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ASSESSMENT OF HIV AND MALARIA INFECTIONS AND PERCEPTION AMONG ANTENATAL WOMEN IN OGUN STATE, NIGERIA

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ABSTRACT

Four hundred pregnant women selected from four Local Government Areas (LGAs) representing urban (Abeokuta South LGA and Abeokuta North LGA) and semi-urban (Obafemi/Owode LGA and Odeda LGA) of Ogun State, were enrolled for study on the evaluation of HIV and malaria infections and perception among antenatal women. Malaria parasite test using Giemsa staining techniques for detection of *Plasmodium falciparum* was employed, while the one-step anti-HIV 1 and 2 Pock Test kit was also adopted for the determination of HIV status/prevalence. Structured questionnaire was used to obtain information on the knowledge and perception of the infections among the women under study. The overall malaria prevalence across the study area was 53.5% (Abeokuta South (49%), Abeokuta North (52%), Obafemi/Owode (50%) and Odeda (63%). Abeokuta South had mean parasitaemia intensity for *P. falciparum* of 2.5 parasites per microlitre blood of infected respondents; others are Abeokuta North (2.0), Obafemi/Owode (1.6) and Odeda (2.1). The overall mean parasite density per infected respondent was 2.0. The HIV prevalence from the study was 3.5% (Abeokuta South (2%), Abeokuta North (5%) Obafemi/Owode (5%) and Odeda (2%)). Demographic data showed that the women were of different age groups, educational qualifications and gravid status. Malaria parasite was more prevalent among the age group 21-25yrs (26%), while HIV prevalence was distributed across the age groups. Women with secondary school education had higher prevalence of malaria and HIV when compared with the other educational levels. On the knowledge and perception of the infections, 63% and 43.8% of the women attribute malaria and HIV infections to mosquito bites and sexual intercourse respectively. Antenatal clinic attendance among respondents was high with 79% attending regularly. In the treatment of malaria, chloroquine was considered as the drug of choice. Interaction with HIV positive women showed that 70.6% of them are on antiretroviral drugs (ARV) with 45% of respondents claiming that ARV drugs are expensive. There is the need for a sustainable control programme to monitor malaria infection and its interaction with HIV, thereby reducing burden of disease and attendant high cost of treatment.

***Keywords*:** HIV, Malaria, Perception, Antenatal Women, Ogun State.

INTRODUCTION

Malaria and HIV are two common infections associated with pregnancy in the sub-Saharan Africa and to a higher extent, in other developing countries. WHO (2003) reported that an estimated 38 million Africans are already infected with HIV-1, and about 300 million to 500 million African suf-

fer from malaria each year, of which 2.7 million people die annually. Of these populations are children, pregnant women, non-immune travellers, refugees or labour forces entering into endemic areas (Steketee, 2001), so the association between the two infections has important implication.

Studies to determine the relationship between malaria and HIV infection in some parts of Nigeria are now gradually being documented (Amuta and Ikpa, 2005). Kublin *et al.* (2005) in assessing the relationship between malaria and HIV infections opined that malaria potentially accelerate HIV diseases progression. The immune deficiency caused by HIV infection reduces the immune response to malaria parasitaemia and therefore, leads to an increased frequency of clinical attacks of malaria. The evidence of an interaction between HIV-1 and malaria in pregnancy is convincing, with more peripheral and placental parasitaemia, higher parasite density, more clinical malaria, more anaemia, and increased risks of adverse birth outcomes. HIV- infected women remain susceptible to the effects of malaria whether or not they are pregnant. Placental HIV-I viral load is increased in women with placental malaria especially those with high parasite density (Allen *et al.,* 1991).

