Arthropod-Associated Skin Diseases among Occupants of Five Designated Junior Staffs' Quarters in Owerri and Enugu, Nigeria

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Abstract

A total of 650 residents from 5 designated junior staffs' quarters in Owerri and Enugu, south-eastern Nigeria were visually examined for arthropod-associated skin diseases between May 2005 and June 2006. Overall, 428 (65.8%) were affected, but prevalence differed according to residence (58.74%), gender (65.30%), age-group (64.88%) and crowding index (62.80%). Scabies was observed on about 46% of the affected individuals, followed by Pediculosis (33%), Tungiasis (11%) and Bedbug-related infection (10%). Tungiasis was dependent on residence but independent of gender, age-group and crowding index. Scabies was dependent on residence and age-group but not on gender and crowding index. Pediculosis was dependent on age-group but independent of residence, gender and crowding index (P>0.05). Bedbug-related infection was however dependent on residence but not on gender, age and crowding index.

Keywords: Arthropod, Skin diseases, Socio-economic status, Residents

Introduction

Ectoparasite infestation in man arises as a result of several factors, such as poor personal hygiene habits, degraded environmental conditions which favour the ecology of the arthropods, and the ability of some arthropods to locate their hosts based on emitted carbon dioxide or other chemical attractants (Fletcher and Axtell, 1993). Man could also be accidentally infested according to his socio-economic circumstances. The diets of parasitic Anoplurans (Lice), Hemipterans (Bugs), Siphonapterans (Fleas) and Acarines (Ticks and Mites) consist of the hosts' blood, tissues and body fluids. Some of these arthropods spend their entire life cycle on the host or near his habitation. Ectoparasites on man are therefore sources of worry and annoyance. Arthropod-bites and the resultant itching and scratching of the skin could be a source of secondary bacterial infection in man (Mahe *et al*., 1995). The lesions that develop gradually may lead to discomfort and unpleasant appearance of the skin. When the feet are involved, tetanus could be an unpleasant consequence leading to fatality (Tonge, 1989; Feidmeier *et al*., 2003). Arthropod infestations may be controlled but they are generally continuous or recurrent.

Studies on some ectoparasites of man have been conducted in parts of North-central, South-western and Niger Delta areas of Nigeria (Ejezie, 1981; Ade-Serrano and Ejezie, 1981; Ogunrinade and Oyejide, 1984; Arene, 1984; Arene and Ukaulor, 1985; Ebomoyi, 1988; Imandeh, 1993; Ebomoyi, 1994; Nte and Eke, 1995; Odueko et al., 2001; Ogunbiyi *et al*., 2005 and Ugbomoiko *et al*., 2007) but there is a dearth of information from South-eastern parts of the country. This study was therefore focused on the socio-economic class occupying five designated junior staffs' quarters in Owerri and Enugu, the respective capitals of Imo and Enugu States, south-eastern Nigeria.

Materials and Methods

This study was carried out between April 2006 and June 2007 on the occupants of five designated junior staffs' quarters in Owerri and Enugu, the respective capitals of Imo and Enugu States in south-eastern Nigeria. Owerri is in the tropical rainforest and oil-palm belt of Nigeria. The climate is characterized by the wet season, from May to October, with temperatures ranging between 19.3º to 25.7º C; and the dry season, from November to April, with temperatures of 22.3º to 32.4º C. Enugu is a sprawling urban city characterized by a dry period between November and April, with temperatures fluctuating within 27º to 33º C; and the rainy season from May to October, with temperatures ranging between 20º to 29º C. The environmental conditions of these cities favour the presence of lice, fleas, mites and bedbugs.

After sensitizing the occupants on the hazards of ectoparasites, a total 650 subjects consented to visual examination for arthropod-associated skin diseases. The sample comprised 135 people from Prisons wader barracks (PWB), 157 from Fire service police barracks (FSB) and 208 from Shell camp police barracks (SCB) all in Owerri, as well as 75 each from the Central police station barracks (CPB) and the Nigerian railway quarters (NRQ) in Enugu. The population was stratified according to residence, age, gender, residence, and crowding index (i.e., number of persons per room). Incriminated arthropods, such as fleas, mites, lice and bedbugs were recognized either by their situations on the hosts or by the symptomatic lesions they caused. Entomological Keys (Ikeme, 1976) was used for the identification of the ectoparasites. We tested the null hypotheses that prevalence of arthropod-associated skin diseases in the study population was not dependent on residence, gender, age and crowding index (H_o: P>0.05).

Descriptive statistics and Pearson Chi-square analysis were performed with SPSS Version 11.

