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Assessment of Knowledge, Attitude, Practices and Risk Factors Towards Urogenital Schistosomiasis among School-Age Children in Anambra State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Author UEA designed the study, performed the statistical analysis, wrote the protocol, and first draft of the manuscript. Authors OET and AOP managed the analyses. Authors UIB, IAM, OUM, and OEP managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Aims: The aim was to Assess the level of Knowledge, Attitude, Practices and Risk Factors Towards Urogenital Schistosomiasis Among School-age Children in Anambra State.

Study Design: This study was designed as a community based cross-sectional study conducted in three rural public primary schools within a community settings, in three endemic Local Government Areas, (Awka South, Orumba North and Ogbaru Local Government Areas) each from the three Senatorial districts (Anambra Central, Anambra South and Anambra North respectively) of Anambra State, South Eastern Nigeria . A twenty one item structured questionnaire containing closed ended questions was used as the instruments for data collection and all questions were prepared in focus of the objectives of the study.

Place and Duration of Study: This study was conducted in three public primary schools in a selected Local Government Area within the three senatorial zones of Anambra State, Nigeria between April to December, 2023.

Methodology: A total of 399 questionaire were distributed and completely retrieved from primary school children in three randomly selected primary schools from the three senatorial zones, namely, Anambra Central, Anambra North and Anambra South. It was analyzed using a descriptive statistical analysis and qualitative data were presented on tables, percentages and charts while inferential analysis were done using simple Statistical technique. Hypothesis were tested using odd ratio statistics at 5% which were considered statistically significant. Data were analysed using SPSS for WINDOWS (version 23.0; SPSS Inc., Chicago, IL, USA). P-values < 0.05 were considered significant.

Results: Out of the 399 pupils, Anambra North had the highest number with 171 (42.9%) pupils, followed by Anambra Central with 118 (29.5%) pupils and then Anambra South which had 110 (27.6%) pupils. This study showed that there was high level of awareness of the disease Urogenital Schistosomiasis (UgS) among school-aged children in the study areas in Anambra State. It showed that 65.7% of the total population of 399 school-aged children from primary schools in the three selected communities, each from the three Senatorial zones had good knowledge of the disease, while 34.3% had poor knowledge of Urogenital Schistosomiasis. This study showed that there was a significant relationship between the Age of respondent ($\chi2 = 12.786$, df = 4, p = 0.0035), class level ($\chi2 = 8.57$, df = 4, p = 0.016) and knowledge of UgS but Gender was not significantly associated with knowledge of UgS ($\chi2 = 2.0$, df = 3, p = 0.2093). There was also, no significant association between Risk Factors and Socio- demographics of the study population as (p>0.05) for Age, Sex and Class group. On the patronage and utilization of Praziquantel, the choice drug for the treatment and prevention, 134(33.9%) took Praziquantel for the purpose of prevention of the disease. 254(63.7%) and 107(26.8%) pupils took Praziquantel because teachers and health workers gave it to them respectively.

Conclusion: This study has showed that there is a remarkable increase in the level of awareness and reduction in prevalence rate of Urogenital schistosomiasis in Anambra State.

Keywords: Praziquantel; UgS; senatorial zones; local government area.

1. INTRODUCTION

Schistosomiasis, also known as Bilharziasis, after Theodore Bilharzia, who identified the parasite in 1851, is a debilitating parasitic disease caused by blood flukes (trematodes) of the genus *Schistosoma* [1]. It is one of the neglected parasitic infections in the tropical and subtropical areas of the world. The infection is widespread and prevalent in Africa where the snail intermediate hosts breed in waters contaminated with urine or faecal waste of infected individuals. Globally, Schistosomiasis ranks second to malaria as the world's most debilitating parasitic disease in terms of the extent of endemic areas and number of infected

persons [2]. It is estimated that Schistosomiasis and Geohelminthiasis represent more than 40% of the global disease burden caused by all tropical diseases, excluding malaria [2].

Urogenital schistosomiasis is widely distributed in Nigeria and is considered a significant health problem [3]. The disease occurs mainly in school-aged children and young adults in Sub-saharan Africa. Schistosomiasis infects a large proportion of children under 14 years of age in many of the affected areas. The estimates for morbidity and mortality in affected populations are high with school age children having the highest prevalence and intensity of infection [4].

Reports on Schistosomiasis due to S. haematobiumhas shown that the disease is widespread in Nigeria, with estimated 101.28 million persons at risk and 25.83 million people infected, thereby constituting a public health problem, particularly in children [5-9]. The distribution of the disease is focal, aggregated and usually related to water resources and development schemes such as irrigation projects, rice/fish farming and dams. It is prevalent in all the states of the federation, with a high infection rate among school children [10-11].

In Anambra State, 15.0% prevalence rate of Urogenital Schistosomiasis was measured across the three senatorial districts of the State [1] and 15.7% prevalence was recorded in Orumba North and South Local Government Areas [4]. [12] reported a prevalence rate of 48.1% using haematuria (Dip Stick Method) as a screening method and 58.3% using Polymerase Chain Reaction (PCR) diagnostic approach in a study at Umuowele village, in Agulu community of Anaocha LGA. . In Umuikwu-Anam, Anambra West LGA, a prevalence rate of 37.9% and 7.9% were recorded by [13] and [14] respectively. Amidst the level of prevalence of the disease among school-aged children across Anambra State, it is important that there is a commensurate level of knowledge and awareness of the disease, its infection pattern, attitude and risk factors that can predispose them to Urogenital Schistosomiasis (UgS).

2. MATERIALS AND METHODS

2.1 Study Area

This study was conducted from April to December 2023 in the three senatorial zones of Anambra State. Anambra State is situated in Southeastern Nigeria and lies between latitude 5° 40′ 00″ N and 6° 50′ 00″ N and longitude 6° 40′ 00″ E and 7° 20′ 00″ E. It is bounded by Delta State to the West, Imo State and Rivers State to the South, Enugu State to the East and Kogi State to the North. It has three Senatorial zones, namely Anambra North, Anambra Central and Anambra South (Ndukweet al, 2019). The area has typical semitropical rainforest vegetation, characterized by fresh water swamps. It has a humid climate with a temperature of about 30.6°C (87°F) and a rainfall between 152 and 203 centimeters annually. The major rivers in the state are River Niger, Omambala, Ulasi and Ezu River. There are other smaller streams, lakes (a prominent one is the Agulu Lake), ponds and burrow pits. With many rivers, ponds, irrigated farming and burrow pits. Anambra State has diverse freshwater environments that offer numerous favourable habitats for aquatic snails that serve as intermediate hosts to *Schistosoma* (Ekwunifeet al, 2005). Anambra State is culturally homogeneous with Igbo as the predominant language, though with slight dialectical variations across and towns. They are predominantly of the Christian religion and their occupation is majorly trading, farming, artisanship and civil servants as well.

