Tungiasis in rural communities of Badagry Local Government Area, Lagos State, Nigeria

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Abstract

An epidemiological study was conducted to determine the prevalence and risk factors to tungiasis amongst 1,030 randomly selected individuals in rural communities of Badagry Local Government Area of Lagos State, Nigeria. Hands, feet, elbows and other parts of the body were examined for the presence of clinical signs of tungiasis and the number and location of lesions were recorded. The study also assessed the respondent's knowledge, attitude and practices to tungiasis amongst the randomly selected individuals. Socio-demographic profile of respondents revealed 40.7% were between 20-39 years, and 10% were elderly (>60 years), 78.8% of the sampled population were from *Egun* ethnic group and 26.6% of the sampled population were farmers. The clinical symptoms observed ranges from itching and oedema to desquamation of skin and loss of toenails. In total, 293 (28.4%) individuals were infested and there was no significant difference in the prevalence of infection between males and females ($p<0.05$), while age-group 0-9 years had the highest prevalence of infection (81.1%) ($p>0.05$). A total of 2,515 lesions were observed, out of which 1,660 were located on the toes and 808 on the sole of the feet. The most important risk factors identified were respondents not using footwear regularly, and living in sandy-floored rooms. Knowledge about the etiology of tungiasis and its transmission was high in surveyed communities, 97.8% of the surveyed population indicated to have experienced tungiasis at least once in their lifetime. Transmission of tungiasis was thought to be majorly related to the presence of local pigs (61.2%), sandy soil (39.6%), dirty environment (26.1%) and fish scales (8.6%). Surgical extraction of embedded sand fleas using unsterile needles, blades or any sharp object (61.5%) and application of kerosene (paraffin) (51.7%) were the most common treatment applied. Targeted health education and intervention measures addressing the associated risk factors need to be implemented in communities with high disease burden.

Keywords: Neglected tropical disease; risk factors; knowledge and treatment practices.

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Introduction

Tungiasis is a neglected tropical skin disease caused by the permanent penetration of the female *Tunga penetrans* (Chigoe flea) (Class; Insecta, Order; Siponaptera) in the skin of man, domestic and wild animals. Fleas generally parasitize a range of hosts and have the ability to transfer from one host to the other (Kettle, 1995).

The prevalence of tungiasis have been reported in east Africa (Mazigo *et al* 2012), sub-Saharan African and Madagascar (Haukelbaug *et al* 2001), South America countries and Caribbean Islands (Haukelbaug *et al* 2001). In Nigeria, prevalence as high as 45.2% has been documented in a rural community of Badagry, Lagos State (Ugbomoiko, 2007a).

Tungiasis has been associated with poverty and poor standards in basic hygiene (Heukelbach *et al* 2001 and Serra-Freire, 2001) and low income communities are affected (Vlassoff and Tanner 1992 and Macintyre *et al* 1999, Suresh *et al* 2016). The disease has also been stigmatized (Mazigo *et al* 2012, Heukelbach and Ugbomoiko, 2007b).

Tungiasis results in significant morbidity, manifesting itself in a number of symptoms such as severe local inflammation, auto-amputation of digits, deformation and loss of nails, formation of fissures and ulcers, gangrene and walking difficulties (Njeumi *et al* 2002; Heukelbaug, 2002; Ugbomoiko *et al* 2007b; Mazigo *et al* 2012). The risk factors for infestation have also been studied in Brazil and Nigeria (Muehlen *et al* 2006 and Ugbomoiko *et al* 2007b), the efficacy of various natural and synthetic medication have been tested in different studies in Nigeria and Brazil (Ade-Serrano *et al* 1982, Saraceno *et al* 1999, Heukelbach *et al* 2003, Heukelbach *et al* 2004, Feldmeier *et al* 2009).

A major prerequisite for obtaining community support for disease control measures is to understand the knowledge, attitude and practices of affected individuals. Previous large scale control studies on several parasitic diseases have identified ignorance and poor knowledge of the cause and transmission of disease in rural populace. Meanwhile there are virtually no data on knowledge and health care behaviour of individuals

affected with tungiasis in endemic communities in Nigeria. Furthermore mapping population at risk is fundamental for appropriate resource allocation and cost-effective intervention.

Presently, control programme targeted at reducing the morbidity of tungiasis are presently not available in Nigeria. This present study focuses on, a community-based cross-sectional study on burden of the disease and associated risk factors; and further seeks to assess the knowledge, attitude and perception of respondents to tungiasis in selected communities in the Badagry Local Government Area of Lagos State, Nigeria.