Anti-malaria therapy is most effective in individuals who have acquired some immunity to malaria, but Owen and Khoo (2004) predicted that response to therapy would be decreased in immune suppressed HIV-infected individuals living in regions of stable transmission. They observed in their studies from the Democratic Republic of Congo that there was no difference in response to anti-malaria treatment with HIV-infected pregnant women when compared with uninfected pregnant women using artemisinim; sulfadoxine-pyrirethamine (SP) and arteriether-immefratrine. Chloroquine is probably still the most widely used anti-malaria drugs in Africa. The extensive spread of resistance has severely limited its usefulness for *Plasmodium falciparum* malaria; however it remains effective for *P. ovale* infections (Winstanley *et al*., 2004). Abu-Raddad *et al* (2006) in their model analysis showed that transient but repeated elevated HIV viral loads associated with recurrent co-infection such as malaria can amplify HIV prevalence.

Preliminary 2005 sentinel survey on the status of HIV in Nigeria by the Federal Ministry of Health, reported that Ogun State had HIV prevalence rate of 3.6%. Considering that HIV infection is associated with malaria, and malaria is known to be associated with infant and maternal mortality in Nigeria, information on how these two important diseases interact are still hampered by lack of knowledge in many key areas such as attitude, perception and drug interaction which forms only a very small part of the potentially massive number of ways in which HIV and malaria interact to the detriment of human health. The study therefore evaluates the prevalence of HIV and malaria infections and perception among antenatal women in urban and semi-urban communities of Ogun State, Nigeria.

MATERIALS AND METHODS

Study area

A cross-sectional study was carried out from May to August 2006 in Health Centres in four Local Government Areas (LGAs) namely: Abeokuta South, and Abeokuta North (urban) and Odeda and Obafemi/ Owode (semi urban) of Ogun State which lies approximately between longitude 2° 31'and 4° 31' E, latitude 6° 31' and 8° N.

Consent

Written consent/approval to use the local governments Health Centres were sought and obtained from the Medical and Ethics committee of the Health Centres. Interactive sessions were also held with the staff of the Health Centres and the respondents explaining the objectives of the study. Verbal consent was obtained from all respondents who participated in the study.

Sampling strategy

Systematic sampling method was employed in selecting the four hundred pregnant women (100 from each study area). The pregnant women who consented to participate in the study were enrolled regardless of tribe, age education qualification and gravid status.

Blood sample collection

Venous blood was obtained using a sterile needle and syringe for each respondent. Blood collected were transferred into Ethylene Diamine Tetra Acetate (EDTA) bottle to prevent blood clot before taking to the Parasitology laboratory of the Department of Biological Sciences, University of Agriculture, Abeokuta for microscopic examination of malaria parasite and HIV screening.

Blood sample analysis

Malaria parasite test using Giemsa staining techniques (thin and thick smears) for detection of *Plasmodium falciparum* was adopted (Cheesebrough, 1987).

Anti- HIV I and II assays were carried out using SD BIOLINE HIV 1 & 2 POCT KIT, manufactured by Standard Diagnostics, Inc, Korea (July 2005). This kit according to the manufacturer is an immune chromatographic (rapid) test for the quantitative detection of antibodies of all Isotopes i.e. (IgG, IgM, IgA) specific to HIV 1- including subtype O and HIV –2 simultaneously in human serum, plasma or whole blood.

Knowledge on health education and disease burden

Information required from respondents which was interpreted in the local language includes name, age, gravid status, marital status, educational qualification, frequency of malaria in a year, drug of choice for malaria treatment and HIV, the use of ante-natal clinics and the cause of both infections. Also information was obtained on the influence of HIV on malaria infection, mode of transmission of both infection and assessment of drug of choice for malaria.

Data Analysis

EPI Info version 6 employing simple percentiles were used in analyzing the questionnaires. SPSS version 10 software employing analysis of variance (ANOVA) and students't -test was used in comparing infection and determining the relationship between infection patterns.

RESULTS

The overall malaria prevalence from the study as presented on Table 1 was 53%. This was made up of Abeokuta South (49%), Abeokuta North (51%), Obafemi/Owode (63%) and Odeda (50%). On the intensity of parasitaemia, the table showed that Abeokuta South had mean parasite density of 2.5 per microlitre of blood from infected respondents, while the least (1.6 per ml) was observed in Obafemi/Owode. The study revealed a mean parasite density of 2.0 parasites per microlitre of infected blood from respondents.

