Assessing the Efficacy and Safety of Ivermectin use for Lymphatic Filariasis Among Eligible Civil Servant in Kaduna State

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Abstract

Background

This research study aims to evaluate the effectiveness and safety of Ivermectin in treating Lymphatic Filariasis among eligible civil servants in Kaduna State, Nigeria. Lymphatic Filariasis is a parasitic disease transmitted through mosquito bites, causing debilitating symptoms such as lymphedema and elephantiasis. Ivermectin has shown promise in treating various parasitic infections, including Lymphatic Filariasis. However, its efficacy and safety profile specifically in the context of civil servants in Kaduna State remain understudied.

Method

The research study employed a mixed-methods approach, combining quantitative data on treatment outcomes and qualitative insights on the experiences of participants. The study also assessed the impact of Ivermectin treatment on the quality of life and productivity of study participants. The hypothesis for this study was tested using chi-square analyses.

Result

The largest age group (35%) falls between 36 and 45 years old. There is a significant drop in the percentage of respondents in the younger age group (5%) and a smaller decrease in the 26-35 and 46-55 age groups (23% and 30%, respectively). It was observed that only age and years of service are the factors statistically significant with filariasis while sex and educational qualification remained insignificant. The implication of this result is that not all socio-demographic factors depict the prevalence of lymphatic filariasis. Age (p=0.001) was seen to be the greatest determining factor of prevalence of lymphatic filariasis. Furthermore, Years of service also determines the prevalence of lymphatic filariasis, this was established by the p value=0.034 while gender is weak factor in determining the prevalence of lymphatic filariasis (p=0.058). Year of service (p=0.000) was seen to score the highest in the test of Ivermectin administration comes with significant safety profile among eligible civil servants of Kaduna State, followed by Age factor (value=0.006). Finding from this study indicates the greater number of 230 (71%) of the total sample, have ever taken Ivermectin for lymphatic filariasis in contrast to 93 (29%) of the total sample, who have never taken Ivermectin for lymphatic filariasis due to one reason or the other. However, 189 (59%) of the total sample were aware of the potential side effects of Ivermectin while134 (41%) of the total sample, were not aware of the potential side effects of Ivermectin. A majority (69%) of respondents reported being aware of some contraindications or precautions for taking Ivermectin from either health care providers or public health campaigns.

Conclusion

Findings from this research will contribute to the existing knowledge on the use of Ivermectin for Lymphatic Filariasis and help inform healthcare practices in Kaduna State

Introduction

Lymphatic filariasis (LF) is the second most common vector-borne parasite illness after malaria, and it is acknowledged as the second largest source of lifelong disability [1]. Humans contract the disease by being bitten by infected mosquito species belonging to the genera Aedes, Anopheles, Culex, and Mansoni [2]. These infected mosquitoes are carriers of filarial worms Wuchereria bancrofti, Brugia malayi, and B. timori, that causes LF. They are believed to infect 50 million people worldwide, while 885 million people are thought to be at risk of infection [3]. Furthermore, it has been reported that LF causes chronic disability in about 36 million persons and 1.63 million disability-adjusted life years (DALYs) were expected to be the global public health burden of LF in 2019 [4,5]. As one of the neglected tropical disease (NTD), the World Health Organization (WHO) has targeted to eradicate lymphatic filariasis (LF), and it is being fixed for elimination as a public health problem (EPHP), with the goal of having 80% of endemic countries certified for EPHP by 2030 [2]. Acute symptoms of LF range from fever that manifests as recurrent episodes of pain and vomiting to more persistent symptoms including lymphedema that may develop into severe limb enlargement (often referred to as elephantiasis) and persistent swellings of the scrotum, also known as hydrocele [6].

