**Determinants of Adherence to Neglected Tropical Disease Interventions Among Children in Selected Communities of Ilorin Metropolis, Kwara State.**

**Abstract**

*Neglected Tropical Diseases (NTDs) remain a significant public health challenge, particularly among school-aged children in endemic regions. This study assessed awareness, willingness, and factors influencing adherence to mass drug administration (MDA) for NTDs among school children. A cross-sectional survey was conducted among school aged children aged 6–18 years, with data collected on socio-demographic characteristics, knowledge of NTDs, reasons for refusal, and determinants of drug uptake. Findings revealed that 64.0% of respondents were aware of NTDs, with health workers and media serving as primary information sources. Although 79.2% were willing to take NTD drugs, adherence was significantly influenced by age (p = 0.001), with older children showing greater willingness. Determinants of adherence included parental support (75.4%), cultural and religious beliefs (72.3%), teacher explanations (29.4%), prior negative experiences with the drugs (25.2%), and peer influence (18.0%). Additionally, only 5.1% of respondents had ever discussed NTDs with their families, highlighting low home-level engagement. Reported side effects—vomiting (14.7%) and dizziness (10.5%)—contributed to non-compliance. Refusals were primarily due to parental opposition (51.5%) and fear of side effects (48.5%). The study underscores the importance of targeted community engagement, including parental and teacher involvement, culturally sensitive messaging, and addressing misconceptions to enhance participation in NTD control programs*

**Introduction**

Neglected Tropical Diseases (NTDs) represent a major public health challenge, predominantly impacting impoverished communities in tropical and subtropical regions, including Nigeria. These diseases disproportionately affect children in community settings, who are especially vulnerable due to limited access to healthcare and inadequate disease awareness. Factors influencing adherence to NTD interventions include socio-economic status, parental involvement, education levels, cultural beliefs, and the availability of healthcare services (George et al., 2023; Bachirou et al., 2023; Akinsolu et al., 2023; Ochola et al., 2022; Molyneux et al., 2021). Globally, approximately 1.5 billion people are afflicted by NTDs, which contribute to significant morbidity and mortality, particularly among children (Akinsolu et al., 2024; George et al., 2023). In sub-Saharan Africa, the prevalence of NTDs such as schistosomiasis can reach infection rates as high as 40.1% in community settings (Opara et al., 2021), and in rural Ethiopia, 39% of households report symptoms associated with NTDs (Mekonnen et al., 2024). These infections not only result in immediate health issues but also impact long-term developmental outcomes, including educational performance (George et al., 2023).

In Nigeria, the prevalence of soil-transmitted helminthiasis and schistosomiasis remains high, with infection rates often exceeding 32% in several regions (Akinsolu et al., 2024; Olerimi et al., 2023). Kwara State, in particular, grapples with compounded challenges such as poverty, limited access to clean water, and insufficient healthcare infrastructure, thereby increasing the vulnerability of its community children to NTDs (Akinsolu et al., 2024; George et al., 2023). The repercussions of these diseases extend beyond health by disrupting community development and perpetuating cycles of poverty. Community-wide mass drug administration programs are thus critical for interrupting transmission cycles and reducing morbidity (Akinsolu et al., 2024; George et al., 2023).

In Ilorin Metropolis, children residing in communities are at heightened risk for infections like schistosomiasis and soil-transmitted helminths, which can lead to issues such as stunted growth and impaired cognitive development (Bachirou et al., 2023; Akinsolu et al., 2023; Ochola et al., 2022). Despite efforts to implement mass drug administration programs, adherence remains low due to barriers such as logistical challenges, misconceptions about disease transmission, and insufficient community engagement (Ralaidovy et al., 2020; Ochola et al., 2022; Sangare et al., 2024). Addressing these challenges through a focused, community-based approach is essential for the success of NTD prevention and control initiatives.

### ****Methodology****

#### **Research Design**

This study adopted a **descriptive cross-sectional survey design**, which is appropriate for assessing the factors influencing adherence to Neglected Tropical Disease (NTD) interventions among children within a community setting at a specific point in time.

