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Knowledge, attitudes and practices regarding malaria in people living with HIV in rural and urban Ghana

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ABSTRACT

Background: One of the malaria vulnerable groups is people living with HIV. This study investigated knowledge, attitude and practices (KAP) towards malaria in people living with HIV attending anti-retroviral therapy (ART) clinics in rural and urban Ghana.

Methods: In this descriptive cross-sectional study patients attending the ART clinics in Atibie (rural area) and Accra (urban area) were interviewed on their knowledge, attitude and practices regarding malaria. Finger-prick capillary blood was tested for *Plasmodium* spp. with rapid diagnostic tests. Multivariate regression analysis was used to determine the influence of KAP on malaria prevalence.

Results: Parasitemia was generally more frequent among HIV positive individuals in the rural area (29/116; 25%) in the rural area than in the urban area (35/350; 10%). Inaccurate knowledge of cause of malaria and prevention methods were associated with increased odds of malaria parasitemia; [OR = 1.51 (CI: 1.29–5.12); $p < .05$] and [OR = 2.59 (CI: 2.53–4.75); $p < .05$], respectively. There were disparities in socio-economic factors. For instance, low level of education was higher in the rural area (45/116; 38.8%) compared to the urban area (121/350; 34.6%).

Conclusions: Malaria control efforts may yield further results when the knowledge and socio-economic gap between rural and urban areas is closed.

1. Introduction

Malaria has been shown to increase the spread and progression of HIV whilst HIV also increases the frequency and severity of malaria (González et al., 2012; Laufer and Plowe, 2007; Abu-Raddad et al., 2006). Malaria patterns have also been observed to differ between HIV-infected patients and HIV-uninfected patients (Flateau et al., 2011). Where interaction between these two is observed, it will be advantageous if malaria and HIV are considered together in intervention programs (Herrero et al., 2007).

Over the past 17 years, there has been a reported decline in malaria worldwide, including Ghana (Baiden et al., 2014; Koram et al., 2000; USAID, 2015) where extensive studies of knowledge, attitude and practices (KAP) of the population have informed and shaped intervention policies. This has led to the development of various communication strategies to improve KAP by enhancing health education (Ghana Statistical Service, 2015). Yet, KAP studies of malaria specifically in people living with HIV are scanty; and as such very little of these interventions focus on them. Apart from the free administration of co-trimoxazole in tandem with anti-retroviral therapy (ART) to prevent opportunistic infections including malaria and bacterial infections, there is no further focus on this malaria-vulnerable population, with regards to interventions. The precarious nature of the interaction between HIV and malaria demands special focus on people living with HIV in order to make interventions that are tailor-made to suit their particular needs available.

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This paper reports the results of knowledge, attitudes, and practices study conducted in ART clinics in Kwahu-South District in rural Ghana, and the Accra Metropolis District in urban Ghana.

2. Materials and methods

2.1. Study area and population

This study was part of a bigger cross-sectional research conducted in Kwahu Government Hospital, a rural district hospital in the Kwahu-South district in the Eastern region of Ghana (Owusu et al., 2016; Owusu et al., 2017) as well as Ridge Regional Hospital, an urban regional hospital in Accra (Greater Accra region) to obtain baseline data on malaria and its interaction with sickle cell disease (SCD) and HIV. Data was collected between September 2013 and August 2015.

The prevalence of HIV in Greater Accra region is 2.4% and in Eastern region is 2.6% (Ghana AIDS Commission, 2017). All ART clinics in Ghana provide patient care for people living with HIV, as well as free anti-retrovirals and co-trimoxazole prophylaxis. Across the country, 83,712 people living with HIV are on anti-retrovirals which represents about 65.6% of those in need of anti-retrovirals (Ghana AIDS Commission, 2014). Antiretroviral therapy is initiated when CD4 count is less than 350 cells/ml and/or patient is symptomatic with HIV infection in WHO clinical stages 3 and 4 (National Aids Control Program, 2010). ART services are currently being provided by 196 health facilities. The Kwahu Government Hospital runs an ART clinic, which provides care to HIV patients from the entire district, as well as neighbouring ones. It is located in the tropical rainforest malaria-epidemiological zone. Ridge Regional Hospital, which also has an ART clinic, is one of the four government hospitals in the country's capital, Accra. It is located in the coastal savannah and mangrove malaria-epidemiological zone.

For this survey, we included all patients participating in the main study who presented at the ART clinic for the first time during study period. As such none was on co-trimoxazole prophylaxis yet. For sample size determination, the formula $n = t2 \times p\ (1 - p)/m^2$ was used with confidence level t = 95%, margin of error m = 0.05. P was malaria prevalence of 27.5%. A total of 466 participants were questionnaire interviewed (116 in Mpraeso and 350 in Accra).

