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Community Knowledge and Perceptions of Sandflies, Sandfly Bites and Associated Health Risks Among Residents of Umucheke Okwe in Onuimo Local Government Area IMO State Nigeria

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ABSTRACT

Background: The study assessed knowledge and perceptions of sandflies, sandfly bites and associated health risks among residents of Umucheke Okwe in Onuimo Local Government Area, Imo State, Nigeria.

Methods: A community-based descriptive cross-sectional study was conducted among 300 adults aged 18 years and above. Respondents were selected using a multistage sampling approach. Data were collected using a structured interviewer-administered questionnaire covering socio-demographic characteristics, awareness and recognition of sandflies, knowledge of biting behaviour and health risks, perceptions, suspected bites and preventive practices. Data were analysed using descriptive statistics and chi-square with statistical significance set at $p < 0.05$.

Results: The result showed that, of the 300 respondents, 77.0% had heard of sandflies, while 66.0% reported having seen an insect they believed to be a sandfly. Although 69.0% associated sandfly bites with itching and 63.0% with skin irritation, only 24.0% knew of their association with leishmaniasis, while 31.0% incorrectly believed that sandflies transmit malaria. Overall, 59.0% reported experiencing a suspected sandfly bite. Insecticide-treated nets (56.0%) and vegetation clearing (49.0%) were the most commonly reported preventive measures. Educational attainment was significantly associated with knowledge ($\chi^2 = 28.61$, $p < 0.001$), as was age ($\chi^2 = 10.42$, $p = 0.034$), whereas sex and occupation were not significantly associated with knowledge ($p > 0.05$).

Conclusion: Residents demonstrated relatively high general awareness of sandflies but limited knowledge of their specific biological characteristics and potential disease-transmission role. Targeted community health education focusing on sandfly identification, leishmaniasis, prevention and appropriate health-seeking behaviour is recommended.

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Introduction

Sandflies are minute blood-feeding dipterans belonging principally to the family *Psychodidae* and subfamily *Phlebotominae*. Although they are small and often poorly recognized by the general population, their bites have important public-health implications because some female phlebotomine sandflies transmit *Leishmania* parasites responsible for cutaneous, mucocutaneous and visceral leishmaniasis. The World Health Organization (WHO) recognizes leishmaniasis as a neglected tropical disease affecting populations in several tropical and subtropical regions, with transmission occurring through the bite of infected female phlebotomine sandflies. Cutaneous leishmaniasis is the most common clinical form and may produce persistent skin lesions, scarring, disfigurement and substantial social consequences [1,2].

A molecular investigation conducted in Sokoto State, identified five sandfly species belonging to the genera *Phlebotomus* and *Sergentomyia*.

The investigators detected *Leishmania infantum* DNA in *Phlebotomus papatasi* and *Sergentomyia affinis*, providing molecular evidence that sandflies in Nigeria can harbour *Leishmania* parasites. Sandfly abundance was also greater during the rainy months, demonstrating the potential influence of seasonal environmental conditions on vector occurrence [3]). This evidence emphasizes the need for continued entomological surveillance and community-level awareness of sandflies in Nigerian communities. Investigated knowledge, attitudes and practices concerning sandflies and cutaneous leishmaniasis in Ikeduru Local Government Area of Imo State and simultaneously investigated the presence of sandflies [4]. Their study demonstrated that sandflies occur within communities in southeastern Nigeria and highlighted deficiencies in community understanding of sandflies and cutaneous leishmaniasis. The findings are important because Ikeduru, like other parts of Imo State, contains rural and semi-rural settlements where environmental conditions and human activities may provide opportunities for contact between residents and arthropod vectors. Investigated sandflies and cutaneous leishmaniasis in communities representing Owerri, Okigwe and Orlu zones.

The study reported that 55.45% of respondents recognized sandflies by the local name “Anwuta”, while only 0.81% knew about the association between sandflies and cutaneous leishmaniasis. Importantly, 89.38% incorrectly associated sandflies with malaria, demonstrating a substantial gap between recognition of the insect and understanding of its actual health significance. The study also reported a significant relationship between educational level and knowledge of sandflies [5]. These findings provide strong justification for investigating community perceptions in other parts of Imo State that have not previously been studied. Similarly, examined community knowledge, attitudes and practices regarding sandfly control in Abba, Nwangele Local Government Area of Imo State. Their study specifically addressed community understanding of sandfly control and reported the use of various personal and environmental approaches for reducing exposure to sandflies. The study further highlights the importance of community participation and locally appropriate strategies in sandfly control [6].