#### **Study Area**

The study was conducted in **Ilorin Metropolis**, the capital of Kwara State, Nigeria. Located at latitude 8° 24' N and longitude 4° 10' E, Ilorin is strategically situated between Nigeria’s southwest and north-central regions, making it a key economic and cultural hub. The city's undulating terrain, surrounded by hills and valleys, influences environmental and public health dynamics, particularly in the context of sanitation and waste management (Ibikunle et al., 2021). With a population of over 800,000, Ilorin is one of Nigeria’s most populous urban centers. It is characterized by rapid urbanization and socio-cultural diversity, which plays a significant role in shaping community-level public health behaviors and interventions (Abdullahi & Gunawardena, 2021). The metropolis is also home to several educational institutions and reflects a mix of socioeconomic activities including trade, agriculture, and small-scale enterprises.

**Target Population**

The target population consisted of **children aged 6–18 years** residing in various communities across Ilorin Metropolis who had been **exposed to NTD intervention programs**, such as deworming exercises or health education campaigns, either through school-based or community-led initiatives.

#### **Sample Size and Participant Recruitment**

The sample size was calculated based on a previously reported NTD intervention coverage rate of 73.1% (Olamiju et al., 2014), at a 95% confidence level and a 5% margin of error. To accommodate possible non-response or incomplete data, a 10% allowance was added, yielding a final sample size of **350 children.** A **multistage sampling technique** was used. First, communities were selected from each of the three Local Government Areas (LGAs) in Ilorin Metropolis—Ilorin East, Ilorin West, and Ilorin South. Within selected communities, households were systematically sampled. Eligible participants were children aged 6–18 years who had previously participated in any NTD-related intervention. Prior to data collection, **informed consent was obtained directly from parents or guardians** at the household level. Assent was also sought from the children. Participation was voluntary, and confidentiality was assured.

#### **Method of Data Collection and Data Analysis**

Data were collected through a **semi-structured interviewer-administered questionnaire**. Trained research assistants conducted face-to-face interviews with parents and children at their homes. For younger children, the questionnaire was simplified and explained in age-appropriate terms to ensure comprehension. Data were entered, cleaned, and analyzed using **Statistical Package for the Social Sciences (SPSS) version 27**. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize the data. Inferential analysis, including **Chi-square tests**, was used to explore the relationship between socio-demographic variables and adherence to NTD interventions. A significance level of **p < 0.05** was considered statistically significant.

#### **Ethical Considerations**

Ethical approval was obtained from the **Kwara State Ministry of Health** and the **Institutional Review Board (IRB)** of the overseeing academic institution. Informed **written consent was secured from parents or guardians** before engaging any child in the study, and **verbal or written assent** was obtained from the children themselves. Participants were assured of confidentiality and anonymity. All data collected were stored securely and used solely for the purposes of this research. Participation was voluntary, and respondents had the right to withdraw at any point without any form of penalty (Meira et al., 2023; Salje et al., 2021; Riñon et al., 2022).

**Result**

**Table 1: Socio-demographic variables**

|  |  |  |
| --- | --- | --- |
| **Variables** | **Frequency** | **Percentage** |
| **Age groups** |  |  |
| 8 – 12 | 136 | 38.9 |
| 13 – 16 | 150 | 42.9 |
| 17 – 18 | 64 | 18.3 |
| **Sex** |  |  |
| Male | 200 | 57.1 |
| Female | 150 | 42.9 |
| **Class** |  |  |
| Primary | 95 | 27.1 |
| Secondary | 255 | 72.9 |
| **Type of school** |  |  |
| Public | 261 | 74.6 |
| Private | 89 | 25.4 |
| **Religion** |  |  |
| Christianity | 169 | 48.3 |
| Islam | 181 | 51.7 |

The majority of the respondents were within the 13–16 years age group (42.9%), predominantly male (57.1%), and primarily enrolled in secondary school (72.9%). A greater proportion attended public schools (74.6%) compared to private schools. In terms of religious affiliation, the participants were nearly evenly distributed, with 51.7% identifying as Muslim and 48.3% as Christian.

