



Adherence to malaria prophylaxis among Peace Corps Volunteers in the Africa region, 2013



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Summary *Background:* Although malaria can be prevented with prophylaxis, it is diagnosed in over 100 Africa-region Peace Corps Volunteers annually. This suggests that prophylaxis non-adherence is a problem in these non-immune travelers.

Methods: We investigated Volunteers' knowledge, attitudes, and practices regarding prophylaxis using an internet-based survey during August 19–September 30, 2013. Adherence was defined as taking doxycycline or atovaquone–proguanil daily, or taking mefloquine doses no more than 8 days apart.

Results: The survey was sent to 3248 Volunteers. Of 781 whose responses were analyzed, 514 (73%) reported adherence to prophylaxis. The most common reasons for non-adherence were forgetting ($n = 530$, 90%); fear of long-term adverse effects (LTAEs; $n = 316$, 54%); and experiencing adverse events that Volunteers attributed to prophylaxis ($n = 297$, 51%). Two hundred fourteen (27%) Volunteers reported not worrying about malaria. On multivariate analysis controlling for sex and experiencing adverse events Volunteers attributed to prophylaxis, the factor most strongly associated with non-adherence was being prescribed mefloquine (OR 5.4, 95% confidence interval 3.2–9.0).

Conclusions: We found moderate adherence and a prevailing fear of LTAEs among Volunteers. Strategies to improve prophylaxis adherence may include medication reminders, increasing education about prophylaxis safety and malaria risk, and promoting prompt management of prophylaxis side effects.

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1. Background

Since 1961, over 215,000 Peace Corps Volunteers (Volunteers) have served worldwide, 46% of them in Africa. Most Volunteer deployments last 27 months. As long-term travelers to this area, Africa-region Volunteers are at high risk for malaria infection. Peace Corps policy requires Volunteers in malaria-endemic countries to take malaria prophylaxis. However, malaria is diagnosed in over 100 Africa-region Volunteers each year, suggesting that non-adherence to prophylaxis is a problem in this population of non-immune travelers.

Concerns about adverse effects of prophylaxis, which are reported by many Volunteers and other travelers to malaria-endemic areas, are suspected to play a large role in non-adherence. In a cross-sectional study of 2701 Volunteers conducted between 2005 and 2006, 62% of respondents reported having a side effect that they attributed to prophylaxis, and 28% reported changing prophylaxis as a result [1]. In a 2003 randomized, double-blinded, placebo-controlled study of 623 non-immune, short-term travelers to sub-Saharan Africa, 85% of participants reported a side effect of prophylaxis [2]. It is unclear what proportion of symptoms attributed to prophylaxis are truly side effects of the medicine rather than normal events related to long-term travel: in a randomized, double-blinded, placebo-controlled study of mefloquine versus atovaquone–proguanil in 1013 patients presenting to travel clinics in 1999, 62% of treatment-emergent adverse effects were determined by the investigators to be unrelated to the study drug [3]. Studies of adherence to long-term malaria prophylaxis in populations of travelers have shown that adherence is poor overall, and that fear of long-term adverse effects (LTAEs), conflicting advice, and complicated or daily dosing strategies are common reasons for non-adherence [4,5].

The U.S. Centers for Disease Control (CDC)-recommended options for prophylaxis in Africa are mefloquine, doxycycline, and atovaquone–proguanil (Malarone™). From as early as 1995 until 2012, Peace Corps policy recommended mefloquine as the drug of choice for Volunteers without a history of psychiatric illness serving in Africa region countries. In December 2012, in response to concerns on mefloquine safety expressed by some Volunteers, and in hopes of increasing overall adherence, the policy was changed to make all prophylaxis options equally available. Peace Corps Medical Officers (PCMOs) are responsible for Volunteer education pre-deployment about the use and importance of uninterrupted prophylaxis, selection of prophylaxis, and management of long-term use of prophylaxis for the duration of Volunteers' service [6]. They are instructed to individualize their choice of agent based on area-specific recommendations (e.g., some Volunteers serve in regions where CDC does not recommend malaria prophylaxis), drug contraindications and precautions, drug tolerance, and dosing schedules. According to Peace Corps policy, Volunteers non-adherent to prophylaxis can be terminated from their Peace Corps service. Peace Corps has followed this policy.

Between July 7 and September 30, 2013, CDC conducted qualitative and quantitative evaluations among active

Volunteers with the aim of identifying risk factors for non-adherence to malaria prophylaxis. We present the findings of the quantitative evaluation.

2. Methods

In July 2013, we conducted focus-group discussions with convenience samples of 30 active, consenting Volunteers in Zambia, a country with high rates of malaria among Volunteers (3.9 cases per 100 Volunteer years in 2012 [7]), and Senegal, a country with low rates of malaria among Volunteers (0.8 cases per 100 Volunteer years in 2012). We also conducted interviews with these countries' PCMOs and each country's Peace Corps directorship. Content of these evaluations centered around participants' views on and personal experience with malaria and malaria prophylaxis, sources for health advice, views on Peace Corps administration policies, and Volunteer-PCMO relationships. CDC staff used transcripts of these discussions to develop an internet-based survey using SurveyMonkey (SurveyMonkey, Palo Alto, CA). A survey was deployed August 19, 2013 by the Peace Corps offices of all 23 countries with active posts in the Africa region to all active Volunteers in-country. The survey was open until September 30, 2013, and completed anonymously by consenting Volunteers.

The survey contained questions on currently prescribed malaria prophylaxis and dosing; current symptoms attributed to prophylaxis and feared LTAEs (adverse effects occurring after Peace Corps as a result of taking prophylaxis during Peace Corps); reasons for taking, not taking, or changing prophylaxis; malaria diagnosis, testing, and care history during Peace Corps service; knowledge and attitudes related to Peace Corps policies regarding non-adherence, malaria, and medication in general; country/region of service; use of tobacco and recreational drugs, and general demographics. Peace Corps-Headquarters provided aggregate, anonymous demographic data on Volunteers in countries where the survey was implemented. These data included median age, gender distribution, number of first- and second-year Volunteers in each country, and case rates of laboratory-confirmed malaria from the year 2012.

Responses were received from Volunteers serving in all countries in the region, including six countries where malaria endemicity is non-uniform enough that CDC's prophylaxis recommendations vary within the country: Ethiopia, Kenya, Tanzania, Namibia, Botswana, South Africa. Although Peace Corps recommends malaria prophylaxis for all Volunteers serving in Ethiopia, Tanzania, and Kenya, Volunteers in all six of these countries may have had contact with people who were appropriately counseled not to take prophylaxis. Because this might have affected their attitudes toward prophylaxis, we excluded all respondents from these six countries.

Descriptive analysis was conducted using SAS 9.3 (SAS Institute, Cary, NC). Adverse events were grouped by organ system for portions of the analysis: neuropsychiatric symptoms were defined as nightmares/vivid dreams, anxiety, insomnia, dizziness/vertigo, depression, limb numbness, psychosis, headache, and tinnitus; gastrointestinal symptoms were defined as heartburn, nausea/vomiting,

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