Materials and methods

Study area

The study-area consist of sixteen rural communities; Aghankanme, Agorin, Agorin Sea Beach, Akakarakumo, Epeme, Erekiti-Ajido, Erekiti-Ijaran, Gbanko, Gberefun, Joforo, Kakon, Kweme, Moba, Okun Moba, Povita and Wesere (Figure 1). These communities are randomly distributed around the coast in the Badagry Local Government Area (LGA) in Lagos State, Nigeria. Badagry is situated between metropolitan Lagos, and the border with Benin Republic. According to the 2006 preliminary census results, Badagry had a population of 241,093. The major occupation was fishing and farming; wells and boreholes were the major sources of water in surveyed communities. Sanitary practice was poor, as indiscriminate defecation and urination were common in most communities. In 2003, Badagry Local government was subdivided in three Local Council Development Areas (LCDAs) namely; Olorunda, Badagry Central and Badagry West.

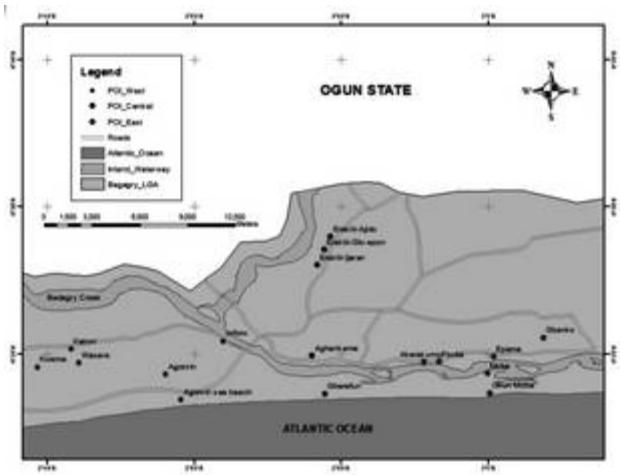

Figure 1. Map of Badagry Local Government Area showing the sampled-areas.

Study design

The study was conducted from March to June, based on published data from endemic communities in Cameroon and Brazil which revealed the highest prevalence during the dry season (Njuemi *et al* 2002 and Heulkelbaug *et al* 2005). This assessment of community burden of tungiasis is based on a simple rapid assessment method using a questionnaire. Each individual selected in a household was individually briefed on the objectives of the survey and informed of their voluntary participation or refusal. Verbal informed consent was obtained from individuals that participated in the study. For those who consented, the questionnaire was administered and clinical examination of lesions on infested persons was carried out.

At the beginning of the survey in each village, the questionnaire was administered to the village-head to determine the population size, the number of households in the community and the major occupation in the village. After administration of the community questionnaire, the geographic coordinates of the community were collected using a Geographical Positioning System (GPS) in front of the house of the village-head. Household surveyed were selected randomly from listed households in the communities.

Knowledge attitudes and practices assessment

A minimum of 60 individuals were randomly selected in each community and were interviewed, regarding socio-demographic variables, history, knowledge, attitude and practices of respondents in relation to tungiasis, using a pretested semi-structured questionnaire. The questionnaire probed into the cause, signs and symptoms of the disease, knowledge of the reservoir hosts harbouring the parasite and preferred treatment.

The same individuals were also examined for the presence of clinical symptoms such as erythema, oedema, pain, itching, desquamation, fissures and pustules. The legs, feet, hands, elbows and arms were examined for the signs of tungiasis. Deformation of nails, loss of nails, deformation of toes, difficulty in walking and using hands, were also recorded as described by Feldmeier *et al* (2003).

The number of lesions was classified according to Collins *et al* (2009): light infestation (0-4 lesions), moderate infestation as (5-13 lesions) and (>13 lesions) lesions as heavy infestation. This approach has been considered as acceptable in hyperendemic communities (Heulkelbaug *et al* 2002). Prevalence of infestation was determined by the numbers of individuals found with at least one lesion of *T. penetrans* over the total number of individuals examined.

Data analysis

Data were entered, checked for entry errors and analyzed using the Epi Info software package version 7.1.1.14 (Centre for Disease Control and Prevention, Atlanta, GA, USA). Ninety-five per cent confidence intervals for prevalence were calculated using the respective Epi Info modules. The data were exported to Microsoft Excel 2013 for further analysis. Fisher's exact test was applied

to determine the significance of difference of relative frequencies.