**Table 2: Knowledge of NTDs among respondents**

|  |  |  |
| --- | --- | --- |
| **Variables** | **Frequency** | **Percentage** |
| **Aware of NTD** |  |  |
| Yes | 224 | 64.0 |
| No | 126 | 36.0 |
| **Sources of information on NTD** | **n=224** |  |
| Teacher | 27 | 12.1 |
| Parent | 16 | 7.1 |
| Health worker | 94 | 42.0 |
| Radio/TV | 73 | 32.6 |
| Friends | 5 | 2.2 |
| Others | 9 | 4.0 |
| **Knowledge of ways by which NTD is spread** |  |  |
| Yes | 120 | 54.6 |
| No | 104 | 46.4 |
| **Ways of spread of NTDs** | **n=120** |  |
| Dirty water | 87 | 72.5 |
| Eating unwashed fruits | 120 | 100.0 |
| Mosquito and insect bites | 51 | 42.5 |
| Walking bare footed | 21 | 17.5 |
| Poor hygiene | 120 | 100.0 |
| Sharing of toilets | 27 | 22.5 |
| Playing in dirty water | 102 | 85.0 |

Out of the total respondents, 64.0% reported being aware of Neglected Tropical Diseases (NTDs), while 36.0% indicated no prior awareness. Among the 224 respondents who were aware of NTDs, the primary source of information was health workers, accounting for 42.0%. This was followed by radio/television (32.6%), teachers (12.1%), parents (7.1%), and friends (2.2%), while 4.0% cited other unspecified sources.

Regarding knowledge of NTD transmission, 54.6% of that aware demonstrated knowledge of how NTDs are spread, whereas 46.4% did not. Among the 120 respondents knowledgeable about the modes of transmission, all identified eating unwashed fruits (100%) and poor hygiene (100%) as major routes of transmission. Other commonly mentioned transmission pathways included playing in dirty water (85.0%), consumption of dirty water (72.5%), mosquito and insect bites (42.5%), sharing of toilets (22.5%), and walking barefoot (17.5%).

**Figure 1: Presentation of respondents by the types of NTDs known**

The bar chart illustrates the respondents' knowledge of specific Neglected Tropical Diseases (NTDs). Among the diseases presented, River Blindness was the most commonly identified, with 35.3% of respondents recognizing it as an NTD. This was closely followed by Elephantiasis, acknowledged by 34.8% of participants. Schistosomiasis was recognized by 25.4%, while Worm Infection was the least identified, with only 19.6% of respondents aware of it.

**Table 3: Experience with NTD Interventions**

|  |  |  |
| --- | --- | --- |
| **Variables** | **Yes (%)** | **No (%)** |
| Given drugs in school to prevent or treat NTDs | 224 (64.0) | 126 (36.0) |
|  | **n=224** |  |
| Take drugs given in school | 189 (84.4) | 35 (15.6) |
| Refused to take drug during NTD campaigns | 64 (28.6) | 160 (71.4) |
| Willing to take NTD drugs again | 187 (83.5) | 37 (16.5) |

Out of the total respondents, 64.0% (n=224) reported being given drugs in school for NTD prevention or treatment, while 36.0% indicated they were not.Among those who received the drugs (n=224), a substantial majority (84.4%) took the medication as instructed, whereas 15.6% did not. Despite this generally high compliance, 28.6% of the overall participants admitted to refusing the drug during NTD campaign efforts, while 71.4% reported not refusing the drugs.

Encouragingly, willingness to take NTD drugs in the future remains high, with 83.5% of respondents indicating they would be willing to take the drugs again, suggesting generally positive attitudes toward NTD drug administration and acceptance among the population studied.