Results and Discussion

Table 1 shows the total sample population of 650, composed of residents from PWB 135 (20.8%), FSB 157 (24.2%), SCB 208 (32%), CPB 75 (11.5%) and NRQ 75 (11.5%). Males contributed 364 (56%) and females 286 (44%) of the sampled population. Percentage contributions to the study population by different age-groups were ≤10 years (56%), 11-20 years (21.4%), 21-30 years (23.2%), 31-40 years (11.4%) and ≥41 years (6.3%). The Table also indicates that persons living ≤3, 3-5 and ≥5 per room constituted 30.6%, 48.3% and 21.1% of the sampled populations, respectively.

Table 1: Arthropod-associated skin diseases in the study population

Characteristic	Arthropod-associated skin diseases			
	Examined		Infected	
	No.	%	No.	%
Residence:				
PWB	135	20.8	86	63.7
FSB	157	24.2	87	55.4
SCB	208	32.0	194	93.3
CPB	75	11.5	33	44.0
NRQ	75	11.5	28	37.3
Total / Mean	650	20.0±3.9	428	58.74±9.76
Gender:				
Male	364	56.0	254	69.8
Female	286	44.0	174	60.8
Total / Mean	650	50.0±6.0	428	65.30±4.5
Age (years):				
≤10	245	37.7	163	66.5
11-20	139	21.4	91	65.5
21-30	151	23.2	103	68.2
31-40	74	11.4	45	60.8
≥41	41	6.3	26	63.4
Total / Mean	650	20.0±5.4	428	64.88±1.28
Crowding index*:				
< 3	199	30.6	91	45.7
3-5	314	48.3	251	79.9
> 5	137	21.1	86	62.8
Tota	650	33.3±7.97	428	62.80±9.87

*PWB: Prisons Wader Barracks Owerri, FSB: Fire Service Police Barracks Owerri, SCB: Shell Camp Police Barracks Owerri, CPB: Central Police Station Barracks Enugu, NRQ: Nigerian Railways Quarters Enugu, SE: Standard Error, *Number of persons per room*

Table 1 also indicates that 428 (65.8%) of the sampled population were generally affected with arthropod-associated skin diseases, but the prevalence differed according to residence, gender, age and crowding index. Mean prevalence for residence was 58.74%; with the occupants of SCB having the highest prevalence (93.3%), followed by PWB (63.7%), FSB (55.4%), CPB (44.0%) and NRQ (37.3%). Mean gender-prevalence was 65.30%; with males having 69.8% over females (60.8%). Mean age-prevalence was 64.88%, and ranged from 60.8% (age-group 31-40 years) to 68.2% (age-group 21-30 years). Mean prevalence for crowding index was recorded as 62.80%; with 45.7% for less than three, 79.9% for three to five and 62.8% for more than 5 persons per room, respectively.

Figure 1 indicated that scabies contributed about 46% of the infections, followed by pediculosis (33%), tungiasis (11%) and bedbug (10%). From this result we infer that mite and louse infestations were the most important ectoparasites encountered among the junior staff residents and their households in the study areas. It is common knowledge that inmates of prison and police cells habour these ectoparasites. Perhaps police and prisons personnel who made frequent contact with these inmates become infested, and eventually transmitted the arthropods to their quarters. Commercial sex workers have been reported to habour body louse (Imandeh, 1993). Unguarded police personnel who engage in illicit affairs with prostitutes may also be infested with louse and scabies; and members of their household could in this way be infected. Generally, as a result of the overcrowded nature and unsanitary accommodation in these barracks and quarters, level of infestation usually builds up. Affected individual most times made effort at controlling the arthropods on their body, but these infestations are observed to be either continuous or recurrent.

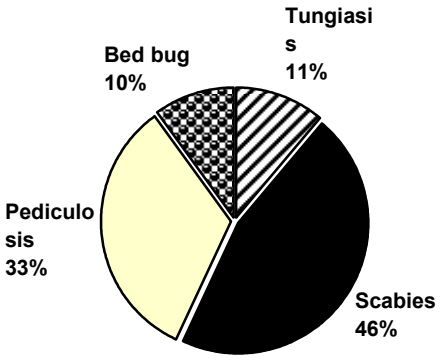

Figure 1: Overall distribution of arthropod- associated skin diseases among infected occupants of junior staff quarters studied at Owerri and Enugu, south-eastern Nigeria (April 2005 - June 2006)

Results of Chi-square analyses are shown in Table 2, while Figures 2, 3, 4 & 5 represent the distribution patterns of particular arthropod-associated skin diseases according to residence, gender, age-groups and crowding index, respectively. Tungiasis was dependent on residence (X^2 =11.181, DF = 4, P<0.05), but independent on gender (X^2 =0.000, DF = 1, P>0.05), age-group (X^2 =9.091, DF = 4, P>0.05), and crowding index (X^2 =0.070, DF = 2, P>0.05). Arene (1984) reported that prevalence in children were significantly higher than in adults with a peak in 5-10 years old age group. However, our result was closely related to that of Ugbomoiko *et al*. (2007) who maintain that the prevalence was highest between 5 and 14 years, decreased in adults, and increased again in the elderly (Figure 4).