Results

Socio-demographic background of sampled communities in Badagry LGA

The socio-demographic characteristics of the sampled population are represented in Table 1. A total of 1,030 individuals participated in the survey; 722 (70.25%) were males, while 208 (29.8%) were females. Majority of the respondents 407 (40.7%) were in the age-group 20-39 years. The occupation of members of the communities were diverse, which majorly include; farming 269 (26.6%), Artisans 186 (18.3%), Fishing 153 (15.1%), while 212 (20.9%) were students. The dominant indigenous ethnic group is the *Egun*, which constitute 810(79.8%) of the respondents. The income profile of the respondents revealed that majority 492(47.8%) earned below the minimum wage #18,000 (equivalent to $90) stipulated by government.

Table 1. Socio-demographic profile of the respondents in Badagry Local Government Area.

Parasitological and clinical findings

Variable	Frequency	Percentage (%)
Sex		
Male	722	70.2
Female	308	29.8
Age-group (yrs)		
0-9	61	6.1
10-14	90	9.0
15-19	79	7.9
20-39	407	40.7
40-59	262	26.2
>60	100	10.0
Occupation		
Artisan	186	18.4
Civil servant	12	1.2
Farmer	269	26.6
Fishing	153	15.1
Housewife	4	0.4
Student	212	20.9
Trader	149	14.7
Unemployed	28	2.8
Ethnicity		
Egun	810	79.8
Fulani	2	0.2
Ghanaian	26	2.6
Ilaje	18	1.8
Yoruba	159	15.7

Table 2 shows the prevalence of infestation in the sampled communities, while prevalence of 43 (68%) was recorded in Epeme; the overall prevalence of infestation in all the sampled communities was 293 (28.4%).

Table 2. Prevalence of tungiasis by communities in Badagry Local Government Area.

Communities	Number infected (Prevalence %)	Number examined
Aghankanme	35 (54.2)	64
Agorin	14 (22.9)	61
Agorin Sea Beach	13 (16.4)	66
Akakarakumo	6 (10.0)	67
Epeme	43 (68.3)	63
Erekiti Ajido	24 (35.0)	68
Erekiti Ijaran	25 (40.0)	62
Gbanko	4 (6.7)	60
Gberefun	32 (49.2)	65
Joforo	17 (25.8)	66
Kakon	13 (20.6)	63
Kweme	18 (27.0)	68
Moba	10 (16.7)	61
Okun Moba	36 (55)	66
Povita	2 (3.3)	64
Wesere	0 (0)	66
Total	**293 (28.4)**	1030

The prevalence of tungiasis in relation to socio-demographic variables are illustrated in Table 3. The males were more infested 212 (29.5%) compared to the females 81 (27.6%) ($p<0.05$). People earning less than the stipulated minimum wage tend to have higher prevalence of infestation compare to those with no source of income 158 (63.2%). There was also high prevalence of infestation among students 147 (69.7%). Children in the age-group of 0-14 years had the highest level of prevalence, while age-group 40-59 years had the lowest level of infestation and there was gradual increase amongst the sixty years and above age group (Figure 2).

In total, 2,515 lesions were observed in infested individuals. The number of lesions stratified by sex, age group, income per month and occupation are depicted in the Table 4. Males had a total of 2,027 lesions compared to females, (488). The age-group 20-39 years had the highest level of parasitic load of 1,298 lesions. The unemployed individuals and those with no income also had very high level of parasite loads of 1,048 and 1,874.

Signs and symptoms such as erthyma, oedema, pains, itching, desquamation, fissures, pustules, deformation of nails, loss of nails, deformation of toes (Plate 1 and 2) and difficulty in walking were observed.

Table 5 shows the parasites preferred sites of infestation; all infested individuals were affected in their toes, with a total of 674 lesions. The heel was least affected with a single lesion in one individual.

Table 3. Prevalence of tungiasis in relation to socio-demographic variables in Badagry Local Government Area.