**Table 4: Reasons for taking and refusing drugs**

|  |  |  |
| --- | --- | --- |
| **Variables** | **Frequency** | **Percentage** |
| **Reasons for refusal** |  |  |
| Scared | 17 | 48.5 |
| Parent told not to take it | 18 | 51.5 |
| **Side effects experienced upon taking drugs** |  |  |
| No side effects | 138 | 73.3 |
| Vomiting | 28 | 14.7 |
| Dizziness | 20 | 10.5 |
| Stomach ache | 3 | 1.6 |

The study showed that fear (48.5%) and parental disapproval (51.5%) were the main reasons for refusing NTD drugs. Most participants (73.3%) who took the drugs experienced no side effects, while a few reported vomiting (14.7%), dizziness (10.5%), and stomach ache (1.6%). This highlights the need for better health education to improve drug acceptance.

**Table 5: Factors Influencing Adherence**

|  |  |  |
| --- | --- | --- |
| **Variables** | **Yes (%)** | **No (%)** |
| Parents support taking drugs given in schools | 264 (75.4) | 86 (24.6) |
| Teachers explain why drug is given | 103 (29.4) | 247 (70.6) |
| Feels safe taking drugs | 139 (39.7) | 211 (60.3) |
| Afraid of taking medicine in school | 101 (28.9) | 249 (71.1) |
| Discouraged you from taking the drugs before | 20 (5.7) | 330 (94.3) |
| Religious or cultural beliefs affect children's willingness to take drugs in school | 253 (72.3) | 97 (27.7) |
| Family discusses health or diseases like worms or infections | 18 (5.1) | 332 (94.9) |

The findings revealed several key factors that influenced children's willingness to take medication in schools. Most parents (75.4%) supported their children taking drugs provided at school, yet a significant proportion of teachers (70.6%) did not explain the reasons for administering the medication. Safety concerns were prevalent, with 60.3% of children feeling unsafe taking the medication, and 28.9% expressing fear of doing so. Cultural and religious beliefs impacted children's willingness to take medicine, as reported by 72.3% of respondents. Additionally, family discussions about health-related topics like worms or infections were minimal, with 94.9% of families not engaging in such conversations. These findings emphasized the importance of parental support, teacher communication, and cultural considerations in influencing children's medication adherence in schools.

**Table 6: Association between socio-demographic variables and willingness to take NTD drugs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | **Willingness to take NTD drugs** | **χ²** | **p-value** |
|  | **Yes (%)** | **No (%)** |  |  |
| **Age groups** |  |  | 16.128 | **0.001** |
| 8 – 12 | 93 (68.4) | 43 (31.6) |  |  |
| 13 – 16 | 127 (84.7) | 23 (15.3) |  |  |
| 17 – 18 | 57 (89.1) | 7 (10.9) |  |  |
| **Sex** |  |  | 0.763 | 0.426 |
| Male | 155 (77.5) | 45 (22.5) |  |  |
| Female | 122 (81.3) | 28 (18.7) |  |  |
| **Class** |  |  | 3.349 | 0.076 |
| Primary | 69 (72.6) | 26 (27.4) |  |  |
| Secondary | 208 (81.6) | 47 (18.4) |  |  |
| **Type of school** |  |  | 2.698 | 0.130 |
| Public | 212 (81.2) | 49 (18.8) |  |  |
| Private | 65 (73.0) | 24 (27.0) |  |  |
| **Religion** |  |  | 0.976 | 0.358 |
| Christianity | 130 (76.9) | 39 (23.1) |  |  |
| Islam | 147 (81.2) | 34 (18.8 |  |  |

The statistical analysis of socio-demographic variables revealed that age had a significant association with willingness to take NTD drugs (χ² = 16.128, *p* = 0.001). Willingness increased with age: 68.4% among children aged 8–12, 84.7% among those aged 13–16, and 89.1% among those aged 17–18. This suggests that older children may possess greater health awareness or autonomy regarding health decisions. In contrast, sex, class level, type of school, and religion showed no statistically significant association with willingness to participate in NTD drug administration.