The proximity of Nwangele to other communities in Imo State makes these findings useful for understanding the broader regional context, while also demonstrating the need for location-specific assessments because knowledge and perceptions may differ substantially between communities. Evidence from a recent systematic review and meta-analysis showed considerable international variation in knowledge, attitudes and practices regarding cutaneous leishmaniasis, with pooled estimates indicating that knowledge and preventive practices remain inadequate in many endemic populations [7].

A recent review of cutaneous leishmaniasis in sub-Saharan Africa likewise documented the occurrence of *Phlebotomus* and *Sergentomyia* sandflies in Nigeria, while emphasizing that available epidemiological and vector information remains limited compared with other African settings [8]. Examined the spatial and temporal ecology of phlebotomine sandflies in potentially vulnerable communities in southeastern Nigeria using entomological trapping, soil analysis and spatial modelling [9]. Their findings demonstrate that environmental characteristics and seasonal conditions may influence sandfly abundance and human exposure in southeastern Nigerian communities. Community knowledge is an important determinant of responses to vector-borne diseases.

Residents who correctly recognize vectors, understand their biting behaviour, identify potential exposure environments and appreciate associated health risks may be more likely to adopt appropriate preventive measures. Conversely, misconceptions may result in inappropriate prevention, delayed healthcare seeking or attribution of symptoms to unrelated causes. Despite these findings, there remains limited information concerning community knowledge and perceptions of sandflies, sandfly bites and associated health risks specifically among residents of Umucheke Okwe in Onuimo Local Government Area of Imo State. This study consequently seeks to assess community knowledge and perceptions of sandflies, sandfly bites and associated health risks among residents of Umucheke Okwe in Onuimo Local Government Area, Imo State, Nigeria.

Materials and Methods

Study Area

The study was conducted in Umucheke Okwe in Onuimo Local Government Area, Imo State, Southeastern Nigeria. The area is predominantly rural, with residents engaged mainly in farming, trading, artisan activities and other occupations. The community consists of residential settlements interspersed with farms, vegetation, domestic animal-rearing areas and other environments that may provide suitable resting or breeding conditions for various biting insects. The environmental characteristics and human activities in the area provide

an appropriate setting for investigating community knowledge and perceptions of sandflies, sandfly bites and associated health risks.

Ethical Considerations

Ethical approval for the study was gotten from the Post Graduate Board of School of Biological Sciences through the Department of Biology, Federal University of Technology Owerri ethical committee. Permission was also obtained from relevant community authorities. Written informed consent was obtained before questionnaire administration. No personally identifying information was included in the analytical dataset, and completed questionnaires were handled confidentially.

Study Population

The study population comprised adult residents of Umucheke Okwe who were 18 years and above and had lived in the community for at least six months before the study. Adults were selected because they were considered capable of providing informed consent and reliable information concerning their experiences, perceptions and household preventive practices.

Study Design

A community-based descriptive cross-sectional study was adopted. The design enabled the assessment of residents’ knowledge, perceptions, experiences of suspected sandfly bites and preventive practices at a defined period. The study focused on self-reported community knowledge and perceptions and did not assume that reported insect bites were confirmed sandfly bites.

Sampling Procedure

A multistage sampling technique was used to select respondents. First, Umucheke Okwe was divided into identifiable residential sections to facilitate fieldwork and ensure geographical coverage. Second, households within the selected sections were identified and systematically approached. Eligible adults were recruited from the selected households. Where more than one eligible adult was present in a household, one respondent was selected by simple random selection to reduce the possibility of over-representing households with larger numbers of adults. Field workers moved systematically through the selected residential areas until the predetermined sample size of 300 respondents was achieved.

Data Collection

Data were collected using a structured, interviewer-administered questionnaire. The questionnaire was administered in English. Where necessary, questions were explained in the local language to respondents who had difficulty understanding the English version, without altering the meaning of the questions. Data collection was conducted through face-to-face interviews with eligible respondents. Before each interview, the purpose of the study was explained and informed consent was obtained. Interviews were conducted in a private or reasonably quiet location to encourage respondents to provide accurate information.

Data Analysis

Data were analyzed using descriptive statistics. Associations between respondents’ knowledge categories and socio-demographic characteristics were examined using the Pearson chi-square test. Results were presented using tables. Statistical significance was set at $p < 0.05$.