The overall HIV prevalence from the study (Table 1) was 3.5%. Prevalence by urban and semi-urban centres showed Abeokuta South (2%), Abeokuta North (5%), Obafemi/Owode (5%) and Odeda (2%). Abeokuta North and Obafemi/Owode from the results had a higher prevalence of 5% each, while a lower prevalence of 2% each was observed in Abeokuta South and Odeda.

Demographic data showed that the women were of different age groups, educational qualifications and gravid status with a high level of antenatal clinic attendance (Table 2). Figure 1 shows that malaria parasite was more prevalence among the age group 21-25yrs (26%), %), while HIV prevalence was distributed across the age groups. Statistical T-test analysis showed no significant difference ($p<0.005$) in the infection rates among the age groups for both malaria and HIV.

Women with secondary school education had more prevalence of malaria and HIV when compared with the other educational levels (Figure 2). Statistical T-test analysis showed a significant difference ($p<0.005$) in the infection rates for malaria in Obafemi/ Owode LGA ($t = 8.041$, $p = 0.004$) and in the infection rates for HIV in Odeda LGA ($t = 10.369$, $p = 0.002$).

On the knowledge and perception of the infections, 64.25% and 43.75% of the women attribute malaria and HIV infections to mosquito bites and sexual intercourse (Table 3). However others believe that stress and exposure to excessive sun also contribute to malaria disease. On the treatment for malaria, chloroquine was considered as the drug of choice by 63.5% of the respondents. Interaction with HIV positive women showed that 66.75% of them are not happy about their status, 73% of them are on anti-retroviral drugs (ARV) with 45.6% of respondents claiming that ARV drugs are expensive.

Table 1: Prevalence and Intensity profile of Malaria and HIV infections among pregnant women in Ogun State

Study Areas	Number examined	Number positive for malaria parasite (% prevalence)	Number of parasites seen (mean load per infected person)	Number Positive for HIV (% Prevalence)
Abeokuta South	100	49(49)	123 (2.5)	2 (2)
Abeokuta North	100	51(51)	106 (2.1)	5 (5)
Obafemi/ Owode	100	63(63)	101 (1.6)	5 (5)
Odeda	100	50(50)	105 (2.1)	2 (2)
Total	400	213(53)	435 (2.0)	14 (3.5)

Table 2: Demographic status of respondents in the studied Local Government areas

Variables assessed	Abeokuta South LG %	Abeokuta North LG %	Obafemi/ Owode LG %	Odeda LG %
Age class in years				
15 – 20	9	8	5	5
21 – 25	25	45	69	61
26 – 30	33	34	18	25
31 – 35	25	8	6	7
36 – 40	7	5	2	2
41 - 45	1	0	0	0
Educational status				
No formal Educ.	3	14	17	21
Primary	30	38	30	25
Secondary	48	43	34	33
Tertiary	19	5	19	21
Marital status				
Married	90	67	79	77
Single	8	26	21	20
Divorced	2	7	0	3
Gravid status				
Primigravid	22	33	51	39
Multigravid	78	67	49	61
Antenatal clinic attendance				
Regularly	92	89	68	67
Not regularly	8	11	32	33