Table 2: Arthropod-associated skin diseases among infected individuals

Characteristic	Infected	Tungiasis		Scabies		Pediculosis		Bedbug	
		No.	%	No.	%	No.	%	No.	%
Residence:									
PWB	86	18	20.9	41	47.7	18	20.9	9	10.5
FSB	87	10	11.5	32	36.8	34	39.1	11	12.6
SCB	194	11	5.7	105	54.1	68	35.0	10	5.2
CPB	33	5	15.1	10	30.3	12	36.4	6	18.2
NRQ	28	3	10.7	9	32.1	9	32.2	7	25.0
Total	428	47	12.78±2.52	197	40.20±4.61	141	32.72±3.16	43	14.30±3.39
X^2			11.181		18.004		9.110		19.272
Df			4		4		4		4
Significance			*P*< 0. 05		*P* < 0. 05		*P* > 0. 05		*P* < 0. 05
Gender:									
Male	254	27	10.6	109	43.0	87	34.2	31	12.2
Female	174	20	11.5	88	50.6	54	31.0	12	6.9
Total	428	47	11.05±0.45	197	46.80±3.80	141	32.60±1.60	43	9.55±2.65
X^2			0.000		1.285		0.205		1.454
Df			1		1		1		1
Significance			*P* > 0. 05		*P* > 0. 05		*P* > 0. 05		*P* > 0. 05
Age (years):									
≤10	163	15	9.2	70	42.9	63	38.7	15	9.2
11-20	91	9	9.8	35	38.5	34	37.4	13	14.3
21-30	103	15	14.5	68	66.0	13	12.6	7	6.8
31-40	45	3	6.7	17	37.8	20	44.4	5	11.1
≥41	26	5	19.2	7	27.0	11	42.3	3	11.5
Total	428	47	11.88±2.22	197	42.44±6.44	141	35.08±5.76	43	10.58±1.25
X^2			9.091		31.905		27.868		3.081
Df			4		4		4		4
Significance			*P* > 0. 05		*P* < 0. 05		*P* < 0. 05		*P* > 0. 05
Crowding index:									
< 3	91	10	10.9	39	42.9	34	37.4	8	8.8
3-5	251	28	11.1	121	48.2	78	31.1	24	9.6
> 5	86	9	10.5	37	43.0	29	33.7	11	12.8
Total	428	47	10.83±0.18	197	44.70±1.75	141	34.07±1.83	43	10.40±1.22
X^2			0.070		0.674		0.802		0.910
Df			2		2		2		2
Significance			*P* > 0. 05		*P* > 0. 05		*P* > 0. 05		*P* > 0. 05

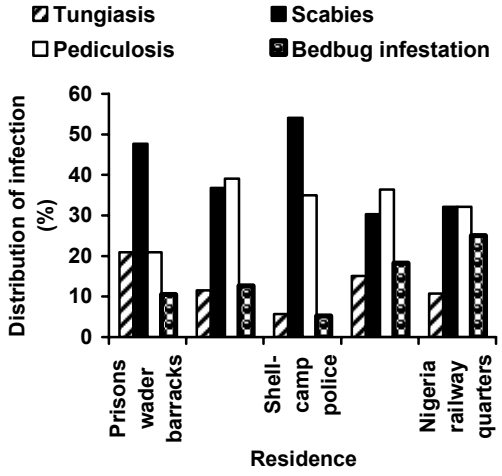

Figure 2: Distribution of particular arthropod-associated skin diseases among occupants of junior staff quarters studied at Owerri and Enugu, south-eastern Nigeria, according to residence (April 2006 - June 2007)

At PWB, CPB and NRQ it was observed that most of the buildings, as well as the communal kitchens and corridors were dilapidated. The jigger fleas were found in the soil near the buildings, and in places within the buildings that are devoid of their former cemented floors. *Tunga penetrans* therefore easily infested any one that moved barefooted on these areas. *Tunga penetrans* was thought to have been introduced from Brazil to Africa (Gordon, 1941). Various pathogenic bacteria have been isolated from tungiasis lesions (Tonge, 1989; Chadee *et al*., 1991; Chadee, 1998), while sepsis, lymphoedema, gangrene, loss of toenails, and auto-amputation of digits have been described (Mashek *et al*., 1977; Chadee, 1998).