This study considered the three Senatorial zones (Anambra North, Anambra South and Anambra Central) as yardstick for partitioning the study area at the State level. Each of these three Senatorial zones has seven (7) LGAs, bringing the LGAs to a total of twenty one (21) in Anambra State. Then, at the LGA level, three (3) LGAs were randomly selected, one from each of the three Senatorial zones. Ogbaru LGA, was selected from Anambra North, Awka South LGA, was selected from Anambra Central and Orumba North LGA was selected from Anambra South. In each of the three selected LGAs, a town was randomly selected for this study. In Ogbaru LGA of Anambra North, the randomly selected town was Ogbakuba. In Awka South LGA of Anambra Central, Ezinator (which comprises of Ndikpa, Ndiora and Ntoko) was randomly selected. While in Orumba North of Anambra South, Omogho was randomly selected. (Fig 1).

2.2 Study Population

The study population was School-age children, which age bracket was between 5 to 15 years. Since the study was a School-base research and School-aged children were the expected focal study population, the study was restricted to schools. Furthermore, in the selection of

Schools, the study strictly considered Public Primary Schools under the Universal Basic Education Board (UBEB), where most of the School-age children from age 5-15 years were found in a common cluster and usually receive annual School-base treatment with Praziquatel, distributed by The Cater Centre (TCC) in collaboration with Anambra State Ministry of Health (AMOH). The study population comprises pupils from the following Primary Schools:

Community Primary School, Ogbakuba, Ogbaru LGA of Anambra North

Community Primary School Omogho, Orumba North LGA of Aambra South

Community Primary School Ndiora, Community Primary School Ntoko and Central School Ndikpa, all in Ezinator, Awka South LGA of Anambra Central.

2.3 Sample Size

The Anambra State School population from primary and secondary according to the Anambra State Statistical Year Book, 2010 is a total of 730,149 students. Therefore, using Sloven's Statistical Formula:

$$n = N/1+N(^2)$$

where;
n = The Sample Size,
N = 730,149 (Population of Primary and Secondary School Students in Anambra State),
e = 0.05 (Error Limit).

Therefore;
n = 730,149 / 1 + (730,149 (0.052)
n = 399.780, n = 400.

2.4 Sampling Technique

A multi-stage sampling technique was adopted to select the study participants in the study area. First, the study area was partitioned into the three (3) Senatorial zones, namely: Anambra North, Anambra South and Anambra Central. Anambra State has 21 LGAs and each of these Senatorial zones has seven (7) LGAs. One (1) LGA was picked from each Senatorial zone by random selection of numbers. The resultant LGAs were Ogbaru LGA from Anambra North, Awka South LGA from Anambra Central and Orumba North LGA from Anambra South respectively. Then at the LGA level, communities were also randomly selected based on the presence of ecological factors that provide the ambience for the optimal survival of the snail intermediate host (Bulinusspp) of Urogenital Schistosomiasis. These factors include but not limited to: fresh water habitats, such as rivers, streams, ponds, lakes, burrow pits and irrigations in farm settlements. In Ogbaru LGA, among the following communities (Odekpe, Ohita, Atani, Ogbakuba, Umunankwo, Osomalla, OgwuIkpele and Akiri) which possess the considered ecological factors, Ogbakuba was randomly selected in this study. The same sampling procedure was adopted for Awka South LGA, to randomly select Ezinator and Orumba South LGA to randomly select Omogho communities respectively.

Then again, in the selection of Schools for this study in the selected communities, the inclusion and exclusion criteria were put into consideration and attempts were made to ensure that the population of each selected school was a considerable representation of school-age children in the study areas. The study was school-age children based and these children were those from age 5-15years, who were enrolled in the Community Public Primary School within the period of 2019 to 2021. In Ogbakuba (a riverine community, where most inhabitants are predominantly fishermen, farmers and traders), Community Primary School Ogbakuba was selected. It was the only Public Primary School in Ogbakuba at the time of this study and it represented the population of school-age children in Ogbaru LGA and Anambra North Senatorial zone at large. Similalr, in Omogho (a predominantly farming community), Community Primary School Omogho was also selected and its population represented considerably the population of school-age children in Orumba North LGA and Anambra South Senatorial zone at large. In same vein, Ezinator being the selected community in Awka South has three sub-communities that make up Ezinator. Ezinator is an Igbo word that means: "Three Access Way", hence, the three sub- communities: Ndiora, Ndikpa and Ntoko make up Ezinator the larger one. Each of these three sub-communities has one Public Primary School, making the Public Primary School in Ezinator three, which are: Oraebeke Community Primary School, Ndiora, Central School Ndikpa and Community Primary School Ntoko. Though these schools are in one larger Community Ezinator, they are considerably far apart from each other, owing to the locations of these three sub-communities from one another. Ezinator in Awka South, which

is a farm settlement that shares boundary with Amaokpala in Orumba North LGA, has the three Community Primary Schools which has the population that considerably reflects the population of school-age children in Awka South LGA and Anambra Central Senatorial zone at large.

2.5 Instrument for Data Collection

A 21item structured questionnaire containing closed ended questions was used as the instruments for data collection. It was prepared in simple English and has the title: "ASSESSMENT OF KNOWLEDGE, ATTITUDE, PRACTICES AND RISK FACTORS TOWARDS UROGENITAL SCHISTOSOMIASIS AMONG SCHOOL-AGE CHILDREN IN ANAMBRA STATE". The questionnaire was constructed following a thorough review of literatures and comprised of sections A, B, C and D. Section 'A' consisted of questions on Bio-data of respondents.

Section 'B' was on ascertaining the Risk factors associated with the infection of Urogenital Schistosomiasis due to attitudes and practices among study population.

Section 'C' focused on the assessment of Knowledge level on Urogenital Schistosomiasis among the study population.

Section 'D' centered on the Level of Patronage of Praziquantel (PZQ) the drug of choice in the control of Urogenital Schistosomiasis.

All questions were prepared in focus on the objectives of the study.

2.6 Validity of Instrument

The questionnaire was developed by the researcher and was approved by the project supervisors. Thereafter, the instrument was further validated by two other lecturers in The Department of Public Health with necessary inputs. They scrutinized the items contained in the questionnaires, as to ensure they are simple, clear with understandable language and comprehensive enough to achieve the research objectives. The content validity was established through strict adherence to study objectives, while the construct validity was established through wealth of experience of the supervisor.

2.7 Reliability of Instrument

The reliability coefficients of the research instrument was determined using Crombach Alpha test and the reliability coefficient using forty (40) participants for the questionnaire in schools outside the selected areas. The reliability coefficient for questionnaire was 0.8 which is considered reliable for the study.