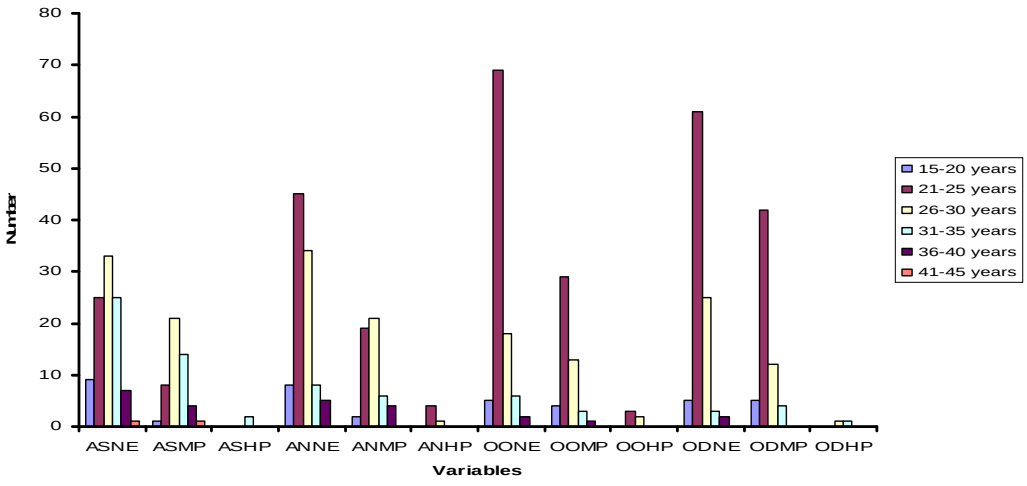

Figure 1: Age, class and prevalence of malaria and HIV among the respondents

Legend

ASNE – Number examined in Abeokuta South
ASMP – Malaria positive result in Abeokuta South
ASHP – HIV positive result in Abeokuta South
OONE – Number examined in Obafemi/Owode
OOMP – Malaria positive result in Obafemi/Owode
OOHP – HIV positive result in Obafemi/Owode
ANNE – Number examined in Abeokuta North
ANMP – Malaria positive result in Abeokuta North
ANHP – HIV positive result in Abeokuta North
ODNE – Number examined in Odeda
ODMP – Malaria positive result in Odeda
ODHP – HIV positive result in Odeda

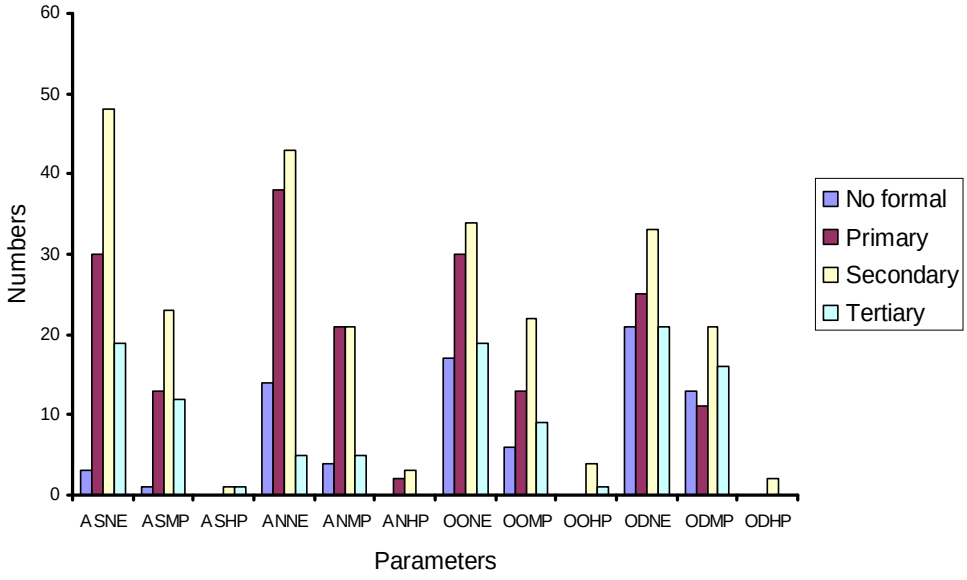

Figure 2: Prevalence of malaria and HIV infections in relation to educational status of respondents

Legend

ASNE – Number examined in Abeokuta South
ASMP – Malaria positive result in Abeokuta South
ASHP – HIV positive result in Abeokuta South
OONE – Number examined in Obafemi/Owode
OOMP – Malaria positive result in Obafemi/Owode
OOHP – HIV positive result in Obafemi/Owode
ANNE – Number examined in Abeokuta North
ANMP – Malaria positive result in Abeokuta North
ANHP – HIV positive result in Abeokuta North
ODNE – Number examined in Odeda
ODMP – Malaria positive result in Odeda
ODHP – HIV positive result in Odeda

DISCUSSION

The study had shown that the 53.5% prevalence of *Plasmodium falciparum* corroborates studies by Idowu *et al.* (2006) who earlier obtained 57.4% prevalence in certain parts of the Ogun State. The indication is that malaria is still endemic in Ogun State however with low parasite density. HIV prevalence from the study was 3.5%, which includes the urban and semi-urban centres.