Variable	No infected (*n*)	Percentage (95% CI)	*p*-value
Sex			
Male	212	29.5 (26.2-33.0)	
Female	81	27.6 (22.7 -33.1)	0.6
Ethnicity			
Egun	221	27.4 (24.4-30.6)	0.002
Fulani	2	100.0 (100-100)	
Ghanian	7	26.9 (11.6-47.8)	
Ilaje	11	64.7 (38.3-85.8)	
Yoruba	51	32.3 (25.1-40.2)	
***Income per month**			
>1000	1	100.0	0.000
1001-2000	13	39.4 (22.9-57.9)	
2001-5000	46	22.4 (16.9-28.8)	
5001-10000	34	13.5 (9.5-18.3)	
10001-17999	21	17.2 (11-25.1)	
>18000	11	8.2 (4.17-14.2)	
No income	158	63.2 (56.9-69.2)	
Occupation			
Artisan	35	18.8 (13.5-25.2)	0.001
Civil servant	0	0.0 (0.0-28.5)	
Farming	46	17.2 (12.9-22.2)	
Fishing	36	36 (17.2-31.3)	
Housewife	0	0.0 (0.0-60.2)	
Student	147	69.7 (63-75.8)	
Trader	18	12.2 (7.4-18.5)	
Unemployed	10	35.7 (18.6-55.9)	

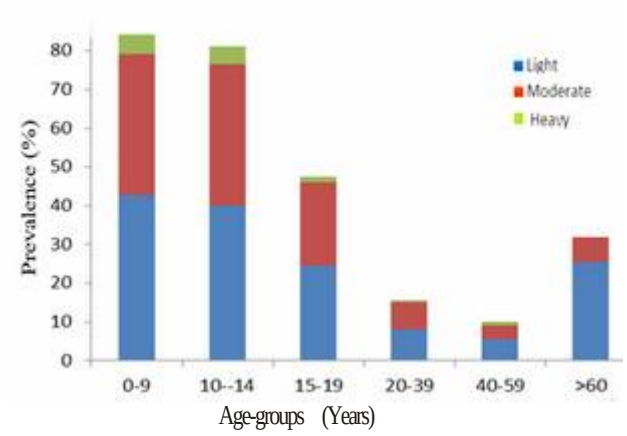

Figure 2. Prevalence of tungiasis stratified by age-group and the intensity of infestation in Badagry Local Government Area.

Table 4. Number of lesions by sex, age group and income per month (*n* = 2515) in Badagry Local Government Area.

Variable	No of lesion (*n* = 2515)	Mean lesions (standard deviation)
Sex		
Male	2027	9.3 ± 66.9
Female	488	5.9 ± 4.3
Age-group (yrs)		
0-9	349	5.8 ± 4.0
10-14	413	5.6 ± 3.8
15-19	204	5.4 ± 3.6
20-39	1,298	20.6 ± 124.3
40-59	135	4.7 ± 4.8
>60	17	2.6 ± 2.4
Occupation		
Artisan	136	3.9 ± 2.2
Civil servant	2	2
Farmers	198	4.2 ± 2.3
Fishing	228	5.7 ± 4.7
Traders	83	4.3 ± 2.3
Students	820	5.5 ± 3.9
Unemployed	1,048	95.3± 297.1

Plate 1. Heavily infested feet of a 27-year old male in Agorin Community of Badagry Local Government Area with deformation, erosion and detachment of toenails with super-infestation.

Plate 2. Desquamation of skin and suppuration on the sole of an infested individual in Agorin Community of Badagry Local Government Area.

Table 5. Distribution of lesions in individuals with tungiasis in Badagry Local Government Area.

Variable	Predilection site	No of individuals with tungiasis at certain sites	Number of lesions
	Feet		
Male	Toes	218	1277
	Soles	56	714
	Heels	12	17
Female	Toes	82	383
	Soles	28	94
	Heels	4	6
	Ectopic site		
Male	Fingers	7	14
	Elbows	3	5
Female	Fingers	3	5
	Elbows	0	0
	Total		**2,515**

Knowledge, attitude and practice of tungiasis

A large proportion of the population perceived tungiasis was caused by association with local pigs (61.2%), while (26.1%) mentioned dirty environment, sandy soil (39.6%), fish scales (8.7%), spiritual factors (2.7%) and (3.7%) have no knowledge of the cause of tungiasis (Figure 3).