Nigeria has the highest burden of lymphatic filariasis in Africa with an estimated 135 million people at risk of the disease. In 2015 globally, 18 of the 73 countries known to be endemic for LF no longer required MDA and were conducting post-MDA surveillance since the Global Programme to Eliminate Lymphatic Filariasis (GPELF) was established in 2000 [7]. In 2017, Togo was confirmed as the first African country to eliminate LF as a public health problem [8]. The main method used to achieve this was mass drug administration (MDA) of anti-filarial drugs to at-risk populations in multiple rounds, a tactic known as preventive chemotherapy. In order to expedite the eradication of LF, a triple medication regimen consisting of ivermectin, diethlycarbamazine, and albendazole (IDA) has been used more frequently since 2019 [4] thus, Ivermectin has been shown to be highly effective in reducing lymphatic filariasis (LF) [4,9,10].

Ivermectin has emerged as a crucial tool in combating LF disease due to its proven effectiveness in reducing the parasite burden [11]. Beyond single-dose efficacy, ivermectin's integration into mass drug administration (MDA) programs has yielded impressive results. By simultaneously treating entire communities, MDA aims to interrupt transmission and ultimately eliminate LF. Trials comparing ivermectin-based triple-drug regimens (ivermectin, diethylcarbamazine, and albendazole) to traditional two-drug regimens (diethylcarbamazine and albendazole) have shown significantly faster reductions in community microfilarial prevalence with the triple-drug approach [11]. This enhanced efficacy paves the way for accelerated LF elimination efforts, presenting Ivermectin as a highly effective and safe tool in the fight against lymphatic filariasis. Its ability to significantly reduce microfilarial burden, both through single-dose administration and mass drug administration programs, contributes significantly to interrupting transmission and achieving the ultimate goal of LF elimination [11].

Large-scale safety surveillance studies are pivotal in detecting rare severe adverse events. Although millions of people in Africa are receiving periodic MDA, safety data from large-scale active CEM studies are scarce partly due to the lack of fully functional pharmacovigilance systems in the region [12]. The WHO's global individual case safety reports database (VigiBase) recently reported serious suspected ADRs and safety signals associated with ivermectin use and the under-reporting of ADRs in SSA [13]. Under or incomplete reporting of AEs, lack of information on baseline characteristics, embracing the number of drug administrations, and the absence of denominators are major drawbacks inherent in spontaneous reporting of pharmacovigilance databases such as VigiBase. The CEM in drug safety assessment studies overcomes such drawbacks [13].

The safety profile of drugs used in public health programs vary between individuals and populations due to host-genetic and environmental factors, including co-infection, comorbidity, and drug-interactions and the use of traditional medicines, which is common in Africa [14]. Poor safety surveillance of medicines during MDA campaigns and the under-reporting rate of AEs in SSA makes it challenging to accurately estimate the risks of drugs used in MDA to inform healthcare policy and practice. Although Ivermectin is an FDA-approved drug and has been used for over 30 years to treat parasitic infections, including river blindness and certain types of roundworm infections, its safety profile in Kaduna, as well as in other location is an essential aspect to consider when assessing its use for various conditions, including lymphatic filariasis.

Ivermectin is considered safe when used as directed for approved indications. However, like any medication, it can have side effects. The most common side effects as reported are usually mild and transient, including headache, dizziness, nausea, and itching. These side effects typically resolve on their own without requiring medical intervention. Serious side effects are rare but have been reported, particularly when Ivermectin is used at higher doses than recommended or for extended periods. These may include allergic reactions, severe skin rashes, muscle or joint pain, and nervous system effects such as seizures or confusion. However, it's important to note that such severe side effects are very uncommon [15].