Fig. 1. Map of Anambra State – Senatorial Districts
(Source: Wikipedia)

2.8 Method of Data Collection

In order to facilitate access to the area of study and to obtain maximum cooperation from the respondents, a letter of introduction from the Head, Department of Public Health was presented to the Heads of each of the Schools visited in the selected Communities. The distribution and collection of the questionnaires was enhanced by training research assistants to be familiar with the contents of the questionnaire, manner of approach and the location of the Schools. In doing this, the assistance of the Teachers was sort for where necessary, especially in filling-out the questionnaire for pupils in Primaries 1 and 2. The completed copies of the questionnaire were collected immediately from the respondents.

2.9 Method of Data Analysis

The data was collected with the aid of questionnaire and to be entered into the Statistical Package for Social Science (SPSS version 23.0) Computer Software. It was analyzed using a descriptive statistical analysis and qualitative data were presented on tables, percentages and charts while inferential analysis were done using simple Statistical technique. Hypothesis was tested using odd ratio statistics at 5% which was considered statistically significant. Data were analysed using SPSS for WINDOWS (version 23.0; SPSS Inc., Chicago, IL, USA). P-values < 0.05 were considered significant.

3. RESULTS

3.1 Demographic Characteristics of the Study Population

There were 399 school-age children who were interviewed across the three senatorial zones (Anambra North, Anambra Central and Anambra South) using the approved questionnaire. Out of this total, 213 (53.4%) and 186 (46.6%) were males and females respectively (Table 1). Anambra North had the most respondents with 171 pupils (42.8%), followed by Anambra Central with 118 pupils (29.6%) and the least was Anambra South with 110 pupils (27.6%). The age groups of the population study size of 399 school- age children across the three senatorial zones in the State were categorized into three groups: 5-8 years, 9-12 years and 13-15 years. Pupils of age 5-8 years were 145 (36.3%), 9-12 years were 223 (55.9%) and 13-15 years were 31 (7.7%). The class groups of the same population size of 399 school-age children were classified into three: Primary 1-2 which had 120 (30.1%) pupils, primary 3-4 which had 149 (37.3%) pupils and primary 5-6 which had 130 (32.5%) pupils.

3.2 Predisposing Risk Factors of the Respondents

3.2.1 Parent's occupation as a predisposing risk factor

The first risk factor was to consider to what extent the parent's occupations predispose the school-age children to urogenital schistosomiasis. There were six occupations considered, which are most common in the study areas. These include: Farming, Fishing, Artisan, Trading, Civil Servant and Clergyman. Each parameter here was considered independently, therefore, the case applies where one respondent can choose more than one Parent's occupation, since we considered both parents as factors (Table 2). Out of the 399 respondents, 283 (70.9%) of them indicated that their parents were into Farming, 84 (21.1%) indicated there parents were into Fishing. Children of Artisan parents were 102 (25.6%), while those whose parents trade were 150 (37.6%). Civil Servants were parents to 62 (15.5%) pupils and 37 (9.3%) of the 399 school-age children had parents who are clergymen.

3.2.2 Sources of drinking water

Another predisposing factor considered were the sources from which the school-children get their drinking water. This was also considered independently as a good number of the entire study population chose more than one source of drinking water. Sources of drinking water considered were River/Stream, Bore Hole/Tap water, Rain water, Sachet/Bottle water. Out of 399 school-children 199 (47.6%) indicated that River/Stream were part of their sources of drinking water. 253 (63.4%) agreed that Bore Hole/Tap water were their own sources, while Rain water was chosen as a source by 90 (22.6%) pupils. On the water sources, 51 (12.8%) school-age children said they also drink Sachet/Bottle water.

Table 1. Demographic characteristics of 399 school children by Senatorial Zones

Characteristics	Anambra North (%)	Anambra Central (%)	Anambra South (%)	Total (%)
Sex				
Male	90 (22.6)	68 (17.1)	55 (13.7)	213 (53.4)
Female	81 (20.3)	50 (12.6)	55 (13.7)	186 (46.6)
Total	171 (42.9)	118 (29.5)	110 (27.6	399 (100)
Age Groups (Yrs)				
5 – 8	59 (14.7)	56 (14.4)	30 (7.5)	145 (36.3)
9-12	96 (23.6)	59 (14.7)	68 (17.0)	223 (55.9)
13- 15	16 (4.2)	3 (0.7)	12 (3.2)	31 (7.7)
Total	171 (42.9	118 (29.5)	110 (27.6)	399 (100)
Class Group (Pry)				
1-2	33 (8.4)	49 (12.3)	38 (9.5)	120 (30.1)
3- 4	67 (16.7)	44 (11.1)	38 (9.5)	146 (37.3)
5 -6	71 (17.7)	25 (6.3)	34 (8.5)	133 (32.5)
Total	171 (42.8)	118 (29.6)	110 (27.6)	399 (100)

3.2.3 Daily activities

There were daily routine activities which were considered as predisposing risk factors of urogenital schistosomiasis among school-children in the study areas in Anambra State. These activities involve: Swimming in Streams, Rivers, Lakes and Ponds (S/R/L/P), Washing in S/R/L/P, Joining parents to Farm/Fish, Going for snail catching by S/R/L/P. These parameters were also considered independently with respect to the entire study population and most of the school-age children chose more than one activity. Out of the 399 study population, 259 (64.9%) indicated that they were involved in Swimming in S/R/L/P and 259 (64.9%) also indicated that they Washed in S/R/L/P. Then again, 336 (84.2%) affirmed that they join their parents in Farming and Fishing activities, while 113 (28.3%) agreed that they engaged in Snail Catching by S/R/L/P.

3.3 Parents' Level of Education

The Fig 2 below is a Bar chart representation of the level of awareness of the disease, Urogenital Schistosomiasis by the parents of the pupils in the schools across the study areas in Anambra. The parents' level of awareness was measured in comparison with their current level of education at the time. This is to ascertain if there was an association between the parents' level of education and awareness of the disease and how this association impacts on the knowledge of the pupils on the disease. The Bar chat shows that Anambra North had most of the parents who are more enlightened and subsequently are more aware of the disease urogenital schistosomiasis. This is followed by Anambra Central and then Anambra South which had least educated parents.

3.4 Knowledge Towards Urogenital Schistosomiasis (Table 3)

3.4.1 Source of information about urinary schistosomiasis

A total of 277(69.4%) of the sample population interviewed indicated that they got the information of the disease from their various schools, while 35(8.8%) agreed that it was in their individuals Churches they were informed about it. We had 27(6.8%) pupils affirmed that their information about urogenital schistosomiasis was gotten from their Community Health Centres, however, 19(4.7%) got the information about the disease from the Mass media, while Social Media was tagged by 11(2.7%) pupils. Then again, 17(4.2%) pupils said their Parents told them about Urinary Schistosomiasis, while 16(4.0%) mentioned other unspecified sources.