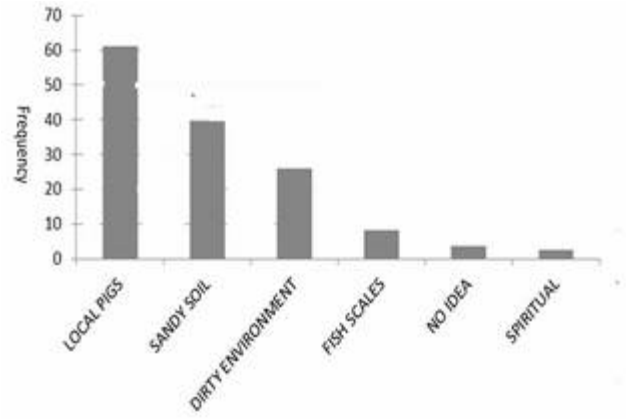

Figure 3. Respondents knowledge on the cause of tungiasis in Badagry Local Government Area**.**

The signs and symptoms of tungiasis varied from mild itching to difficulty in walking as captured in the questionnaire; 90% of the respondents indicated that they experienced itching and desquamation of skin, while 55% and 35% of respondents affirmed that oedema and ulcer respectively were clear signs of tungiasis. Loss of toe nails was experienced in (20%) and difficulties in walking in (4%) of the infested individuals (Figure 4).

A large proportion of the respondents affirmed that they had seen the parasite majorly on local pigs (66.0%), while others sited it on dogs (20%), goat (8%) and chicken (6%), (Figure 5)

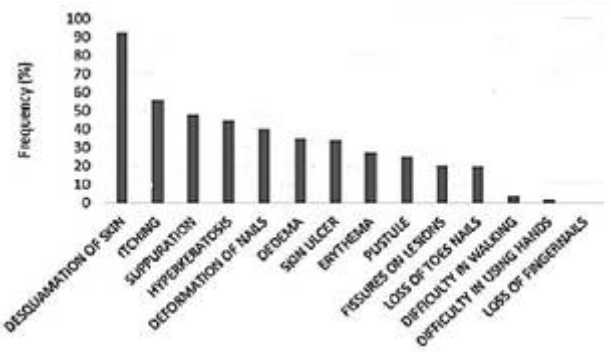

Figure 4. Signs and symptoms observed in individuals with tungiasis in Badagry Local Government Area.

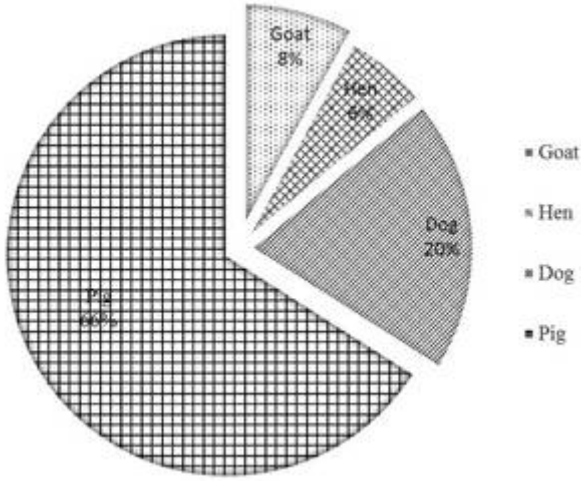

Figure 5. Respondents knowledge on the reservoir hosts harbouring tungiasis in Badagry Local Government Area.

Attitude, such as not putting-on and footwear regularly were believed by 65% of the respondents to be an important risk factor predisposing to infestation. A high number of respondents (86%) associated the infestation with living in accommodation with un-cemented floor. Also chicken and goats were thought to be associated with the disease (Table 6).

Most of the respondents preferred the use of kerosene (paraffin) (51.72%) and physical removal (61.48) of the embedded fleas for treatment. Others use cashew nut extracts, *kiki* (*Euphorbia laterifolia*) extract, domestic cooking salt, available agrochemical and synthetic insecticides in the treatment of the embedded fleas. None of the individuals interviewed indicated seeking medical attention at health centres for treatment (Table 7).

Fifty per cent of the respondents were of the opinion that the best control measures were to disallow pigs from moving freely near human residence; while (39.8%) were of the opinion that good sanitary practises were key to the control of human tungiasis. However, 1.1% of the sampled population believed that the cause of tungiasis was spiritual and therefore concluded it cannot be controlled (Figure 6).

Table 6. Risk factors associated with tungiasis in Badagry Local Government Area.