**Discussion**

The study showed that the majority of the respondents were aged 13–16 years (42.9%), with a slightly higher proportion of males (57.1%) than females (42.9%). Most were in secondary school (72.9%), and a significant majority attended public schools (74.6%). This demographic profile was typical for NTD intervention campaigns, which were often delivered through public school systems due to ease of access and higher enrolment rates. This finding was consistent with Salam et al. (2014), who emphasized that community-based interventions, particularly those implemented through schools, were among the most effective strategies for the prevention and control of helminthic neglected tropical diseases in endemic regions.Bottom of Form The study revealed that 64.0% of the children were aware of NTDs, with health workers (42.0%) and radio/TV (32.6%) being the main sources of information. This was consistent with findings by Ngunyali et al. (2023), who reported that healthcare providers and mass media were key sources of information in community-wide mass drug administration programs for lymphatic filariasis and soil-transmitted helminths in Tanzania. However, only 54.6% of the children in the present study knew how NTDs were spread, indicating the persistence of misconceptions about transmission routes. Similarly, Olamiju et al. (2014) found low levels of knowledge about NTD transmission among residents of Abuja, Nigeria, despite some awareness of NTD control activities. These findings suggested that while awareness may be increasing, gaps in accurate understanding of disease transmission remain a significant barrier to effective prevention behavior.

The study found that 64.0% of the children reported being given drugs in school to prevent or treat NTDs, and among these, 84.4% took the drugs. Encouragingly, 83.5% of children indicated a willingness to take NTD drugs again, demonstrating general acceptance of the MDA program. This finding aligned with Akinsolu et al. (2023), who reported that community perception of school-based mass drug administration in Ogun State was generally positive, especially when parents and children were adequately informed about the purpose and safety of the drugs. Their study emphasized that trust in the health system and community engagement significantly enhanced uptake and willingness to participate in future MDA rounds. The study also explored reasons for refusal. The main reasons included fear (48.5%) and parental opposition (51.5%). Additionally, minor side effects like vomiting (14.7%) and dizziness (10.5%) were reported. These findings were consistent with those of Kisoka et al. (2014), who identified fear of adverse reactions, lack of adequate information, and parental influence as key factors contributing to low drug uptake during mass drug administration for lymphatic filariasis in both rural and urban areas of Tanzania. The presence of even minor side effects, combined with misinformation or lack of communication, remained a significant deterrent to adherence in community-based deworming initiatives.

The study identified critical factors influencing adherence. Parental support (75.4%) and religious or cultural beliefs (72.3%) were key determinants. Meanwhile, only 29.4% of children indicated that teachers explained why the drugs were given, and just 5.1% discussed NTDs with their families. These findings were consistent with those of Adekeye et al. (2017), who emphasized the importance of community engagement in NTD treatment, noting that parental and community involvement played a critical role in the success of mass drug administration programs. Furthermore, the lack of adequate explanation from teachers suggested a missed opportunity in using schools as platforms for health education, a gap also identified by Adekeye et al. (2017) in their assessment of varying community needs in NTD control efforts.

The study provided a statistical analysis of socio-demographic variables in relation to willingness to take NTD drugs. A significant association was observed with age (p = 0.001), with older children more likely to take the drugs. This may have reflected greater health awareness or autonomy among older children, as reported by Olamiju et al. (2023), who found that older participants in mass drug administration (MDA) campaigns were more likely to adhere to drug intake due to increased health literacy and understanding of the benefits. However, there was no significant association with sex (p = 0.426), school type (p = 0.130), class level (p = 0.076), or religion (p = 0.358), suggesting that while demographic factors were important, behavioral and social influences may have played a larger role, a finding also observed by Olamiju et al. (2023) in their study on schistosomiasis control programs in Lagos, Nigeria.

**Conclusion and Recommendations**

In conclusion, the study confirmed that although awareness and willingness to participate in NTD interventions were relatively high, adherence was significantly influenced by age, parental support, and cultural beliefs. To enhance compliance, it is recommended that intervention programs focus on increasing parental and teacher involvement, ensuring the delivery of accurate health information, and addressing concerns about minor side effects. Effective management of these factors can improve the overall success of NTD interventions and promote sustained participation.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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