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Parasitological Profile of *Perstans* filariasis among Blood Donors in Ile-Ife, Southwest, Nigeria

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ABSTRACT

Filariasis transmission occurs during blood transfusion which poses a serious menace to the recipient of the blood and reduces blood availability in the blood bank. This study was conducted at Ile – Ife, in Osun State Southwest Nigeria between March and September, 2009 with a view to determine the prevalence of blood filariasis among blood donors in relation to age, sex and occupation of the donors. The blood samples of 250 donors were parasitologically examined directly with wet preparation, while the thick and thin films prepared from the Knott concentration method were stained with Giemsa staining technique for the presence of filarial worms. Out of the total 250 blood samples examined, 23(9.2%) were positive for filarial worm. The specie of filarial worm detected was mainly *Mansonella perstans*. The distribution of blood filariasis was higher among infected male donors 18 (78.2%) than their female counterparts 5(21.8%). Peak distribution was observed among blood donors aged between 21-30years old 15(65.2%), followed by donors aged 31-40years 5(21.7%) and least among donors in age bracket 41-50years 3(13.0%). Those within the age group of 10-20years had no filarial worms in their blood. Further studies also revealed that filarial worms were not found in the blood of the volunteer donors while the positive cases (9.2%) were found in the blood of the commercial blood donors. Among the later, distribution of filariasis was highest among those that are farmers 10(43.5%), followed by commercial motorcyclists 6(26.1%), Bricklayers 3(13.0%) and the least filarial frequency was observed among traders 2(8.7%) and Lumbers 2(8.7%) respectively. This study confirms that some blood donors in Ile –Ife and its environs still harbor filarial worms in their blood and there is a tendency to infect the recipients through blood transfusion thereby spreading the infection and thus complicating the heamatological status of these recipients.

Key words: *Mansonella perstans*, blood donors, frequency, filariasis, Ile-ife.

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INTRODUCTION

Blood transfusion involves the safe transfer of blood components from a donor to a recipient. The demand for blood has greatly increased over the years. Transfusion-related transmission is possible among which are a group of tropical diseases caused by several species of nematode parasites and their larvae. Filariasis due to blood transfusion is an emerging area of interest in tropical medicine (Viroj-Wiwanitkit, 2009). Its transmission by blood transfusion is not impossible, but pose a serious threat to the recipient of the blood and reduce the availability of the blood in the blood bank as any donor with microfilaremia are always excluded automatically(Ojo-Bola *et al.*, 2014).

The ecological factors like temperature and humidity play a significant role in filariasis transmission

(Manson, 2003). It is generally recognized that considerable temperature and high humidity are necessary for the survival of most vector insects.

Mansoniellosis is one of the most widespread filarial infection of man in Nigeria which is caused by the worms *Mansonella perstans* and *Mansonella ozzardi*, which occupy the serous cavity of the abdomen. In all cases, *Mansonella perstans* is transmitted by tiny biting midges of the genus *Culicoides* as the adult worms are found in the cavities and the non- periodic unsheathed microfilariae is found in the blood. (Agbolade *et al.*, 2006).

The presence of *M. perstans* microfilaraemia has been associated with disease symptoms such as generalized itching of skin, joint and muscle ache. Severe pain in the abdomen and liver region with neurological and psychic symptoms , endocrinological

disturbances, recurrent lymphoedema in the limbs and face resembling Calabar swellings, and nodules containing adult worms in the conjunctiva or eyelids (Lansoud *et al.*, 1989; Agbolade, *et al.*, 2005; Bregani *et al.*, 2006).

Since chronic filariasis in any population will not only jeopardize their health, but can also suppress the components of their immune system and as such render them susceptible to other diseases resulting in reduced economic growth (Babu and Nutman, 2014)., there is a need for monitoring of the occurrence and prevalence in such areas, thus serving as prelude to effective management and control of infections. This study therefore aims at investigating the distribution pattern and prevalence of filariasis among blood donors in Ile Ife and environs.

METHODS

Ethical consideration: Prior to the commencement of this study, ethical clearance and permission was obtained from Adventist Health International, Ile-Ife, Osun state, Nigeria. All blood donors were allowed voluntary and commercial participation and were educated about the rationale behind the project.