3.4.2 Causes of urogenital schistosomiasis

There were several parameters considered as possible cause(s) of Urogenital Schistosomiasis and among these, Eating of snails was inculpated by 91(22.8%) pupils as a cause, while 81(20.3%) pointed fingers at Contact with infected water. In same vein, 65(16.2%) and 39(9.8%) believed that Urogenital Schistosomiasis is caused by Witchraft and a Curse from the gods respectively. Playing in the

soil was ticked by 43(10.8%) pupils to be the cause of Urogenital Schistosomiasis, while 165(41.4%) respondents said it was Eating with dirty hands or Contaminated food. Similarly, 105(26.3%) pupils said one gets Urogenital Schistosomiasis from Drinking untreated water, while 38(9.5%) chose other non-specified causes.

3.4.3 Signs and symptoms of urogenital schistosomiasis

There were different signs and symptoms that were considered in this research to be associated with Urogenital Schistosomiasis and one of them is Body ache which passed among 107(26.8%) pupils as symptom, while Head Ache was ticked by 81(20.3%) of the entire respondents. Blood in stool and Blood in urine were associated as symptoms by 131(32.4%) and 165(41.4%) of the sample population respectively. Regular Fever and Body itching were ticked as signs and symptoms of U.S by 35(8.8%) and 39(9.8%) pupils respectively. Abdominal pain had 47(11.8%), Vomiting 29(7.3%), Diarrhea 27(6.8%), Loss of Appetite 29(7.3%), Painful Urination 32(8.0%), Nightmares 19(4.7%) of the pupils and 37(9.2%) pupil chose other non-specified signs and symptoms.

3.5 Attitudes Towards Infection (Table4)

When we looked at the attitude of the pupils towards the infection Urogenital Schistosomiasis (Table 4), 296(74.2%) of the entire pupilsin the study areas considered the disease as a serious infection, 53(12.3%) pupils said it was like any other infection. Pupils who believed it is Not a Serious Infection were 23(5.8%), while 8(2.0%) believed it is a Sickness from the gods and those pupils who chose other non- specific attitude towards the infection were 20(5.0%).

3.5.1 How urogenital schistosomiasis is prevented

Considering the sampled population independently, to prevent Urogenital Schistosomiasis, 216(54.1%) pupils chose Avoid swimming in Rivers, Stream, Lake or Pond (R/S/L/P), while 178(44.6%) went with Avoid washing in R/S/L/P. In same vein, 63(40.9%) said that to prevent the disease one must Wear footwear. Sleeping under Bed Nets was chosen by 166(41.6%) pupils as a measure of preventing Urogenital Schistosomiasis, while 187(46.9%) pupils agreed that Avoiding Fishing Activities will prevent being infected with the disease, then127(18.3) pupils said Not offending the gods will keep one safe from the disease.

Table 2. Responses of 339 Interviewees by schools/senatorialzones to risk factors of urinary Schistosomiasis

Variables	Anambra North	Anambra Central	Anambra South	
	No. (%)		No. (%)	Total (%)
Parent's Occupation				
Farming	136 (34.1)	79 (19.8)	68 (17.0)	283 (70.9)
Fishing	43 (10.8)	19 (4.7)	22 (5.0)	84 (21.1)
Artisan	32 (8.0)	22 (5.5)	48 (12.0)	102 (25.6)
Trading	94 (23.6)	27 (6.8)	29 (7.3)	150 (37.6)
Civil Servant	29 (7. 3)	18 (4.5)	15 (3.8)	62 (15.5)
Clergy man	9 (2.30)	16 (4.0)	12 (3.0)	37 (9.3)
Source of Drinking Water				
River/Stream	62 (15.5)	57 (14.3)	71(17.8)	190 (47.6)
Bore Hole/Tap water	115 (28.8)	65 (16.3)	73 (18.3)	253 (63.4)
Rain Water	40 (10.0)	27 (6.8)	23(5.8)	90 (22.6)
Sachet/Bottled water	23 (5.8)	10 (2.9)	18 (4.5)	51 (12.8)
Daily Activities				
Swimming in S/R/L/P	116 (29.1)	97 (24.3)	46 (11.5)	259 (64.9)
Washing at S/R/L/P	105 (26.3)	80 (20.1)	74 (18.5)	259 (64.9)
Join your Parents to Fish/Farm	148 (37.1)	89 (22.3)	99 (24.8)	336 (84.2)
Go for snail catching by the S/R/L/P	55 (13.9)	48 (12.0)	30 (7.5)	113 (28.3)

NB: S/R/L/P = Stream/River/Lake/Pond

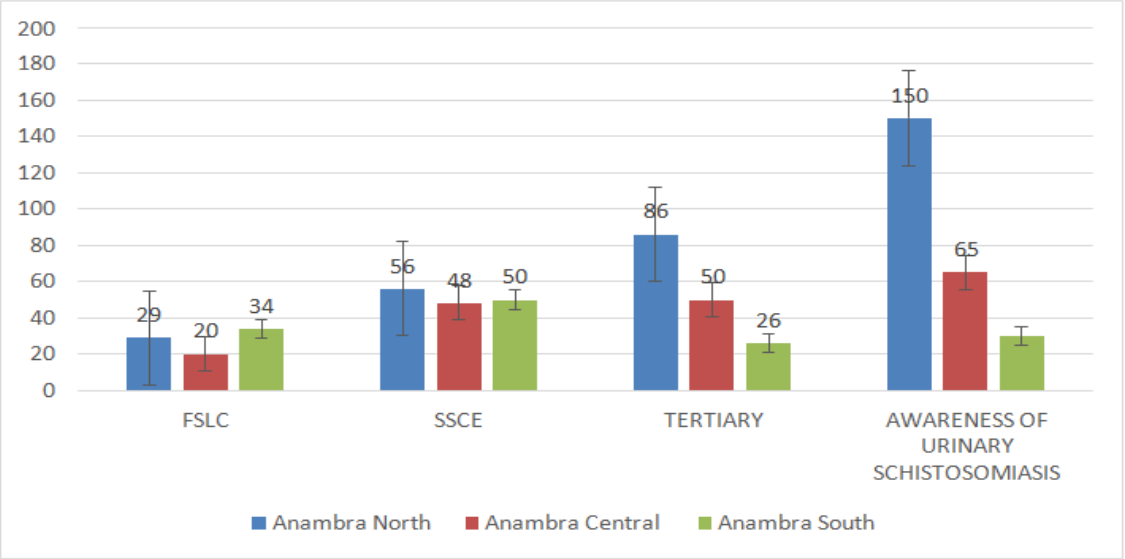

Fig. 2. Parents' highest education level and awareness of urinary schistosomiasis by 399 interviewees

3.5.2 How Urogenital Schistosomiasis is treated in the study areas

When we considered how the school-age children accessed treatment, when they perceived they may have been infected with Urogenital Schistosomiasis, 350(85.2%) pupils said one of the major ways the get treated was to visit the Hospital, 104(26.1%) pupils admitted that Visiting Patent Medicine Stores was part of their approaches, while 115(28.8%) pupils confirmed that Treatment with herbs was part of the approaches they adopted. In the same vein, 52(13.0%) affirmed that Visiting Prayer House was part of what they did in view to getting healed of the disease, while 89(22.3%) pupils said they also explored Visiting Traditional Chief Priests for remedies but 35(8.8%) pupils said they did nothing about the condition.