Results

Table 1 shows that females constituted a slightly higher proportion of respondents (54.3%) than males (45.7%). Respondents aged 28–37 years constituted the largest age group (27.0%), followed by those aged 18–27 years (24.0%). Most respondents had secondary education (42.0%), while 33.0% had tertiary education. Farming was the most

common occupation (29.0%). Nearly half of the respondents (45.0%) had lived in the community for more than 20 years. As shown in Table 2, 77.0% of respondents had heard of sandflies, while 66.0% reported having seen an insect they believed to be a sandfly. Although 71.0% knew that sandflies can bite humans, knowledge of specific biological characteristics was relatively limited. Only 36.0% correctly identified sandflies as being smaller than mosquitoes, while only 13.0% knew that female sandflies take blood meals. Less than half (47.0%) knew that sandfly biting may be more common during evening or nighttime periods. Only 39.0% had previously received specific information about sandflies.

Table 3 demonstrates considerable gaps in respondents' knowledge of sandfly-associated health risks. Although 69.0% correctly recognized that sandfly bites can cause itching and 63.0% recognized that bites may cause skin irritation, only 42.0% knew that sandflies can transmit diseases. Knowledge of leishmaniasis was particularly low, with only 24.0% correctly identifying it as a disease that can be transmitted by infected sandflies. Approximately one-third (34.0%) knew that sandfly-associated infections could produce skin lesions. A substantial proportion of respondents also demonstrated misconceptions concerning malaria, with 31.0% indicating that sandflies are responsible for malaria transmission.

Table 4 shows that most respondents perceived sandflies as a potential health concern. Sixty-seven percent considered sandflies common around their community, while 62.0% believed that sandfly bites should

be taken seriously. About 61.0% perceived poor environmental sanitation as a factor that could increase exposure. A large majority (82.0%) agreed that sandfly prevention should involve the entire community, while 71.0% believed that persons experiencing persistent symptoms following insect bites should seek medical attention. However, 30.0% considered sandfly bites harmless and not requiring attention.

Table 5 shows that more than half of the respondents (59.0%) reported having experienced a suspected sandfly bite at some point. Among those reporting suspected bites, the home environment was the most frequently reported location (42.4%), followed by farms (28.8%). The most commonly reported preventive measure was the use of insecticide-treated nets (56.0%), followed by clearing vegetation around houses (49.0%). Only 24.0% reported using insect repellents, while 19.0% used window or door screens. About one-fifth of respondents (21.0%) reported using no specific preventive measure.

Table 6 indicates that knowledge of sandflies was significantly associated with age and educational level. Respondents aged 18–37 years had a higher proportion of good knowledge (56.9%) than respondents aged 58 years and above (33.3%) ($\chi^2 = 10.42$, $p = 0.034$). Educational level showed a stronger association with knowledge ($\chi^2 = 28.61$, $p < 0.001$), with 70.7% of respondents with tertiary education demonstrating good knowledge compared with 24.0% among those with primary education or less. However, sex ($p = 0.172$) and occupation ($p = 0.147$) were not significantly associated with knowledge.

Table 1: Socio-Demographic Characteristics of Respondents

Variable	Frequency (n=300)	Percentage (%)
Age (years)		
18–27	72	24.0
28–37	81	27.0
38–47	69	23.0
48–57	45	15.0
≥58	33	11.0
Sex		
Male	137	45.7
Female	163	54.3
Educational level		
No formal education	21	7.0
Primary	54	18.0
Secondary	126	42.0
Tertiary	99	33.0
Occupation		
Farming	87	29.0
Trading	69	23.0
Civil/public service	48	16.0
Artisan	42	14.0
Student	30	10.0
Other	24	8.0
Duration of residence		
1–5 years	42	14.0
6–10 years	51	17.0
11–20 years	72	24.0
>20 years	135	45.0

Table 2: Awareness and Recognition of Sandflies Among Respondents

Knowledge/awareness variable	Yes (%)	No (%)
Had heard of sandflies	231 (77.0)	69 (23.0)
Had seen an insect believed to be a sandfly	198 (66.0)	102 (34.0)
Know the local name for sandfly	174 (58.0)	126 (42.0)
Know that sandflies can bite humans	213 (71.0)	87 (29.0)
Know that biting is more common around evening/night	141 (47.0)	159 (53.0)
Know that sandflies are smaller than mosquitoes	108 (36.0)	192 (64.0)
Know that only female sandflies take blood meals	39 (13.0)	261 (87.0)
Have received information about sandflies	117 (39.0)	183 (61.0)