Population studied and sample collection: The study was conducted at Adventist Health International, Ile Ife Osun State. Information on each individual was obtained for age, sex and occupation. A total number of 250 donors age between 18 and 45years comprising of both males and females were screened for the study between March and September 2009. 5ml of venous blood samples were collected in citrated anticoagulant bottles in the laboratory as the donors come majorly in the morning and afternoon.

Parasitological examination: Preparation of Specimen for Microscopic Examination: Blood samples were examined directly. A small drop from the anticoagulated blood was placed on a clean grease free slide, covered with cover slip and examined under x10 objective. Presence of motile microfilariae was detected by their undulating motion, displacing the red blood cells from side to side as they move (Arora and Arora, 2005).

Knott concentration method: 1 ml of citrated blood was placed into a centrifuge tube containing 10ml of 2% formalin, the tube was thoroughly mixed and centrifuged for 2 minutes at 2000 r.p.m, as the supernatant fluid was then decanted and the sediments were examined as a wet mount under low (100x) and high dry (400x) power (Knott, 1939).

Staining Method for Identification of Microfilariae:

Thick smears were prepared from the remaining sediment, and were left to air dry. The smears were stained with Giemsa stain, and the stained slides were examined under microscope using 100x objective. Identification was according to the keys in Learning Bench Aid No.3 (Tropical Health Technology) (Uttah *et al.*, 2005).

RESULTS

Of the two hundred and fifty (250) blood donors that were parasitologically screened, twenty three (23) of them representing prevalence of 9.2% were discovered to harbor filarial worms in their blood. Among the blood donors examined, it was discovered that *Mansonella perstans* was the only filarial worms found during the study. Out of the total 23 infected blood donors, male donors had a higher distribution of *Mansonella perstans* 18 (78.2%) than their female counterparts 5(21.8%). (Table 1).

Table 1:
Distribution of *Mansonella perstans* in relation to gender and age among infected blood donors

Age Group of donors (Years)	Number Positive		Total (%) positive
	Male	Female	
21-30	12 (52.2)	3 (13.0)	15 (65.2)
31-40	4 (17.4)	1 (4.3)	5 (21.7)
41-50	2(8.7)	1 (4.3)	3 (13.0)
TOTAL	18 (78.2)	5 (21.8)	23(100)

Peak distribution was observed among positive blood donors aged between 21-30years old 15(65.2%), followed by donors aged 31-40years 5(21.7%) and least among donors in age bracket 41-50years 3(13.0%). (Table 1).

Those within the age group of 10-20years had no filarial worms in their blood. Further studies also revealed that filarial worms were not found in the blood of the volunteer donors while the positive cases (9.2%) were found in the blood of the commercial blood donors. Among the later, distribution of filariasis was highest among those that are farmers 10(43.5%), followed by commercial motorcyclists 6(26.1%), Bricklayers 3(13.0%) and the least filarial frequency was observed among traders 2(8.7%) and Lumbers 2(8.7%) respectively (Fig 1).

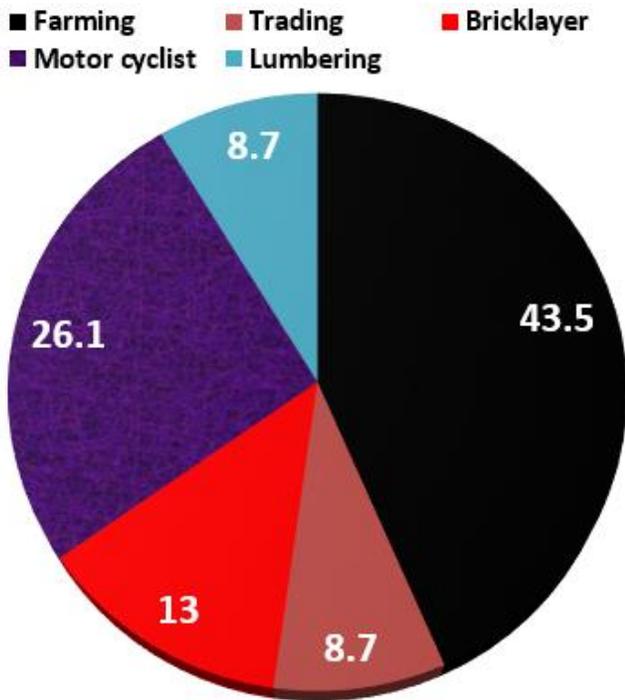


Fig 1: Distribution of *Mansonella perstans* in relation to occupations of blood donors

