

Full Length Research

Malaria Infection among Inmates of Jos Prison, Plateau State, Nigeria

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Prison inmates are often tagged “the forgotten ones” and are among the population with high risk for dangerous and contagious diseases. This study was conducted to determine the prevalence of malaria infection among prison inmates in Jos, Plateau State, Nigeria. Blood samples of 300 inmates within the age range of 18 and above 60 years, were screened for malaria infection. Blood samples were collected by finger prick to determine malaria parasitaemia using thick and thin film methods. Of the 300 inmates examined, 161 (53.67%) were infected with malaria parasites. Malaria infection was highest among inmates within the age range of 41-50 (70.4%). The prevalence of the infection with respect to their various units showed that the condemned inmates are more parasitized (72.50%), followed by those serving jail terms (62.00%). In relation to gender, males had the prevalence of 54.45% while the females had the prevalence of 37.50%. There was no statistical relationship between the prevalence of malaria infection ($P>0.05$) with respect to age groups and various units. The used of insecticides treated nets and the incorporation of basic health education into the curricular of the inmates were recommended.

Key words: Malaria, inmates, prevalence, infection.

INTRODUCTION

Prisoners carry much more burden of illness than other members of the society (Ishaku and Mamman, 2014). They harbor diseases that are determined both by the environment from which they come from and by the prison in which they live. Most health professionals find it difficult to work in a prison set up, due to under nutrition, lack of concern, inadequate facilities and expertise, which deteriorates the health of inmates. Weishbuch (1992) observed that there are problems of severe drug abuses, alcoholism, trauma, homicide, suicide, HIV/AIDS, malaria, STDs, TB, skin and helminthes infection etc among prisoners.

Malaria continues to be one of the most serious infectious diseases approximately causing about one

million deaths (WHO, 2008). The malaria parasites, *Plasmodium falciparum* invades and grows within its host red blood cells (Miller *et al.*, 2002). As the parasites exports proteins that modify the exoskeleton and membrane bound tissues (Glemister *et al.*, 2002, Mills *et al.*, 2007).

Despite the substantial advances in the treatment and prevention of malaria over the past decades, malaria still threatens the lives of millions in tropical countries. The symptoms of malaria are non specific and parasitological diagnoses uncommon, making precise calculation of the disease burden difficult and causing both anti-malaria drugs and under treatment of non malaria causes of fever (Snow *et al.*, 2005; WHO, 2011)

Prison health is a neglected area. Those who are incarcerated represent a medically underserved population and are at a high risk of medical disorders. Hardly any health professional wants to work in a prison set-up. The lack of concern, facilities and expertise further

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Table 1. Prevalence of malaria infection among inmates in Jos prison.

Prison Unit	No. Examined	No. Infected	% Infected
AWT	110	41	37.27
JT	100	62	62.00
LT	50	29	58.00
CD	40	29	72.50
Total	300	161	53.67

AWT: Awaiting Trial, JT: Jail Term, LT: Life Term, CD: Condemned

guarantees the deterioration of the health of inmates. This explains the reason for such limited studies in a prison set-up, especially in Nigeria.

There seem to be little or no work carried out in these neglected settlements called the prisons, and have prompt this very research. The findings are discussed from the point of view of the social aspects of the inmates which encourage host-vector contact and hence the transmission of parasites and their implication for public health.

This study is an attempt to determine malaria status of persons from a section of our society, who condemned by law, are behind the high walls of one of the largest prisons of our country, with the view to generate information that may spur or stimulate planning, management, prevention and control strategies for Nigerian prisoners.

MATERIALS AND METHODS

Study area

This study was carried out at Jos central prison. This prison is located in Jos, the capital city of Plateau State, Nigeria. Jos is an old tin mining city with an upland stretching approximately 104 Km from north to south, characterized by impressive ridges and isolated rocky hills separated by extensive plain. Jos is linked by road, rail and air to the rest of the country. It has an average daily temperature of 22°C, humidity of 60% and average rainfall of 140 mm (Udo, 1970). The inhabitants are mostly civil servants, businessmen, traders, farmers and casual labourers

Study population

Three hundred (300) inmates that presented themselves for medical treatment at Jos prison clinic were used for this study. This comprised of 110 awaiting trial (AWT), 100 serving jail term (SJT), 50 serving life term (SLT) and 40 condemned prisoners (CD), with ages ranging from less than 20 to above 60 participated in this study.