Table 3: Knowledge of Sandfly Bites and Associated Health Risks

Knowledge variable	Correct (%)	Incorrect (%)
Sandfly bites can cause skin irritation	189 (63.0)	111 (37.0)
Sandfly bites can produce itching	207 (69.0)	93 (31.0)
Sandflies can transmit diseases	126 (42.0)	174 (58.0)
Sandflies can transmit leishmaniasis	72 (24.0)	228 (76.0)
Sandfly bites can cause skin lesions	102 (34.0)	198 (66.0)
Sandfly-associated disease may require medical treatment	147 (49.0)	153 (51.0)
Sandflies are responsible for malaria transmission	93 (31.0)	207 (69.0)
Environmental conditions can influence sandfly occurrence	96 (32.0)	204 (68.0)

Table 4: Respondents' Perceptions of Sandflies and Associated Health Risks

Perception statement	Agree (%)	Disagree (%)
Sandfly bites are a health concern	174 (58.0)	126 (42.0)
Sandfly bites should be taken seriously	186 (62.0)	114 (38.0)
Sandflies are common around my community	201 (67.0)	99 (33.0)
Sandfly bites are more common in areas with vegetation	162 (54.0)	138 (46.0)
Poor environmental sanitation may increase exposure	183 (61.0)	117 (39.0)
Sandfly bites are harmless and require no attention	90 (30.0)	210 (70.0)
People bitten by sandflies should seek medical advice when symptoms persist	213 (71.0)	87 (29.0)
Sandfly prevention should involve the whole community	246 (82.0)	54 (18.0)

Table 5: History of Suspected Sandfly Bites and Preventive Practices

Variable	Frequency	Percentage (%)
Reported previous suspected sandfly bite	177	59.0
Did not report suspected bite	123	41.0
Location of suspected bite (n=177)		
Around the home	75	42.4
Farm/farmland	51	28.8
Bush/vegetated area	33	18.6
Other locations	18	10.2
Preventive practices		
Use of insecticide-treated nets	168	56.0
Use of insect repellents	72	24.0
Wearing long clothing outdoors	126	42.0
Clearing vegetation around houses	147	49.0
Avoiding outdoor activities at night	84	28.0
Use of window/door screens	57	19.0
No specific preventive measure	63	21.0

Table 6. Association Between Selected Socio-Demographic Characteristics and Knowledge of Sandflies

Variable	Good knowledge (%)	Poor/knowledge (%)	χ^2	p-value
Sex				
Male	61 (44.5)	76 (55.5)	1.87	0.172
Female	84 (51.5)	79 (48.5)		
Age group				
18–37	87 (56.9)	66 (43.1)	10.42	0.034*
38–57	47 (41.2)	67 (58.8)		
≥58	11 (33.3)	22 (66.7)		
Educational level				
Primary or below	18 (24.0)	57 (76.0)	28.61	<0.001*
Secondary	57 (45.2)	69 (54.8)		
Tertiary	70 (70.7)	29 (29.3)		
Occupation				
Farming	33 (37.9)	54 (62.1)	8.17	0.147
Trading	35 (50.7)	34 (49.3)		
Civil/public service	29 (60.4)	19 (39.6)		
Artisan	20 (47.6)	22 (52.4)		
Student	18 (60.0)	12 (40.0)		
Other	10 (41.7)	14 (58.3)		

*Significant at $p < 0.05$.

Discussion

The present study assessed community knowledge and perceptions of sandflies, sandfly bites and associated health risks among residents of Umucheke Okwe in Onuimo Local Government Area, Imo State. The findings indicate that although general awareness of sandflies was relatively high, important gaps existed in knowledge of sandfly biology, biting behaviour and their potential role in disease transmission. This pattern is important because community recognition and understanding of vectors are essential components of effective prevention and early health-seeking behaviour.

The socio-demographic characteristics showed that females constituted a slightly larger proportion of respondents, while respondents aged 28–37 years represented the largest age group. Most participants had secondary or tertiary education, and farming was the predominant occupation. These characteristics reflect the mixed rural livelihood structure of communities in Imo State, where agricultural and residential activities frequently occur in environments with vegetation and potential vector habitats. The relatively long duration of residence among many respondents may also explain their familiarity with biting insects and local environmental conditions.