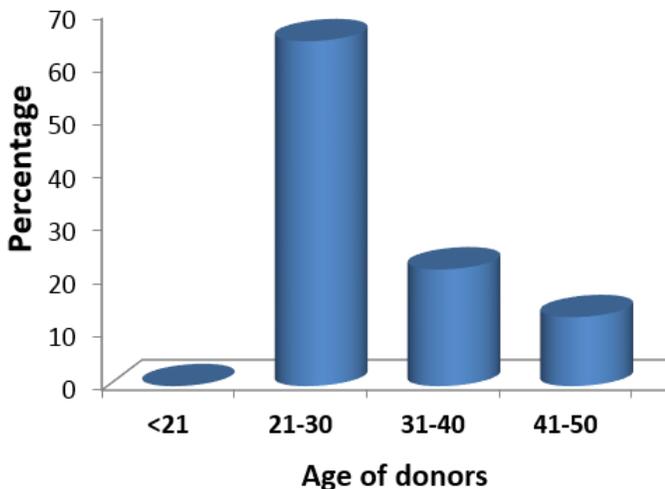


Fig 2: Distribution of *Mansonella perstans* in relation to age of blood donors

DISCUSSION

Mansonellosis is the most widespread filarial infection of man in Nigeria and other West African countries (Simonsen *et al.*, 2003). From our investigation, the prevalence of *Mansonella perstans* microfilaraemia in

this study is similar to the findings of Uttah *et al.*, (2011) who reported a prevalence of 11.2% in Calabar, but higher than the 2.5% reported by Ojo-Bola *et al.*, (2014) in Ekiti, and 1.01% reported by Mabayoje *et al.*, (2006) in Oshogbo while it is comparably lower than the 21.7% prevalence reported by Anosike and Onwuliri, (1994) in Bauchi, all in Nigeria. These differences may be attributed to the population studied and geographical locations of the study as some locations like rural communities provide the right breeding conditions for the *culicoides* vector such as wet mud and leaf litter or the underbrush, and rotten banana stems (Boorman, 1993;Uttah *et al.*, 2011).

The only causative agent of filarial infection identified among blood donors in this study was *Mansonella perstans*. This may be connected to the timing of blood collection since the type and numbers of microfilariae coincide with their periodicity. Higher prevalence of *Perstans filariasis* that was observed in adults donors (21-50years) in this study is also similar to the observations of Arene and Atu, (1986) and Uttah *et al.*, (2011) in Niger Delta area of Nigeria and Calabar respectively as this may be associated with greater exposure of adults due to their occupations and daily activities.

Furthermore, *Perstans filariasis* was found to be highest in donors who are farmers, this is possible as their daily activities due to their occupation (farming) expose them to the biting vectors. Due to the fact that blood transfusions carry the risk of transmitting microfilaria parasite to the recipients and limit the availability of the blood as any donor with microfilaraemia will be excluded automatically, however according to Bregani *et al.*, (2003), in cases of real need of blood, the presence of *M. perstans* microfilariae in donated blood is probably not an absolute contra-indication to perform a transfusion, at least in endemic areas in which chronic immunological stimulation against filarial infection is possible. In such cases, Instituting prompt antifilarial treatment for patients receiving such blood may be a credible alternative (Mabayoje, *et al.*, 2006)

We strongly recommend intensified biosecurity and environmental sanitation to eliminate the breeding sites of *culicoides* (biting midges) which are the vectors of *Mansonella perstans* and an epidemiological study should be conducted to enable the Government to plan a proper treatment campaign with Ivermectin and albendazole in endemic communities. We also recommend that virtue of the prevalence of masonellosis in the commercial donors, voluntary donation should be encouraged in all blood banks

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