Kaduna state government has raised an alarm that over five million people in the state are at risk of contracting river blindness, lymphatic filariasis, bilharziasis and intestinal worms, noting that the state is working hard to tackle the menace, and because there is limited evidence on the specific efficacy and safety of Ivermectin use among eligible civil servants in Kaduna State. The Civil servants, being a vital and sizable population, are susceptible to lymphatic

filariasis due to their frequent exposure to mosquito vectors in their work environments and home. This research aims to assess the efficacy and safety of Ivermectin use for lymphatic filariasis among eligible civil servants of Kaduna State. By investigating the potential benefits and risks of Ivermectin treatment, this study seeks to contribute to the existing knowledge on the management of lymphatic filariasis and inform evidence-based interventions targeted at civil servants. The findings of this research will have implications for healthcare professionals, policymakers, and other stakeholders involved in the control and prevention of lymphatic filariasis. It will help in guiding treatment strategies, improving patient outcomes, and ultimately reducing the burden of lymphatic filariasis among eligible civil servants in Kaduna State. By addressing the gap in knowledge regarding the efficacy and safety of Ivermectin use, this study aims to contribute to the broader goal of eliminating lymphatic filariasis as a public health problem.

Materials and Methods
### Study Design and Participants
This is cross-sectional study amongst eligible civil servants from various government ministries and agencies in Kaduna State. Participants were selected through multi-stage random sampling to ensure representativeness across government sectors and age groups. The eligible population included individual civil servant who are between the ages of 18 to 60 years, and have been diagnosed with lymphatic filariasis during pre-transmission assessment survey and transmission assessment survey for lymphatic filariasis (LF Pre-Tas & Tas) conducted at the designated sentinel and spot check sites in endemic LGAs of Kaduna state or live in areas where the disease is prevalent. These have no diagnosed pre-existing medical conditions (e.g., severe asthma, pregnancy), no history of allergy to Ivermectin or its components, consenting to participate in the study. Pregnant women with known hypersensitivity to ivermectin, and participants involved in an MDA campaign within the past six months were excluded.

Study Setting
The study area was Kaduna, a state in the northern part of Nigeria (10°20'N 7°45'E). The state is bordered to the north by Kano State, to the west by Katsina State, to the south by Niger State and the Federal Capital Territory and to the east by Bauchi and Plateau States. There are 1583 registered healthcare facilities in Kaduna State, including 5 tertiary institutions, 30 secondary institutions, 1011 primary healthcare centers and 533 private health facilities.

Sampling Techniques
Systematic random sampling technique was used to select participants for the study. A sampling frame was created by obtaining a list of all eligible civil servants from the Bureau of statistics records in the selected MDAs. A sampling interval was then calculated by dividing the total number of eligible civil servants by the desired sample size. Starting from a randomly selected individual, every nth eligible civil servant was included in the sample until the desired sample size is reached. This technique helped ensure that the sample is a representative of the eligible civil servant population and is not biased toward any particular characteristic. Based on the available records, the initial estimate indicates a population size of approximately 2,000 civil servants who meet the inclusion criteria.
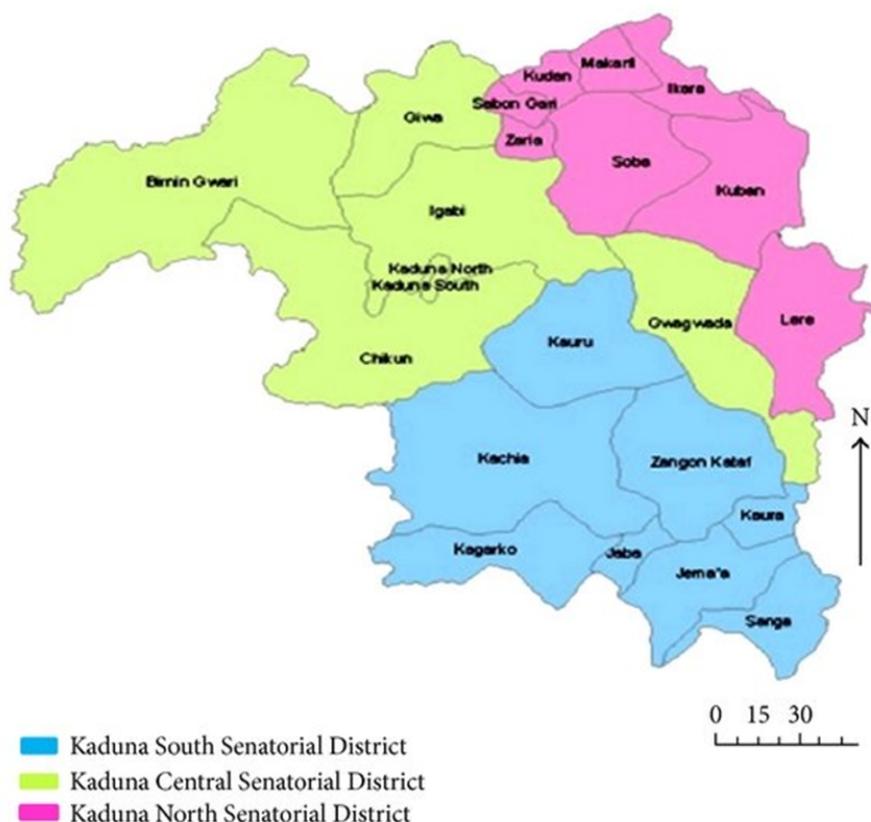
Map of Kaduna State Showing the 23 LGAs across the 3 Senatorial zone
Sample Size Determination
The sample size determination was based on the estimated population size and an acceptable margin of error. The minimum sample size needed for adequate representation and statistical power was calculated using appropriate formulas, such as the sample size formula for cross-sectional studies. As a starting point, assuming a confidence level of 95% and a precision level of 5%, the estimated minimum sample size was approximately 323 civil servants.