3.6 Patronage of Praziquantel in the Control of Urogenital Schistosomiasis (Table5, Fig2)

3.6.1 Reason for taking praziquantel

The pupils in all the study areas gave various reasons why they took Prazequantel. Among these included 254(63.7%) pupils who said that they only took the drugs because it was giving to them in school by their Teachers and Health workers, while 107(26.8%) pupils said that they took the drugs because Health Workers gave it to them in the Church. Then again, 134(33.9%) pupils said they actually took Prazequantel for the prevention of urogenital schistosomiasis.

3.6.2 Number of times praziquantel has been taken from 2019 to 2021

The Anambra State Government through the Ministry of Health and Ministry of Education in collaboration with The Carter Foundation has been administering Prazequantel in Anambra State, particularly among School-age children in areas endemic for urogenital schistosomiasis. In same vein, we then investigated the level of patronage of the drug as a major control strategy for Urogenital Schistosomiasis among the school-age children in the randomly selected areas in the three Senatorial zones of the State for the period of 2019 to 2021.

In this course, we found out that among the 399 sampled population, 126(31.6%) attested to have taken Prazequantel once since2019,98(24.6%) of the pupils took twice, 96(24.0%) pupils were only those who took three times from 2019 to 2021. However, 76(19.0%) said they either don't take Prazequantel or have stopped taking it for one reason or the other, while 3 (0.75%) said they have not seen the drug Praziquantel for the first time.

3.6.3 Reasons for stopping usage or non-intake of praziquantel

In order to ascertain the reasons why some pupils have either refused to take Praziquantel or

stopped taking Praziquantel, we adopted the sampling of some possible adverse events, irritations, allergies and beliefs that may be associated with taking the drugs. In consideration of these underlying factors, 76 (19.0%) pupils affirmed that they were passing blood in their urines after taking Praziquantel for the first time, while 74 (18.5%) said they stopped taking Prazequantel because it is bitter. Further findings showed that 34 (8.5%) pupils said they stopped taking Praziquantel because it is bitter, 69 (17.3%) pupils said they have never taken the drug because, their parents asked them not to take any drugs giving to them in school, while 25 (6.3%) said they stopped taking Praziquantel because it makes them drowsy. Then again, 30 (7.5%) pupils confirmed that they stopped taking the drugs because it makes them vomit, 14 (3.5%) pupils said they vomited blood the first time they took Praziquantel, 28 (7.0%) said they do not take Praziquantel, because the odour irritates them. There were also 19 (4.5%) pupils who said they stopped taking Praziquantel because they had rashes on their bodies the first time they took it. This may sound awkward but 22 (5.5%) of the sample population believed that urinating blood is a spiritual problem, as such they do not take Praziquantel, however 128 (32.1%) pupils said they do not have any issues taking Praziquantel.

Table 3. Knowledge towards urinary schistosomiasis among 399 pupils by Schools/Senatorial zones

ZONE	**Anambra North (N=171)**	**Anambra Central (N= 118)**	**Anambra South (N=110)**	
Variables	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**	**Total (%)**
Knowledge **Source of information about Urogenital Schistosomiasis**				
School	130 (32.6)	81 (20.3)	66 (16.5)	277 (69.4)
Church	13 (3.2)	12 (3.0)	10 (2.5)	35 (8.8)
Health care Centre	10 (2.5)	7 (1.7)	10 (2.5)	27 (6.8)
Mass Media	5 (1.2)	5 (1.2)	9 (2.2)	19 (4.7)
Social Media	4 (1.0)	0 (0.0)	7 (1.7)	11 (2.7)
Parents	8 (2.0)	4 (1.0)	5 (1.2)	17 (4.2)
Others	1 (0.2)	9 (2.3)	6 (1.5)	16 (4.0)
What are the causes of Urogenital Schistosomiasis				
Eating Snails	23 (5.7)	15 (3.7)	53 (13.2)	91 (22.8)
Contact with Infected water	6 (1.5	17 (4.2)	58 (14.5	81 (20.3)
Witchcraft	37 (9.2)	15 (3.7)	13 (3.2)	65 (16.2)
Curse from the gods	19 (4.7)	9 (2.3)	11 (2.7)	39 (9.8)
Playing in the soil	19 (4.7)	14 (3.5)	10 (2.5)	43 (10.8)
Eating with dirty hands Or Contaminated foods	90 (22.5)	48 (12.0)	27 (6.8)	165 (41.4)
Drinking untreated water	44 (11.0)	39 (9.8)	22 (5.5)	105 (26.3)
Others	15 (3.7)	12 (3.0)	1 (0.3)	38 (9.5)
What are the signs and symptoms of Urinary Schistosomiasis				
Body Ache	60 (15.0	12 (13.0)	35 (8.7)	107 (26.8)
Headache	43 (10.8)	7 (1.7)	31 (7.8)	81 (20.3)
Blood in stool	29 (7.3)	23 (5.8)	79 (19.8)	131 (32.8)
Blood in Urine	49 (12.3)	51 (12.8)	65 (16.2)	165 (41.4)
Regular Fever	17 (4.2)	6 (1.5)	12 (13.0)	35 (8.8)
Body itching	11 (2.7)	1 (0.3)	27 (6.8)	39 (9.8)
Abdominal pain	27 (6.8)	9 (2.3)	11 (2.7)	47 (11.8)
Vomiting	14 (3.5)	7 (1.7)	8 (2.0)	29 (7.3)
Diarrhea	4 (1.0)	0 (0)	23 (5.8)	27 (6.8)
Loss of appetite	9 (2.2)	1 (0.3)	19 (4.7)	29 (7.3)
Painful Urination	5 (1.2)	1 (0.3)	26 (6.5)	32 (8.0)
Nightmares	7 (1.7)	6 (1.5)	6 (1.5)	19 (4.7)
Others	17 (4.2)	9 (2.2)	11 (2.7)	37 (9.2)

NB: NB: S/R/L/P = Stream/Lake/Pond

Table 4. Attitude towards urogenital schistosomiasis among 399 pupils by Schools/Senatorial zones