Scabies was dependent on residence (X^2 =18.004, *DF* = 4, *P*<0.05) and age-group (X^2 =31.905, *DF* = 4, *P*<0.05), but independent on gender (X^2 =1.285, *DF* = 1, *P*>0.05), and crowding index (X^2 =0.674, *DF* = 2, *P*>0.05). SCB recorded the highest prevalence of scabies with 54.1%, while age-group 21-30 years was highest with 66.0% (Figures 2 and 4). Scabies epidemics have been known to occur primarily in institutional settings, such as prisons, incarceration units and long-term care facilities, and poverty leading to overcrowding may also increase the rates of transmission (Van-Nestle and Simon, 1978).

Pediculosis was observed to be dependent on age (X^2 =27.668, *DF* = 4, *P*<0.05); independent on residence (X^2 =9.110, *DF* = 4, *P*>0.05), gender (X^2 =0.205, *DF* = 1, *P*>0.05) and crowding index (X^2 =0.802, *DF* = 2, *P*>0.05). Age-groups below 20 years were more susceptible to pediculosis (38%).

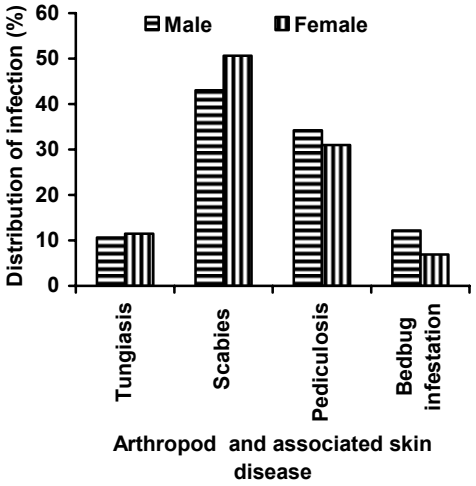

Figure 3: Distribution of particular arthropod-associated skin diseases among occupants of junior staff quarters studied at Owerri and Enugu, south-eastern Nigeria, according to gender (April 2006 - June 2007)

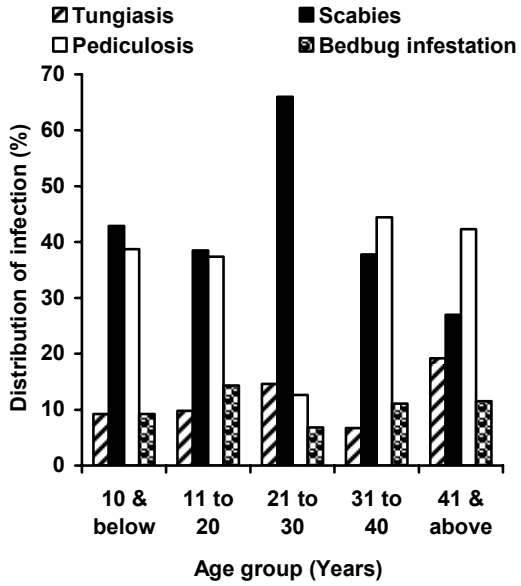

Figure 4: Distribution of particular arthropod-associated skin diseases among occupants of junior staff quarters studied at Owerri and Enugu, south-eastern Nigeria, according to age (April 2006 - June 2007)

This is in line with the findings of Arene and Ukaulor (1985) that highest prevalence of pediculosis was among the 6-13 year age group. However, we also observed a high prevalence of pediculosis among those above 31 years old (Figure 4).

Bedbug infestation was however found to be dependent on residence (X^2 =19.272, *Df* = 4, *P*<0.05); independent on gender (X^2 =1.454, *Df* = 1, *P*>0.05), age-group (X^2 =3.081, *Df* = 4, *P*>0.05) and crowding index (X^2 =0.910, *Df* = 2, *P*>0.05). NRQ Enugu, with dilapidated wooden prefabricated structures recorded the highest prevalence (25.0%) of bedbug infestation (Figure 2). Bedbug bites have been proposed as a factor contributing to the formation of a skin reaction termed papular urticaria, and patients with papular urticaria have been shown to demonstrate immunoglobulin G antibodies to bedbug (*Cimex lectularius*) antigens (Abdel-Naser *et al*., 2006). Mattresses, mats and other bedding materials spread under the sun, on account of bedbug infestations, are common sights in all the quarters and barracks studied. Camps, whether military, refugee or civilian, are sure places to find bedbugs (Gbakima *et al*., 2002).

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