Formular: n = z^2 * p(1-p) / (e^2)

n = required sample size, z = standard normal deviate corresponding to the desired confidence level, p = estimated population proportion (often 0.5 is used), e = margin of error

Data Collection
Data was collected through self-administered questionnaires and face-to-face interviews. The questionnaire captured information on demographic of respondents, experience with ivermectin, knowledge and perception of ivermectin, safety and concerns, recommendations and awareness, as well as additional comments or suggestions regarding the use of ivermectin for lymphatic filariasis among civil servants in Kaduna state for improvement in decision making. The researcher used the structured questionnaires to collect information (data) from the study respondents. The questionnaires used were developed according to standard based on the sound objectives.

Data Analysis Techniques
This data analysis technique focuses on quantifying the efficacy and safety of Ivermectin treatment for Lymphatic Filariasis (LF) among civil servants in Kaduna State. It combines quantitative and qualitative data analysis methods to provide a comprehensive picture of Ivermectin efficacy and safety in the context of civil servants in Kaduna State. Quantitative data from the questionnaires will be analyzed using descriptive statistics and inferential tests to assess associations between variables. Qualitative data from interviews will be thematically analyzed to identify key themes and patterns. Mixed methods triangulation will be employed to combine the quantitative and qualitative findings for a richer understanding of the research question.

Ethical Considerations
Informed consent was obtained from all participants before data collection. Anonymity and confidentiality was ensured throughout the study. Ethical approval was sought and approved by the relevant authorities.

Results
A total of 335 questionnaires were administered using random sampling techniques to select the respondents into the study population. Three hundred and twenty-three questionnaires (323) were responded to and returned, while 12 questionnaires were not returned. Table .1 summarized the prevalence of lymphatic filariasis among eligible civil servants in Kaduna State with their socio-demographic characteristics. It was observed that only age and years of service are statistically significant with LF prevalence while sex and educational qualification remained insignificant.