Zone	Anambra North (N=171)	Anambra Central (N= 118)	Anambra South (N=110)	
Variables	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**	**Total (%)**
Attitude Towards Urogenital Schistosomiasis Attitude towards Infection				
Considered as a serious Infection	138 (34.6)	65 (16.2)	93 (23.3)	296 (74.2)
Just like other Infections	18 (4.5)	21 (5.3)	33 (8.3)	53 (12.3)
Not a serious Infection	3 (0.8)	7 (1.7)	13 (3.3)	23 (5.8)
Sickness from the gods	2 (0.5)	6 (1.5)	0 (0.0)	8 (2.0)
Others	5 (1.2)	8 (2.0)	7 (1.7)	20 (5.0)
How do you prevent Urogenital Schistosomiasis?				
Avoid swimming in R/S/L/P	84 (21.1)	42(10.5)	90 (22.6)	216(54.1)
Avoid washing in R/S/L/P	56 (14.0)	43 (10.8)	79 (17.8	178 (44.6)
Wearing of foot wears	50 (12.5)	46 (11.5)	67 (16.8	63 (40.9)
Sleeping under Bed nets	67(16.8)	50 (12.5)	49 (12.3)	166 (41.6)
Avoid Fishing Activities	69 (17.3	30 (7.5)	88(22.1)	187 (46.9)
Not offending the gods	76 (19.4)	32 (8.0)	19 (4.7)	127 (18.3)
How do you treat Urogenital Schistosomiasis in your Locality?				
Going to the Hospital	150 (37.6)	86 (21.6)	104 (26.1)	340 (85.2)
Visiting Patent Medicine Store	38 (9.5)	18 (4.5)	48 (21.3)	104 (26.1)
Treatment with herbs	52 (13.0)	24 (6.0)	39 (9.8)	115 (28.8)
Visiting Prayer Houses	25 (6.3)	15 (3.8)	12 (3.0)	52 (13.0)
Visiting Traditional Chief Priest	71 (17.8)	13 (3.3)	5 (1.3)	89 (22.3)
Doing Nothing	20 (5.0)	8 (2.0)	7 (1.8)	35 (8.8)

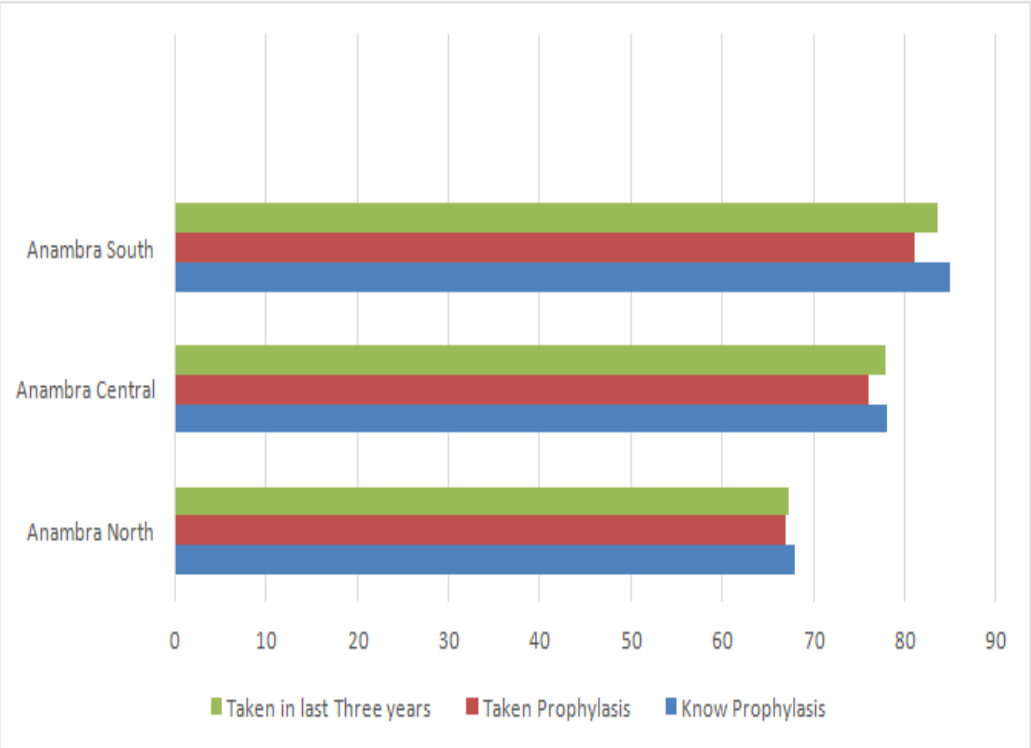

Fig. 3. Percentage distribution of 399 interviewees by schools/ zones on responses to knowledge and uptake of prophylactic drug, praziquantel

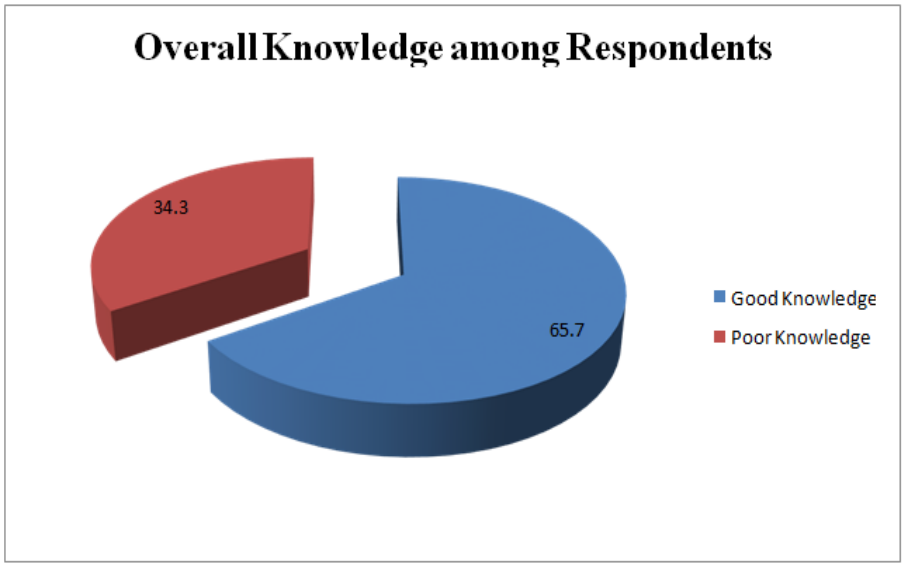

Fig. 4. Overall knowledge of urinary schistosomiasis among respondents

Furthermore, Fig 3 shows that Anambra South had the highest knowledge and patronage of the prophylaxis at above 80% patronage, than Anambra Central and Anambra North which were both below 80% in patronage of the prophylaxis Praziquantel, the drug of choice in the control of Urogenital Schistosomiasis. However, on the general scale, there was an overall knowledge and patronage of prophylaxis at above 65% in all three Senatorial zones, which is actually a considerable value for Anambra State.

3.7 Overall Knowledge Level of Urogenital Schistosomiasis among Respondents

Fig. 4 shows that more than half of the respondents, 262 (65.7%) across the three senatorial districts demonstrated good knowledge of Urogenital Schistosomiasis, while 137 (34.3%) of them had poor knowledge of Urogenital Schistosomiasis.