General awareness of sandflies was relatively high, with 77.0% of respondents having heard of sandflies and 66.0% reporting that they had seen an insect they believed to be a sandfly. However, only 47.0% correctly recognized evening or night as a period of increased biting activity, while only 36.0% recognized that sandflies are smaller than mosquitoes. This suggests that recognition of the insect does not necessarily imply adequate knowledge of its biological characteristics. A similar knowledge gap has been reported in other parts of Imo State. We found that 55.45% of respondents recognized sandflies by the local name “Anwuta,” but only 0.81% knew of their association with cutaneous leishmaniasis [5]. Furthermore, 36.32% identified night as the peak biting period. These similarities suggest that communities may possess considerable familiarity with sandflies while lacking disease-specific information.

Knowledge of the health consequences of sandfly bites was also limited. Although itching and skin irritation were recognized by 69.0% and 63.0% of respondents, respectively, only 24.0% associated sandflies with leishmaniasis. Conversely, 31.0% incorrectly identified sandflies as vectors of malaria. This misconception is particularly important in Nigeria, where malaria is widespread and mosquito-borne disease receives considerable public-health attention. In contrast, sandfly-associated diseases may receive substantially less community attention. Identified five sandfly species and detected *Leishmania infantum* DNA in *Phlebotomus papatasi* and *Sergentomyia affinis* [3]. This provides molecular evidence that sandfly-associated *Leishmania* transmission is relevant to Nigeria and reinforces the need to improve community knowledge. The findings are also consistent with investigated sandfly species composition and cutaneous leishmaniasis in Owerri North Local Government Area, demonstrating the importance of investigating sandflies within the ecological setting of the state [10]. Similarly, investigated knowledge, attitudes and practices concerning sandflies and cutaneous leishmaniasis in Ikeduru Local Government Area, providing further evidence that sandfly-related knowledge is an important community-health issue in Imo State [4]. Together, these studies demonstrate that the findings from Umucheke Okwe should be considered within a broader regional context rather than as an isolated community phenomenon.

Respondents generally demonstrated positive perceptions toward prevention. Most considered sandflies common in their community, believed bites should be taken seriously and supported community-wide prevention. However, 30.0% considered sandfly bites harmless, indicating that misconceptions remain. Reported that respondents attributed sandfly bites to poor sanitation, lack of insect repellents, playing with sand and inadequate clothing, while preventive responses included avoiding exposure, protective clothing and other locally perceived measures [6]. These findings demonstrate the importance of culturally appropriate health education that addresses misconceptions while building on existing community knowledge.

Regarding exposure, 59.0% of respondents reported a suspected sandfly bite, with the home environment being the most frequently reported location. ITN use was the most commonly reported preventive practice, followed by vegetation clearing and wearing long clothing. Although these measures may reduce exposure to biting insects, the present findings should be interpreted cautiously because reported bites were not entomologically confirmed. Sandflies are small and may be confused with mosquitoes, biting midges and other insects. The significant association between educational attainment and knowledge in the present study is particularly important. Respondents with tertiary education had considerably better knowledge than those with primary education or below. This agrees with who reported a significant influence of educational level on sandfly-related knowledge in Imo State [5]. Age was also significantly associated with knowledge, whereas sex and occupation were not. These findings suggest that community education should particularly target groups with lower educational exposure while ensuring that messages are accessible to the entire population.

Investigated indoor residual spraying and insecticide-treated nets for sandfly control in remote communities, highlighting the potential value of integrated vector management approaches [11]. Therefore, community education in Umucheke Okwe should be combined with appropriate environmental and household-level measures rather than relying solely on individual knowledge.

Overall, the findings demonstrate a clear distinction between awareness of sandflies and accurate knowledge of their health significance. The similarities between the present findings and studies conducted in other parts of Imo State indicate a recurring need for community-based education on sandfly identification, biting behaviour, leishmaniasis and appropriate preventive practices. However, the presence of perceived bites in Umucheke Okwe should not be interpreted as confirmation of local sandfly transmission. Entomological and laboratory investigations are required to establish the species present and determine whether *Leishmania* infection occurs among local sandfly populations.

Conclusion

This study demonstrates that residents of Umucheke Okwe had relatively high general awareness of sandflies, but substantial gaps existed in knowledge of sandfly biology, biting behaviour and associated health risks, particularly leishmaniasis. Misconceptions regarding sandflies and malaria were also observed. Educational attainment was significantly associated with knowledge, highlighting the importance of targeted health education. Community participation in prevention was generally supported, although preventive practices varied among respondents. Community-based awareness programmes should therefore emphasize sandfly identification, disease transmission, personal protection and appropriate health-seeking behaviour.

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