Parameters	Frequencies n (%)	Chi-square Value	P-value
Age Distribution			
18-25 years old	8 (2.48)	25.938	0.001**
26-35 years old	53 (16.41)		
36-45 years old	110 (34.06)		
46-55ears old	72 (22.29)		
> 56 years	19 (5.88)		
Gender			
Male	139 (43.03)	5.708	0.058
Female	94 (32.41)		
Duration of Service			
< 1 year	3 (0.93)	16.673	0.034**
1-5 years	30 (9.29)		
6-10 years	47 (14.55)		
11-15 years	75 (23.22)		
> 15 years	107 (33.13)		
Educational Qualification			
Diploma	91 (28.17)	5.924	0.432
Others	14 (4.33)		

Degree	110 (34.06)		
Masters	47 (14.55)		
**Value statistically significant			

Table 1: Association Between Socio-Demographic Characteristics the Prevalence of Lymphatic Filariasis Among Respondents

Variable	Yes n (%)	No n (%)	Not sure n (%)	Total
Ever taken Ivermectin for the prevention or treatment of LF	230 (71)	93 (29)	0.00	**323**
Aware of the potential side effects of Ivermectin	189 (59)	134 (41)	0.00	**323**
Have taken Ivermectin and experienced any side effects.	7 (2)	316 (98)	0.00	**323**
Believe that Ivermectin has helped in reducing LF symptoms	271 (84)	4 (1)	48 (15)	**323**
Have taken Ivermectin and noticed any improvement in lymphatic filariasis symptoms.	110 (34)	209 (65)	4 (1)	**323**
Think Ivermectin should be made available to all eligible civil servants in Kaduna state	269 (83)	10 (3)	44 (14)	**323**
Frequently received Ivermectin treatment for lymphatic filariasis in the past year.	< once a year 46 (14)	Once a year 238 (74)	>once a year 39 (12)	**323**

Table 2: Knowledge and Perception of Ivermectin

Table 2 indicated that 230 (71%) respondents have ever taken Ivermectin for lymphatic filariasis, while 93 (29%) respondents have not, suggesting that Ivermectin is a commonly used medication for this condition in the target population. 189 (59%) respondents were aware of the potential side effects of Ivermectin while 134 (41%) were not aware of the potential side effects of Ivermectin. Interestingly, a very high number 316 (98%) who took Ivermectin reported not experiencing any side effect. 74% received Ivermectin treatment for lymphatic filariasis once a year, 14% receives treatment more often than annually, while 12% receives treatment more than once a year. Majority (84%) of the respondents strongly agreed and believe that Ivermectin has been helpful in reducing LF symptoms. A very small percentage (1%) of respondents disagree with Ivermectin helping with LF symptoms, while 15% of respondents are neutral and are unsure or don't have an opinion on Ivermectin's effectiveness. Even though, 209 (65%) of the respondents who took Ivermectin did not notice improvement in their symptoms while a moderate proportion (34%) of respondents who took Ivermectin noticed improvement in their LF symptoms, 83% of respondents strongly agreed and believe that Ivermectin should be made available to all eligible civil servants.

Variable	Yes n (%)	No n (%)	Total
Aware of any contraindications or precautions for taking Ivermectin	224 (69)	99 (31)	323
Ever missed an Ivermectin treatment for lymphatic filariasis	64 (20%)	259 (80)	323
Feel that the current dosage of Ivermectin for LF is adequate	228 (71)	95 (29)	323
Satisfied with the effectiveness of Ivermectin in treating LF	266 (82)	57 (18)	323

Table 3: Experience with Ivermectin Use

Table 3 shows that 69% of respondents reported being aware of some contraindications or precautions for taking Ivermectin from either health care providers or public health campaigns table 3. In addition, 80% participants reported never missing a treatment while 20% of the study population have missed Ivermectin treatment at least once. 71% of study respondents felt the current dosage of Ivermectin is adequate while 29% felt the current dosage is inadequate. 82% of respondents reported satisfaction with Ivermectin's effectiveness.