3.8 Analysis of Relationship Between Parameters

3.8.1 Association between the knowledge of urogenital schistosomiasis and socio-demographics of the respondents at the schools/senatorial zone

Table 6 shows the association between the knowledge of urinary schistosomiasis and socio demographics of respondents at the Schools/Senatorial Zone. There was a statistically significant relationship between age of respondents ($\chi2$ =12.786, df=4, p= 0.0035), class level ($\chi2$ =8.57, df=14, p= 0.016) and knowledge of Urogenital Schistosomiasis. Also the results showed that gender ($\chi2$ = 2.0, df=3, p=0.20923) was not associated with knowledge of Urogenital Schistosomiasis.

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3.9.2 association between the risk factors of urogenital schistosomiasis and the socio-demographics of respondents at the schools/senatorial zones

Table 7 below, also shows that socio-demographic characteristics of the respondents,

which include the Age, Gender and Class, showed no significant association with the Risk factors of Urogenital Schistosomiasis in the study areas. (p>0.05). (See Table 7)

3.9.3 Association between risk factors of urogenital schistosomiasis in the study areas and study population

The table 8 shows how the Risk Factors of Urogenital Schistosomiasis are associated with the respondents and the study areas. The risk factors considered in this study were Parent's Occupation, Sources of Drinking water and Daily Activities. The table further went to show that there was no significant relationship betweenParent's Occupations, Sources of Drinking Water and Daily Activities and the exposure of the school- children to the infection of the disease Urogenital Schistosomiasis (p>0.05) in the State.

Table 5. Responses of 399 interviewees by Schools/Senatorial Zones on reason for taking praziquantel and stopping usage or non-intake

	Anambra North	Anambra Central	Anambra South	
Variables	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**	**Total (%)**
Why did you take PZQ				
Health workers and our Teachers gave it to us in school	99 (24.8)	68 (17.0)	87 (21.8)	254 (63.7)
Health workers gave us in the Church	29 (7.2)	24 (6.0)	54 (13.5)	107 (26.8)
To prevent me from getting Schistosomiasis	17 (4.3)	54 (13.5)	63 (15.8)	134(33.9)
How many times did you take Praziquantel since 2019?				
Once	91 (22.8)	20 (5.0)	15 (3.8)	126 (31.6)
Twice	52 (13.0)	24 (6.0)	22 (5.5)	98 (24.6)
Thrice	38 (9.5)	43 (10.8)	15 (3.8)	96 (23.1)
If you have stopped taking PZQ, why?				
I was passing blood in urine after taking it for the first time	24 (6.0)	24 (6.0)	28 (7.0)	76 (19.0)
I stopped taking it because It is bitter	23 (5.8)	27 (6.8)	24 (6.0)	74 (18.5)
I do not take because it is big in size	12 (3.0)	17(4.3)	5 (1.3)	34 (8.5)
My parents asked me not to take it	38 (9.5)	19 (4.8)	12(3.0)	69 (17.3)
I stopped taking it because it make me drowsy	11 (2.80	12(3.0)	2(0.1)	25 (6.3)
I stopped taking it because it makes me vomit	5 (1.3)	13 (3.3)	12(3.0)	30 (7.5)
I stopped taking it because I vomited blood the first time I took it	6 (1.5)	7 (1.8)	1(0.3)	14 (3.5)
I don't take it because of the smell	9 (2.3)	5 (1.3)	14 (3.5)	28 (7.0)
I stopped taking it because I had rashes the first time I took it	3 (0.7)	13 (3.3)	3(0.7)	19 (4.5)
I don't take it because I believe blood in the urine is a spiritual problem	12 (3.0)	6 (1.5)	4 (1.0)	22(5.5)
I don't have any issue taking Praziquantel	54 (13.5)	28 (7.0)	46 (11.5)	128(32.1)

Table 6. Association between the knowledge of Urogenital Schistosomiasis and socio-demographics of the Respondents in the Schools/Senatorial Zone

Variables	Good Knowledge (%)	Poor Knowledge (%)	Total (%)	χ2	P-value	Decision
Age				12.786	0.0035	***S****
5 – 8	37 (9.4%)	92(23.2%)	129 (32.3%)			
9-12	58 (14.5%)	27 (6.8%)	85 (21.3%)			
13- 15	167(41.8%)	18 (4.3%)	185 (46.4%)			
Total	**262(65.7)**	**137(34.3%)**	**399 (100%)**			
Gender				2.0	0.20923	***NS***
Male	106 (26.5%)	107(27.0%)	213 (53.4%)			
Female	98 (24.5%)	88 (22.0%)	186 (46.6%)			
Total	**204(51.1%)**	**195(48.9%)**	**399 (100%)**	8.57		
Class Group					0.016	***S****
1-2	61 (15.3%)	59(14.8%)	120 (30.1%)			
3- 4	97(24.3%)	49 (12.3%)	146 (36.6%)			
5 -6	84 (21.0%)	49(12.3%)	133 (33.3%)			
Total	**242(60.6)**	**157(39.4)**	**399 (100%)**			

S= Significant, NS*= Not Significant*

Table 7. Association between the Risk factors of Urogenital Schistosomiasis and the socio-demographics of 399 Interviewees by Schools/Senatorial Zones.

Socio-demographics Decision	χ2	DF	P. Value
Age NS	2.039	7	0.218
Gender NS	13.4	5	0.553
Class NS	7.53	3	0.435

Table 8. Associationbetween the risk factors of urogenital schistosomiasis and the practices of the school-age children in the senatorial zones

Variables	anambra North	Anambra Central	Anambra South		P-Value
	No. (%)	**No. (%)**	**No. (%)**	**Total (%)**	
Parent's Occupation					
Farming	36 (34.1)	79 (19.8)	68 (17.0)	283 (70.9)	
Fishing	43 (10.8)	19 (4.7)	22 (5.0)	84 (21.1)	
Artisan	32 (8.0)	22 (5.5)	48 (12.0)	102 (25.6)	
Trading	4 (23.6)	27 (6.8)	29 (7.3)	150 (37.6)	
Civil Servant	18(4.5)	15 (3.8)	62 (15.5)	29 (7. 3)	
Clergy	9(2.30)	16(4.0)	12(3.0)	37(9.3)	0.709*
Source of Drinking Water					
River/Stream	62 (15.5)	57 (14.3)	71(17.8)	190 (47.6)	
Bore Hole/Tap water	115 (28.8)	65 (16.3)	73 (18.3)	253 (63.4)	
Rain Water	40 (10.0)	27 (6.8)	23(5.8)	90 (22.6	
Sachet/Bottled water	23 (5.8)	10 (2.9)	18 (4.5)	51 (12.8)	0.257#
Daily Activities					
Swimming in R/L/P	116(29.1)	97 (24.3)	46 (11.5)	259 (64.9)	
Washing at R/L/P	105 (26.3)	80 (20.1)	74 (18.5)	259 (64.9)	
Join Parents to Fish/Farm	148 (37.1)	89 (22.3)	99 (24.8)	336 (84.21)	
Go for snail catching by the S/R/L/P	55 (13.9)	48 (12.0)	30 (7.5)	113 (28.3)	0.160^