2.2. Data collection

We collected socio-demographic information as well as information on knowledge, attitudes and practices of participants using a structured questionnaire which was modelled in English and translated into the local languages of Twi (in Kwahu-South) and Ga (in Accra). After pre-testing the questionnaire on 10 people, it was revised by two investigators (EDAO and CB) for clarity. Responses from pre-testing were excluded from the final study results. Eight data collectors were trained on how to approach potential participants and explain the questionnaire contents. The interviewer fitted the responses to the response options using numeric labelling as the structured questionnaire was administered to participants. The first part of the questionnaire consisted of socio-demographic information, e.g. age, sex, education and possession of health insurance. The second part determined the knowledge and awareness of participants where malaria was concerned. Questions included cause of malaria, signs and symptoms and malaria prevention methods. The third part sought to find out the attitude of participants towards malaria, for instance whether they would buy and use insecticide wall paint, and also whether they would use malaria rapid diagnostic test kits (RDT) in their homes. The fourth part included questions on their practices such as whether they slept under insecticide treated mosquito nets (ITN), and which of the preventive methods they used. The second to fourth parts consisted of 5 questions each. Parents or guardians of participants under 18 years of age responded to questions on their behalf. For quality assurance, the primary investigator re-administered questionnaires to randomly selected 5% of previously interviewed participants. There were 5 discordant results, all of which were excluded from the study. Incompletely filled questionnaires were excluded from the study.

For malaria screening, finger-prick capillary blood of patients was tested with malaria rapid diagnostic test (RDT) First Response® Malaria Ag *P. falciparum* (HRP2). Those who tested positive were referred to the attending physician for malaria treatment according to the national recommendations (MOH, 2014a). Management of malaria in Ghana requires diagnosis either by RDT or microscopy; thereafter, treatment with an artemisinin combination therapy (ACT), namely either artesunate-amodiaquine (AS + AQ), artemether-lumefantrine (A-L) or dihydroartemisinin-piperaquine (DHAP) as first-line drug combinations (DFID, 2011). If these fail, second-line drug, oral Quinine (QN) for 7 days, is used (DFID, 2011; MOH, 2014b).

2.3. Data analysis

Double-entry of data was done with Microsoft Office Excel® 2010 (Microsoft Corporation, USA) and statistical analyses performed with STATA® 14 (StataCorp., College Station, TX, USA). Multivariate regression analysis was used in determining whether primary outcome of malaria parasitemia was influenced by several independent variables such as knowledge of the cause of malaria, symptoms of malaria and prevention methods, as well as the use of ITN, after adjusting for potential confounders such as age and sex and level of education. Chi square was used to compare between rural and urban areas, Fischer's test was used where values were less than 5. The Bonferroni rule was applied where multiple comparisons were made between rural and urban areas, otherwise p-value $< .05$ was used.

2.4. Ethical consideration

This study was approved by the Ghana Health Service (GHS-ERC: 08/07/13 and GHS-ERC: 02/03/14). Informed written consent were obtained from the participants or their guardians. The Director of the National AIDS Control Program (NACP) and the Medical Directors of Ridge Regional Hospital and Kwahu Government Hospital gave permission for the study.

3. Results

The socio-demographic characteristics of participants in the rural and urban areas are shown in Table 1. In both rural and urban areas, female participants living with HIV [63/116 (54.3%) and 189/350 (54%), respectively] outnumbered male participants (53/116, 45.7% and 161/350, 46% respectively). Apart from students, the most common occupation of participants in both rural (30/116; 25.9%) and urban areas (94/350; 26.9%) was trading. White collar jobs were more common in urban participants (9/116; 7.8% in rural and 42/350; 12% in urban areas). Lack of formal education was higher in the rural area both in participants with HIV (45/116; 38.8%); compared to those in the urban area (121/350; 34.6%). More people in the urban area (94/350; 26.9%) than in the rural area (26/116; 22.4%) had some form of insurance, either the national health insurance scheme (NHIS) or a private one. In the rural study, parasitemia was more prevalent (29/116; 25%); compared to those in the urban area (35/350; 10%).

3.1. Knowledge and awareness

The knowledge and awareness of HIV positive and negative participants in rural and urban areas are summarized in Table 2. In general, knowledge of participants in the urban area was higher than in the rural area. No one in the urban area thought malaria was caused by a curse. Yet 5 rural participants (4.3%) said malaria was caused by a curse. However, the knowledge of ACT being the treatment for malaria was