Variable	Yes n (%)	No n (%)	Not sure n (%)	Total
Aware of any drug interactions between Ivermectin and other medications you are taking.	75 (23)	248 (77)	0.00	323
Aware of any drug resistance issues related to Ivermectin use for lymphatic filariasis.	46 (14)	277 (86)	0.00	323
Have taken Ivermectin currently experiencing any adverse effects	7 (2)	316 (98)	0.00	323
Comfortable with the mode of administration (e.g., oral, injections) of Ivermectin.	276 (85)	16 (5)	31(10)	323

Table 4: Safety and Concerns with Ivermectin Use

Table 4 describes the respondents' awareness of potential drug interactions between Ivermectin and other medications they are taking. 77% of the respondents were not aware of any potential interactions. More so, 14% of the study respondents were aware of potential drug resistance issues with Ivermectin for lymphatic filariasis, while the majority (86%) were not aware of this potential problem. 98% of the respondents reported no current side effects. 85% of the respondents were comfortable with the mode of administration of Ivermectin while 10% were unsure about their comfort level.

Variable	Yes n (%)	No n (%)	Not sure n (%)	Total
Think the government should provide education and awareness campaigns about Ivermectin for LF	291(90)	12(4)	20(6)	323
Recommend Ivermectin to other eligible civil servants for lymphatic filariasis prevention or treatment	308(95)	0(0.00)	15(5)	323
Aware of any alternative treatments available for lymphatic filariasis other than Ivermectin	22(7)	301(93)	0.00	323
Ever been diagnosed with any pre-existing medical conditions that might affect your ability to take Ivermectin	27 (8)	296 (92)	0.00	323
Currently pregnant or planning to get pregnant (Ivermectin use during pregnancy is contraindicated)	41 (13)	282 (87)	0.00	323

Table 5: Recommendations and Awareness

In table 5, 90% of the respondent thinks the government-provided educational campaigns about Ivermectin for lymphatic filariasis (LF). A vast majority (90%) of respondents strongly agreed and believe the government can provide educational campaigns. While a small percentage (4%) disagree and a significant portion of (6%) minority of respondents are neutral or unsure. 95%) of respondents indicated they would strongly recommend Ivermectin to others. 7% of the respondents reported being aware of alternative treatments for lymphatic filariasis. While a majority (93%) were not aware of any alternatives. A relatively small percentage (8%) of respondents reported having pre-existing medical conditions that might impact Ivermectin use. While others do not. A significant portion (13%) of respondents are currently pregnant or planning to get pregnant. While the majority (87%) of respondents are not currently pregnant or planning pregnancy. These is because Ivermectin use is contraindicated during pregnancy due to potential risks to the developing fetus.

Parameters	Frequencies n (%)	Chi-square Value	P-value
Age Distribution			
18-25 years old	9 (3.27)	33.898	0.006**
26-35 years old	57 (20.73)		
36-45 years old	112 (40.73)		
46-55 years old	80 (29.09)		
> 56 years	17 (6.18)		
Gender			
Male	168 (57.93)	7.922	0.094
Female	122 (42.07)		
Duration of Service			

< 1 year	3 (0.93)	45.886	0.000**
1-5 years	30 (9.29)		
6-10 years	53 (16.41)		
11-15 years	84 (26.01)		
> 15 years	105 (38.18)		
Educational Qualification			
Diploma	116 (35.91)	18.774	0.094
Others	16 (4.95)		
Degree	132 (40.87)		
Masters	59 (18.27)		
**Value statistically significant			

Table 6: Association Between Socio-Demographic Characteristics the Safety Profile of Ivermectin Use Among the Respondents

Implementation of Ivermectin treatment for lymphatic filariasis among eligible civil servants in Kaduna State is significantly associated with many barriers and challenges. Table 7 presents the association between socio-demographic characteristics and challenges (such as inadequate funding, awareness creation, and availability of medicine) associated with the implementation of Ivermectin treatment for lymphatic filariasis among the respondents. Our result shows that only gender and years of service are statistically significant while age and educational qualification remained insignificant. The implication of this result is that not all socio-demographic factors depict the prevalence of lymphatic filariasis. Implementation of Ivermectin treatment for lymphatic filariasis is significantly associated with many barriers and challenges (such as inadequate funding, awareness creation, and availability of medicine.