Sample collection

Following an official consent secured from the prison officers and the inmates with assurance of confidentiality of the results, the blood samples were obtained by finger pricking using sterile disposable lancets on slides. Thick and thin smears were prepared from the blood samples collected from the inmates. Demographic information such as age, sex and prison unit of each inmate was obtained.

Preparation and Microscopic Examination of Parasites

Thin and thick Giemsa's stained blood smeared slides were prepared following standard microbiological method for microscopic identification of malaria parasites as described by Cheesbrough (2002) and Arora and Arora (2005). The data obtained were analysed using chi-squares (χ^2) test to compare the rate of infection.

RESULTS

Of the 300 inmates screened, 292 (97.33%) were males and 8 (2.67%) females. The overall prevalence obtained from this study was 53.67%. prevalence of malaria infections with respect to the various units of the prison were 37.27%, 62.00%, 58.00% and 72.50% for AWT, JT, LT and CD respectively (Table 1).

The prevalence of malaria infection with respect to age groups were 46.40%, 56.36%, 54.4%, 70.40%, 36.00% and 57.14% for age groups <20, 21-30, 31-40, 41-50, 51-60 and 61> respectively (Table 2).

In relation to gender, males had the prevalence of 54.45% while their female counterpart had the prevalence of 37.50% (Table 3).

DISCUSSIONS

The relatively high prevalence of malaria (53.67%) among inmates of Jos prison is not surprising for a number of reasons: poor environmental sanitation,

Table 2. Malaria distribution in inmates with various age groups.

Age Group	No. Examined	No. Infected	% Infected
< 20	56	26	46.40
21- 30	110	62	56.36
31- 40	68	37	54.41
41-50	27	19	70.40
51- 60	25	9	36.00
61>	14	8	57.14
Total	300	161	53.67

Table 3. Prevalence of malaria among inmates in relation to gender.

Gender	No. Examined	No. Infected	% Infected
Male	292	159	54.45
Female	8	3	37.50
Total	300	161	53.67

source of drinking water and lack of mosquito nets coupled with the fact that prison is not regularly fumigated create opportunities for this infection to thrive among the inmates. Presently, Jos prison is overcrowded and the structures built since 1930 have not been updated.

This malaria infection rate by age was highest among ages 41-50 (70.40%) and among the condemned inmates (72.50%). This could be due to several factors which may include constant exposure to the vector, inmates duration in the prison and age as observed by Smith *et al.* (1995), Trape and Roger (1996) in Tanzania and Congo respectively that malaria infection are inversely related to age. Thus, some inmates suffer from a disproportionately high rate of infection while other inmates are at lower risk.

In addition, the condemned inmates were never allowed to move out of the prison and they receive less attention in terms of health as agreed by Weisbuch (1992). A higher prevalence of malaria was also observed among those serving jail terms (62.00%) which is little lower than the condemned inmates (72.00%) because those serving jail terms are regarded as the mobile and working units among the inmates. They are usually taken out for manual labour in farms, such activities makes them interact closely with the outdoors biting mosquitoes which expose them to mosquitoes bite and consequently result in high prevalence of malaria infection.

Male inmates were reported to have higher prevalence of malaria infection (54.45%) than their female counterpart (37.50%). The present result conforms to the recorded higher prevalence of malaria in male than in female in Gombe, Nigeria (Umar, 2006). However, studies have shown that females have better immunity to parasitic disease and this was attributed to genetic and

hormonal factors (Krogstad, 1996).

This may be because the male inmates are freer than the females which leisure hours are strictly controlled and restricted. Also, female inmates have better personal hygiene practices.

Conclusion

The establishment of these parasites in these inmates may portend grave consequences on human health. There is therefore the need to introduce and intensify preventive and control measures for malaria infection, and therefore basic health education should be incorporated into the curricular of the inmates, adequate bed space with treated mosquitoes nets and other social and recreational facilities be provided to reduce vector borne infections.

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