Variable	Number Examined	Number infected (%)	Risk Ratio (95%CI)	Odd Ratio (95%CI)	*p*- value
Irregular use of footwear					
Yes	656	37 (13.6)	2.0 (1.8-2.3)	8.6 (6.3-11.7)	<0.001
No	353	32 (57.5)			
Animal in compound					
Yes	416	148 (35.6)	0.9 (0.8-0.9)	0.6 (0.4-0.7)	<0.001
No	599	144 (24.4)			
Uncemented room					
Yes	123	72 (58.5)	1.8 (1.5-2.2)	4.3 (2.9-6.3)	<0.001
No	887	220 (34.8)			
Sleeping on the ground					
Yes	201	73 (36.3)	0.9 (0.8-1.0)	0.7 (0.5-0.9)	0.011
No	808	219 (27.1)			
Type of animal in compound: Pigs					
Yes	176	83 (47.2)	0.7 (0.6-0.8)	0.4 (0.3-0.5)	<0.001
No	834	209 (25.1)			
Dogs					
Yes	90	34 (37.8)	0.9 (0.7-1.0)	0.6 (0.4-1.0)	0.06
No	920	258 (28.0)			
Goats					
Yes	263	94 (35.7)	0.9 (0.8-1.0)	0.6 (0.5-0.9)	0.006
No	747	198 (26.5)			
Hens					
Yes	227	77 (34)	0.9 (0.9-1.2)	1.0 (0.5-2.1)	1.00
No	783	215 (27.5)			

Table 7. Preferred treatment options for tungiasis in Badagry Local Government Area.

Treatment Options	Frequency	Percentage
Use of kerosene	525	51.72
Removal of fleas	624	61.48
Cashew nut juice application	270	26.6
Kiki extract	84	8.28
Wash with Salt	119	11.72
Hexachlorocyclo hexane (Gamalin)	41	4.04
Application of ashes	10	0.99
Application of synthetic Insecticides	14	1.38

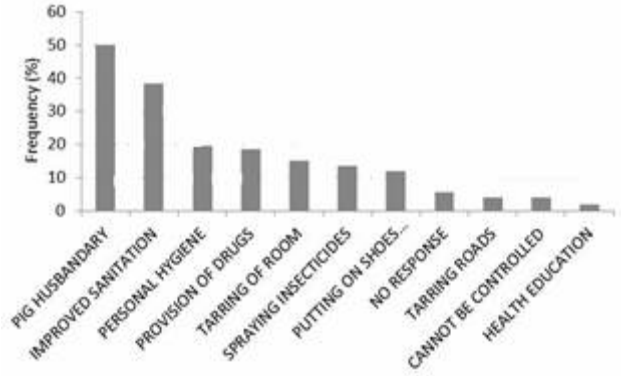

Figure 6. Respondents perception of tungiasis control measures in Badagry Local Government Area.

Discussion

Tungiasis is a predominant disease of rural communities in tropical regions of the world (Heukelbaug *et al* 2001). The disease has not gained the attention of policy makers and professionals. Presently, no control measure is in place for controlling the disease in Nigeria.

In this study, there is no significant difference in the prevalence between sexes. Similar studies from Brazil and Nigeria indicated no significant difference in prevalence between males and females (Muehlen *et al* 2003; Ugbomoiko *et al* 2007b). In contrast, Carvalho, *et al* (2003) observed significantly higher prevalence in females than males in a resource-poor community in South Brazil. Interestingly, other studies conducted in Brazil, Trinidad, and Nigeria indicate higher prevalence in males compared to females (Ade-Serrano and Ejezie, 1981; Arene, 1984; Wilcke, 2002; Chadee, 1998). Apparently, the pattern of occurrence in males and females differs from community to community.

The prevalence was highest in children within the age-group 1-9 years and lowest in age-group 40 to 59 years. The finding confirms what was earlier reported by Ugbomoiko *et al* (2007b) and Collins *et al* (2009). The factors that could probably be affecting the high level of prevalence among the elderly and children were; children playing and walking in sand barefooted or putting on footwear that barely covers the entire feet, e.g. flip-flops or damaged shoes; most children also sleep on mats or bare ground where transmission could occur readily, while the adults sleep on bed. The elderly probably find it more difficult to remove embedded fleas as result of poor eye sight and lack of association with younger

persons who can help remove the fleas. The lower prevalence observed in young adults may be related to experience and skills, a result of them becoming more skilful in removing embedded female fleas. These factors probably impact therefore making the distribution of the age-specific prevalence with follows its characteristic S-shaped pattern. It was also observed that there was reduction in the number of individuals with heavy level of infestation compared with what was reported by Ugbomoiko *et al* (2007b). This may be due to increase awareness about the disease and infrastructural developments over time.