Parameters	Frequencies n (%)	Chi-square Value	P-value
Age Distribution			
18-25 years old	15 (4.64)	17.367	0.136
26-35 years old	65 (20.12)		
36-45 years old	134 (41.49)		
46-55 years old	88 (27.24)		
> 56 years	21 (6.50)		
Gender			
Male	168 (61.76)	12.830	0.005**
Female	122 (44.85)		
Duration of Service			
< 1 year	3 (0.93)	31.698	0.002**
1-5 years	38 (11.76)		
6-10 years	57 (17.65)		
11-15 years	106 (32.82)		
> 15 years	119 (36.84)		
Educational Qualification			
Diploma	116 (35.91)	10.051	0.346
Others	16 (4.95)		
Degree	132 (40.87)		
Masters	59 (18.27)		
**Value statistically significant			

Table 7: Association Between Socio-Demographic Variables and Challenges Associated with Ivermectin Use

Discussion

This study assessed the efficacy and safety of ivermectin use for lymphatic filariasis among eligible civil servants in Kaduna state. To investigate the risk factors associated with the prevalence of LF amongst the civil servants, their age, gender, duration in service and educational qualifications was probed (table 1). 68%, (n= 219) of our study respondents identified as male while 32%, (n= 103) identified as female participant in the study. The largest age group (35%, n=110) falls between age 36 - 45 years old. The employment duration of the respondents showed that majority, 33.13%

(n=107) have been in their current employment for more than 15 years. Overall, our results indicated that age, duration of employment are significantly associated with the prevalence of LF among the respondents.

While gender is tending towards being significantly associated with the prevalence, educational qualification shows no association with prevalence of LF in our study. Previous studies from Congo DR, South Sudan and Nigeria have implicated age and gender as strong predictors for LF prevalence and infection [16-19]. This may be due to the fact that females are more careful with their health status compared to males, therefore taking necessary precautions which prevents them from unnecessary exposure to the risk of being infected with LF. Similarly, the significant contribution observed from the duration of employment may be because older workers/workers who have stayed longer on the job, are also older in age, and therefore be a recipient of the conferment of the benefits of age. In addition, staying longer on a job may confer certain benefits such as access to special training (including training on health), funding, and other experiential knowledge which may confer better healthy living compared to their younger counterparts.

Majority of the respondents (n=230, 71%) reported having ever taken Ivermectin for LF. Even though most of the participants (n=189, 59%) have the knowledge or at least are aware of the potential side effects of taking Ivermectin for LF, still, 98% (n=316) who have taken Ivermectin reported not to have experienced any side effects taking ivermectin for LF, coupled with 65%, (n=209) who reported noticing that Ivermectin has affected an improvement in their lymphatic filariasis symptoms. This in fact, compelled 83% (n=269) of the respondents to suggest that Ivermectin should be publicly made available in the state for end-users, especially civil servants, against LF. This observation is in tandem with those reported by some researchers. For instance, it was reported that most adverse effects (AEs) that occurred during the first two days of Ivermectin administration were transient and were resolved progressively through day seven. Most studies, both clinical trials and observational, have reported similar AEs such as headache, drowsiness, fever, dizziness, and stomach [20]. The same events were reported in higher numbers through spontaneous reporting to the WHO's Vigibase, although the incidence rate could not be quantified [13]. In fact, just mild-to-moderate AEs in the first two days of treatment were reported in some safety studies conducted using diverse study designs, target populations, and treatment indications [21,22]. In support of our observation, the relatively lower incidence of AEs observed by Fimbo et al, (2022) in a Tanzanian study indicates a better safety profile of Ivermectin use for LF. Most respondents 74% (n=238) received Ivermectin for the treatment of lymphatic filariasis once every year. Still, a significant portion of 14% (n=46) receives treatment more often than annually, coupled with a smaller proportion of 12% (n=39) receives treatment more than once a year. This is very likely for those living in transmission zones or neighbouring states where LF is endemic and MAM was implemented.