It was observed from the study that all HIV positive respondents were also malaria positive. The association between HIV infection and malaria had been previously observed by Colenbunders, *et al*. (1990) in rural Rwanda and urban Congo, and Allen *et al.* (1991) who adduced that there is a significantly increased prevalence of malaria parasitaemia and fever in HIV-1-positive pregnant women.

The study noted the limitations in assessing differences in geographic distribution even when it observed varying distributions in the malaria and HIV prevalence levels. It is important for cautious efforts to be taken since geographic overlap may increase HIV spread from urban communities to semi-urban communities. On the prevalence of malaria and HIV among age groups, the study showed that age group 21-25yrs had highest number of positive cases. The observed age

Table 3: Knowledge and Perception of HIV and malaria diseases among pregnant women in the studied Local Government Areas

Variables assessed	Abeokuta South LG %	Abeokuta North LG %	Obafemi/ Owode LG %	Odeda LG %	Overall (%)
Knowledge about malaria transmission					
Mosquito bite	60	67	57	73	257 (64.25)
Stress	18	6	17	22	63 (15.75)
Exposure to sun	13	9	13	5	40 (10)
No idea	9	18	13	0	40 (10)
Knowledge about HIV transmission					
Sexual intercourse	46	40	40	49	175 (43.75)
Blood transfusion	11	3	3	9	26 (6.5)
Sharp objects	20	16	21	21	78 (19.5)
No idea	23	41	36	21	121 (30.75)
How do you feel being HIV positive					
Not happy	50	50	67	100	267 (66.75)
Neglected	50	0	33	0	83 (20.75)
Will of God	0	25	0	0	25 (6.25)
Not concerned	0	25	0	0	25 (6.25)
Are you on Antiretroviral (ARV)					
Yes	50	67	75	100	292 (73)
No	50	33	25	0	108 (27)
If No, why					
Very expensive	50	100	33	0	183 (45.6)
Not available	50	0	67	0	117 (29.3)
Effect of antiretroviral					
Drowsiness	33	33	14	100	180 (45)
Weak and tired	0	67	72	0	139 (34.75)
No effect	67	0	14	0	81 (20.25)
Drug of choice for malaria treatment					
Chloroquine	58	48	52	96	259 (63.5)
Fansidar	8	12	0	0	20 (5.0)
Herbs	10	26	48	4	88 (22.0)
Paracetamol	24	14	0	0	38 (9.5)
Regular usage of drugs					
Yes	96	97	94	87	374 (93.5)
No	4	3	6	13	26 (6.5)

groups had been shown to be more sexually active. Also, multigravids were more infected than primigravids; while married women accounted for 78% of the multigravid population.

Chloroquine was observed from the study to be the drug of choice. This may be due to the high antenatal clinic attendance which had created the level of consciousness among respondents. WHO/AFRO (2003) reported that chloroquine remains the most widely used malaria prophylactic drugs in tropical Africa; followed by herbs since traditional medicine is widely used to treat malaria, and is often more available and affordable than western medicine (Merlin and Gerard, 2004).

Observation from the study showed that about 70.6% of HIV positive respondents are currently on antiretroviral drugs with 45% of respondents claiming that ARV drugs are expensive. On the psychological effect of HIV infection, 66% HIV positive respondents are not happy about their status in addition to neglect by family and friends. The issue of stigmatization creates a suicide intention among some positive cases. However, the knowledge and perception of malaria and HIV infection among the study population is encouraging considering that health education is a key factor in the control and prevention of communicable diseases. With the low prevalence of HIV from the study, there is the need for a sustainable control programme to monitor malaria infection and its interaction with HIV, thereby reducing burden of disease and attendant high cost of treatment. This is in addition to screening fully all blood for transfusion, and continuous public enlightenment of both diseases which would be effective in interrupting transmission of both infections.

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