In this study, factors such as putting on footwear regularly and living in sandy floor rooms were important independent risk factors; other factors of significance, include sleeping on the ground and rearing of domestic animals in the compound. This is similar to what was reported in previous studies in Brazil and Nigeria indicating that the transmission of *T. penetrans* occur indoors (Ugbomoiko *et al* 2007a and Linardi *et al* 2010), identifying sandy floor inside the house as an important independent risk factor for tungiasis. Another factor is resting outside regularly in a common place.

The host's skin must be close to the ground for the fleas to gain access, because it is incapable of jumping very high (Heukelbaug *et al* 2001). Therefore, majority of the lesions associated with tungiasis are on feet, especially on the periungual region of the toes. Significant lesions have also been found on the ectopic regions such as the elbows, thighs and gluteal regions (Heukelbaug *et al* 2002).

In this study, all the infested individuals had at least one lesion on their toes. Lesions were also found in ectopic regions such as elbows, heels and fingers. It was also observed that unemployed individuals and those with no income at all had the highest number of lesions; further emphasizing that tungiasis is a disease of the impoverished population.

Tungiasis was treated by the affected individuals themselves or by a family member and not by health care professionals (Winter *et al* 2009). Similarly in this study none of the infested individuals sought assistance at any health care facility. Treatments were carried out individually or through families and friends with kerosene, surgical removal with sharp objects, cashew nut extracts, salt, Hexachlorocyclohexane (Gamalin) and other available insecticides.

Respondents in Badagry West LCDA indicated to have observed the parasite mostly on pigs, other animals include dogs, goats and local chickens. Similar to reports in previous studies carried out in some African countries namely; Nigeria, Cameroon and Sao Tome and Prýncipe, pigs were reported as the most important reservoir host (Pampiglione *et al* 1998, Njuemi *et al* 2002, Ugbomoiko *et al* 2008).

Most of the sampled-individuals believed-intensive rearing of pigs or total ban of pigs rearing and improved sanitation is key to the eradication of tungiasis. In fact, the sampled-population and community leaders of Wesere claimed that they were able to eradicate the disease in their community as a result of banning pig-rearing in 2009. Other control measures that were recommended include personal hygiene, concreting the floor of rooms, wearing well covered shoes regularly and provision of treatment drugs against embedded parasite.

In this study, respondents ranked tungiasis as the third most common health challenge in their communities after malaria and typhoid fever. Several studies have shown tungiasis as a problem of poor rural populations in numerous developing countries in South America, the Caribbean and sub-Saharan Africa (Heukelbaug, 2001). Despite its associated morbidity and the growing awareness of the disease, tungiasis is not recognised at the local or international level as a serious health issue. In addition, in resource-poor settings, strict hygiene is often not applied, and severe inflammation and bacterial superinfestation are common results. Unfortunately, there is no available drug, with satisfactory clinical efficacy against tungiasis (Heukelbach, 2006). The disease remains an important health problem to the impoverished, and needs to be addressed by health officials, the medical community, researchers and sufferers themselves.

To effectively reduce the prevalence of tungiasis in endemic communities, individuals, communities, local and international organisations and the government must show concern and commitment towards combating the disease. According to Joseph *et al* (2006), the four predominant methods for reducing tungiasis are; (1) wearing closed-shoes, (2) containment of domestic animals, (3) regular watering the floors within houses and (4) maintaining good personal hygiene. These improvements will provide an effective approach, not only to prevent tungiasis, but also other diseases associated with poverty (Ugbomoiko *et al* 2007a). More drastic interventions should also be channelled towards improving the lives of tungiasis sufferers, such as provision of concrete floors in buildings and dwelling places (Muehlen *et al* 2006), administration of antibiotics, provision of shoes (Joseph *et al* 2006), and also application of residual insecticide spraying in infected individuals (Pilger *et al* 2008). Evidence suggests that in rural villages like these, new shoes are traditionally only worn on special occasions (Collins *et al* 2009). Provision of shoes therefore would only be successful as an intervention, if the shoes are worn regularly and not solely reserved for special occasions and ceremonies. An integrated approach of combining the reduction of animal reservoirs, use of insecticides, environmental modifications and health education will be effective, successful and sustainable in tungiasis prevention and control.

Incorporating the control of tungiasis with the control of other neglected tropical diseases will fast track the endemic prevalence and morbidity reduction of the ectoparasitosis.

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