The current study shows a strong belief 84% (n=271) among respondents that Ivermectin helps reduce LF symptoms. However, it's important to consider this in the context of previous research. Large, well-designed clinical trials are the gold standard for evaluating medication effectiveness. So far, such studies haven't shown conclusive evidence that Ivermectin definitively reduces LF symptoms. Overall, while the current study suggests a strong belief in Ivermectin's effectiveness for LF, more rigorous research is needed before it can be recommended as a treatment. This study builds on previous research examining Ivermectin awareness, adherence, dosage, and satisfaction. In a prior study, 69%, (n=224) of respondents reported awareness of contraindications or precautions (table 3). The current study found similar results, with a high percentage of participants 82% (n=266) reporting satisfaction with Ivermectin's effectiveness. This study examines adherence to and satisfaction with Ivermectin treatment for lymphatic filariasis (LF) among a sample of 323 participants. In the current study, 20% (n = 64) of participants reported ever missing an Ivermectin treatment.

This adherence rate is lower than that reported in a similar study by Ottridge et al. (2019) in Tanzania, where only 12% of participants admitted to ever missing treatment [23]. Additionally, 71% (n = 228) of participants in the current study felt the current dosage of Ivermectin was adequate. This finding is similar to the 74% reported in the Ottridge et al. (2019) study [23]. Further research is needed to explore the factors influencing adherence and satisfaction with Ivermectin treatment for LF. This study examines participants' knowledge and experience with Ivermectin treatment for lymphatic filariasis (LF). The findings suggest a moderate level of awareness regarding drug interactions, with 23% (n = 75) of participants reporting knowledge of potential interactions between Ivermectin and other medications. This awareness rate highlights the need for further education on Ivermectin interactions, particularly considering the high proportion (77%, n = 248) who were unaware. Compare to a study by Albonico et al. (2008) in Ethiopia investigated community knowledge, attitudes, and practices related to LF and mass drug administration (MDA) programs [24]. While their study did not directly assess awareness of specific topics like drug interactions or resistance, it provides valuable context on overall knowledge levels in an LF-endemic setting. Their findings suggested a need for improved health education alongside MDA programs to optimize treatment effectiveness. This study examines public support for government-led education campaigns on Ivermectin for lymphatic filariasis (LF) and recommendations for treatment among civil servants.

The findings reveal a strong desire for information, with a significant majority (90%, n = 291) endorsing such campaigns. In comparison to Previous Study by Ramachandran et al. (2016) conducted in India investigated community awareness and perceptions towards LF and MDA programs [25]. While their study focused specifically on healthcare providers, it offers valuable insights. They found that a significant proportion (82%) of healthcare providers reported a need for improved educational materials for both themselves and the communities they serve. This aligns with the current study's

findings, suggesting a general need for increased education on LF and Ivermectin across various populations. It also explores participants' awareness of alternative treatments for lymphatic filariasis (LF), pre-existing medical conditions that might affect Ivermectin use, and pregnancy status. The findings indicate a high level of unawareness regarding alternative treatments (93%, n = 301) and a low prevalence of pre-existing conditions (8%, n = 27) or current pregnancy (13%, n = 41). A similar study conducted by Alzohaili et al. (2017) investigated medicinal plant use for lymphatic filariasis in Saudi Arabia [26]. They found that 22.7% of participants reported using herbal remedies alongside conventional treatment for LF. This contrasts with the current study's finding of limited awareness of alternatives (7% vs. 93%), suggesting potential regional variations in reliance on traditional medicine practices for LF. Further research is needed to explore the use of traditional medicines alongside Ivermectin-based MDA programs in your specific location (Kaduna North, Nigeria).

This study highlights a potential public health concern: 13% (n = 41) of participants reported being pregnant or planning pregnancy, unaware that Ivermectin use during pregnancy is contraindicated. A study by Gyapong et al. (2010) explored knowledge, attitudes, and practices (KAP) related to lymphatic filariasis (LF) and mass drug administration (MDA) programs in Ghana [27-40]. Their research specifically investigated women's awareness of Ivermectin use during pregnancy.

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