 4

B. Omapulaapulo okutala ontseyo yaanuuvu shinasha nomukithi gomomadhiladhilo o

Neurocysticercosis:

B1. Sho todhiladhila oshike hashi eta oshintona? []

Omukithi gwa Kalunga=1; Omuntu alogwa=2; Ohashi etwa kuupuka wonyama yoshingulu=3

B2: Megumbo lyaandjeni omuna omuntu eehama oshintona sha etwa komapuka gonyama

yoshingulu? []

Ee=1; Aaye=2, Kandishiwo=3

B3: Otoningi ngiini uuna wamono omuntu akwatwa koshintona shazi muupuka wonyama

yoshingulu? []

Otefadhukapo= 1; Otandimufala koshipangelo=2, Shilwe = 3

B4: Otodhiladhila kutya oshintona sha etwa kuupuka womonyama yoshingulu oshina

omukwayu? []

Ee=1; Aaye=2, Kandishiwo =3

B5. Owa pangelwe uupuka womepunda? []

Eee=1; Aaye=2, Kandishiwo=3

B6. Aanegumbo lyoye oya tuntilwa okukeelela uupuka womepunda? []

Ee=1, Aaye=2, Kandishiwo=3

B7. Iingulu yaandjeni oyapewa omuti gokukeelela uupuka? []

Ee=1, Aaye=2, Kandishiwo =3

C. Omapulaapulo shinasha nomaiyuvo komukithi go Neurocysticercosis:

C1. Otopitika okanona koye kadhana nakakwawo taka ehama oshintona sha etwa kuupuka? []

Aaye=1; Ee=2, Kandishiwo = 3

C2. Otopitike omumoye kadhona ahokanwe komutu ta ehama oshintona sha etwa kuupuka womepunda wazilila monyama yoshingulu? []

Ee=1; Aaye=2, Kandishiwo =3

C3. Otodhiladhila kutya opena okatongotongo naantu mboka yena oshintona sha etwa kuupuka womepunda wazi monyama yoshingulugainst? []

Ee=1; Aaye=2, Kandishiwo =3

C4. Otopitikaokanona koye kena oshintona shaza muupuka wonyama yoshingulu kaye kosikola? []

Ee=1; Aaye=2, Kandishiwo=3

C5. Epango linipo watala lili hwepo topopile?: []

Ondohotola koshipangelo = 1

Oonganga yoshiluudhe = 2

Oongerka dhashinanena=3

D. Oomapulaapulo okutala omukalolo hagu longithwa kaavu shia sha nomukuthi go Neurocysticercosis:

D1. Ohamwiwatele peni? []

Okandjugo kopashinanena ke li megumbo = 1; Okandjugo kopamuthigululwakalo = 2; Omiihwa = 3.

D2. Openi hamu kutha omeya gokulongitha? []

Opomba yomeya = 1; Omomulonga nenge momikanka= 2, Omedhiya nenge momboola = 3.

D3. Oho fulukitha omeya gokunwa? []

Ee=1, Aaye=2, Ha aalushe =3

D4. Megumbo lyaandjeni omuna oshingulu? []

Ee = 1; Aaye = 2.

D5. Ingulu yaandjeni ohiyi pashiwana ? []

Ee =1, Aaye =2.

D6. Ingulu ohayi vulu kukwatathana nomatudhi sho tayi pashiwana? []

Ee =1, Aaye=2, Kandishiwo =3

D7. Oholi onyama yoshingulu? []

(Ee = 1; Aaye = 2.

D8. Onyama yoshingulu ohamukutha peni? []

Puundingosho wopomukunda =1, Megumbo =2, Koshilahite =3

D9. Openi oshingulu hashi dhipagelwa? []

Megumbo = 1; Okokatomeno = 2, Kandishiwo =3

D10. Oholi onyama ndji ya kangwa, ndji yayothwa naandji yapyo momeya? []

Ee = 1; Aaye = 2.

D11. Onyama yoshingulu ohamu yi teleke ngiini? []

Momeya=1; tatukanga/ yotha = 2.

D12. Oho opaleke iikasha yoye uuna wazi kokandjugo? []

Ee=1; Aaye=2, Omathimbo gamwe awike=3

D13: Oho yogo iikaha iikaha yoye mpanga inolya? []

Ee=1; Aaye=2, Haalushe =3

D14: Oho iyogo lungapi koonyala mesiku? []

Lumwe =1; likando oyindji = 2

D15: Ouna omeya gagwana okwiiyoga koonyala? []

Ee=1; Aaye=2, Haalushe gagwana=3

D16: Omeya geni holongitha mokwiiyoga koonyala? []

Omeya tagamatuka kopomba=1; omeya mokawasha=2

D17: Ohoyogo nawa iiyimati niikwamboga manga inoyilya? []

Ee=1; Aaye=2, Haalushe=3