NB: S/R/L/P = Stream/River/Lake/Pond
**Fischer's Test; #Student's t-test; ^Pearson Chi Square*

4. DISCUSSION

4.1 Knowledge, Attitude and Practice (KAP)of UgS

This study showed that there was high level of awareness of the disease Urogenital Schistosomiasis (UgS) among school-aged children in the study area, Anambra State. It showed that 65.7% of the total population of 399 school-aged children from primary schools in the three selected communities, each from the three Senatorial zones in the State, had good knowledge of the disease, while 34.3% had poor knowledge of Urogenital Schistosomiasis (UgS). This result agrees with the work of [1] which showed high level of awareness at 91% in a community KAP (Knowledge, Attitude and Practice) study in, Nampula Province, Mazambique. It also agreed with the work of [15], which reported a high level of awareness in a Schistosomiasis study in Gwako community, a rural community in FCT (Federal Capital Territory) Abuja, Nigeria. On the other hand, this study is at variance with the work of [16], which 2% awareness of UgS was recorded among a population of 290 pupils in a Prevalence and Associated Risk Factors study among primary school pupils in Jidawa and Zodiya Communities of Jigawa State, Northern Nigeria and the work of [17], which recorded a low awareness level in a study in some communities in Bende LGA of Abia State, Southeast Nigeria.The study also showed that Parents of pupils from Anambra North (AN) Senatorial Zone had the highest level of education and the zone also showed the highest level of awareness of UgS among the three Senatorial zones. This is quite frankly; a surprise finding as Anambra North is prominent with riverine communities more the Anambra South and Anambra central and also has more hard-to-reach areas, as such one would expect a low population level of educated Parents. However, there is no significant association between Parents' level of education and the awareness level of the pupils ($p > 0.05$).

Then again, while 81(20.3%) pupils correctly identified that the cause of UgSis contact with infected water bodies and 165(41.4%) correctly indicated blood in urine as a major symptom of UgS, 65(16.2%) believed UgS is caused by witchcraft and 8(2.0%) pupils attributed the sickness as an infliction from the gods in agreement with [17], which recorded 1.6% of the study population in some communities in Bende LGA of Abia State as believing that UgS infection was as a result of wrong doing by infected persons. This evidently revealed that even in the 21st century people still associate diverse of superstitious beliefs to disease infections [18].

On the patronage and utilization of the drug Praziquantel as the choice drug for the treatment and prevention, 134(33.9%) took Praziquantel for the purpose of prevention of the disease. 254(63.7%) took Praziquantel because it was given to them by their teachers and health workers in their communities. 107(26.8%) took Praziquantel because health workers brought it to the Church. This is a clear indication that though 33.9% took Praziquantel because they were aware it is a preventive chemotherapy, a larger percentage took Praziquantel on account of the confidence they had on the fact that it was given to them by their teachers and community health workers in thier school or church. This goes a long way to telling how much efficacy and impact the awareness of UgS can have on the control of the disease through intensive Education of the population at risk of the disease especially in endemic communities. In all these however, AS (Anambra South) among the three Senatorial zones showed the highest level of awareness and patronage of the drug Praziquantel from 2019 to 2021 at a patronage and awareness level above 80%. On the other hand, Anambra North (AN) which showed highest number of educated parents and highest level of disease awareness, showed the lowest level of awareness of the drug PZQ at above 65% and lowest level of patronage of PZQ at above 75%, which are both considerably above average [19].

In the same vein, when we considered the level of patronage and utilization of Praziquantel from 2019 to 2021, we found out that 126(31.6%) took Praziquantel (PZQ) once (1 time) during this 3 year period, 98(24.6%) took PZQ twice (2 times) and 96(24.0%) took it thrice (3 times). However, 76(19.0%) do not take PZQ or had stopped taking PZQ before 2019 due to one belief or the other or an associated adverse event from previous use, while 3(0.75%) indicated that they have not seen PZQ for the first time [20].

Another germane part of this study was identifying the underlying risk factors and the level of association with the study population. The primary risk factors in focus in this study were: Parents' occupation, source of drinking water and daily activities. Out of the entire population, 283(70.9%) and 84(21.1%) indicated

that their parents were into farming and fishing respectively, 199(47.6%) indicated that they had community river and stream as their major sources of drinking water. 259(64.9%) affirmed that they were involved in both swimming and washing streams, rivers lakes or ponds within their communities and 366(84.2%) indicated that they joined their parents in farming and fishing activities [21]. However, the study showed that the associated risk factors of Urogenital Schistosomiasis (UgS) did not show any significant relationship with the practices among the school-age children in all Senatorial zones. Parent's occupation as an associated risk factor did not show any significant relationship with the practices of the school-age children as Fisher's t-test showed ($p = 0.709$) (Table 8). Then again Students t-test also showed that Source of Drinking water had no significant relationship with the practices of the school-age children ($p = 0.257$) (Table 8) [22]. Pearson's Chi square test had ($p = 0.160$) which also confirmed that there was no significant relationship between Daily Activities associated with UgS and practices among school-age children in the study area (Table 8). These non-significant relationships between the associated risk factors of UgS, even though they were present, which also affirms the endemicity of UgS in Anambra State (Ndukweet al, 2019), could actually be as a result of the high awareness level of risk factors and transmission of UgS in the study area. Then again, Anambra State as a study area has scarce rural communities but more of urban and semi-urban areas, which have basic amenities for daily living, such as portable drinking water in variouscommuinities, villages and kindreds. Also, the life style in these urban and semi-urban areas prominent within Anambra State makes frequency of human Interaction with infection sites reasonably low eventhough the pupils are still exposed to risk factors associated with UgS [23].

5. CONCLUSION

Anambra State, though an endemic area for UgS, has a high level of awareness of the disease Urogenital Schistosomiasis (UgS). This high level of awareness is definitely as a result of the annual Mass Drug Administration, (MDA) campaign by Anambra State Ministry of Health and The Carter Centre (TCC) for the control of UgS. This has reflected in the considerably high level of patronage of Praziquantel the drug of choice for treatment and control of UgS. Then again, Anambra State being a commercial hub for many Small Scale businesses, has helped in virtually urbanizing most rural communities, thereby making provisions for basic amenities such as portable drinking water. This rapid urbanization of Anambra State has also led to the increase in migration of people from rural communities to urban areas for greener pasture, where the possibility to access information on UgS abounds and also reducing the population of people who are at risk due to constant interaction with infected water bodies.

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CONSENT AND ETHICAL APPROVAL

The ethical approval for this research was obtained from the Health Research Ethics Committee of Anambra State, Ministry of Health, Awka. (MH/AWK/M/321/228). The study and wrtten consent process receive ethical approval from the head of department of public health, federal university of technology owerri. Furthermore, ethical approval was sought and obtained from the: anambra state ministry of health, head of health department in the three LGA from each senatorial zone and heads of all the schools selected for this study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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