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Knowledge, attitude and practice about malaria in south-western Saudi Arabia: A household-based cross-sectional survey

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ABSTRACT

This study aimed to assess the level of knowledge, attitudes, and practices (KAP) concerning malaria and malaria prevention among rural populations residing in the southwestern region of Saudi Arabia. This was a household-based cross-sectional survey, using structured questionnaire that was developed and distributed among households selected randomly from 19 villages (clusters) located in a southwestern region of Saudi Arabia, north of the border with Yemen. The data collected were analyzed using SPSS version 20. A majority of respondents (98.4%) reported that they had heard about malaria, but only 21.7% reported that they had sufficient information about the disease. Surprisingly, the most popular source of information was the internet and social media (proportion responding positively in parenthesis) (25.5%), followed by family (21.7%), while information from health facilities contributed only 12.4%. A majority of respondents were aware that malaria is a communicable (89.1%) and deadly (70%) disease; however, only 30.2% of the respondents responded that malaria is a treatable disease. Almost all of the aware respondents (97.5%) were inclined to seek treatment from health facilities, and 63.2% preferred to seek treatment within 24 h of presenting with symptoms. Regarding personal precautions, the most common practice adopted by respondents was indoor residual spraying IRS (47.3%), followed by anti-mosquito spraying (29.8%), mosquito bed nets (13.2%) and combined anti-mosquito sprays and nets on windows (4.7%). This KAP study did not show any statistically significant differences in KAP due to age; however the practices of preventive measures against malaria differed significantly by nationality (Saudi versus non-Saudi). We conclude that most populations living in the villages have an acceptable level of knowledge and awareness about malaria and seek timely treatment. However, the positive attitudes and practices in relation to personal protection and prevention measures against malaria require marked improvement. The obvious gap between the knowledge and practice related to malaria prevention requires innovative strategies based on local evidence that well suits the local circumstances to promote and encourage the adoption and practice of personal protective measures.

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Abbreviations: KAP, knowledge, attitude, practices; SD, standard deviation; LSDI, Lubombo Spatial Development Initiative.

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Background

Malaria, a febrile illness affecting people of all age groups, is endemic in 109 countries, spanning all continents, with the exception of Australia and Antarctica [1]. It is often fatal in children under the age of five years; however, the mortality rate in adults is not as high because adults have a better immune response than children [1]. Approximately 300 million people are affected by malaria resulting in the deaths of 1–1.5 million people every year [2]. This preventable disease represents a dual burden in that it places an increased challenge on the health system and economic stress on individuals and the community as a whole [3]. *Plasmodium falciparum* is the predominant parasite strain causing malaria in Saudi Arabia and Yemen [5].

According to the World Health Organization's (WHO) the strategic plan for malaria control and elimination for the period 2006–2010 revealed that in the Eastern Mediterranean region, 6.1 million cases of malaria were reported in 2000, 4.5 million cases in 2003 and 2.7 million cases in 2005 [4]. Every year, 10.5 million cases and 49,000 deaths are reported in the Eastern Mediterranean region alone. Although Saudi Arabia has a low incidence of malaria overall, certain areas that share borders with other countries like Yemen where malaria is hyper endemic still have a high prevalence. Thus, in areas such as the Jazan region in the southwestern part of the country, malaria is still hyper-endemic for several reasons, including the climate that is conducive to mosquito breeding in addition to the continuous importation of malaria cases from Yemen [5].

Saudi Arabia is in the stages of malaria pre-elimination and elimination. The WHO report of 2010 documented a 50% reduction in malaria cases in the country between 2000 and 2009 showing good progress in the country's efforts to get rid of malaria [5]. Studies conducted in 2001 and 2006 indicated that the eastern province of Saudi Arabia is free of indigenous malaria transmission [6,7]. However, some official statistics show that malaria cases continue to be imported into the country. From the period 1990 up to and including 1999 the number of documented malaria cases in Saudi Arabia was 206 of which 93% were reportedly associated with a history of travel to the southwestern region of the kingdom [6]. From January 1994 to 2005 no indigenous cases were reported but approximately 56 cases of imported malaria were identified at a site in the eastern province of Saudi Arabia [7]. In 2013, the Saudi Ministry of Health (MoH) reported 2513 cases nationally, most of which occurred in the Jazan region [12]. The Jazan area is known for hyper-endemic transmission of malaria due to continuous importation of cases from Yemen. As the situation in Yemen continues to deteriorate, we believe that more cases will likely be imported from that area into Jazan in the near future.

Various studies have shown that improving community knowledge, attitudes and practices (KAP) can play an effective role in preventing and controlling febrile diseases such as malaria. For example, the Lubombo Spatial Development Initiative (LSDI) established a close collaboration between Mozambique, Swaziland and South Africa, which aim at controlling the spread of malaria in Africa. The study promoted the use of spraying indoor surfaces with insecticides (IRS) and successfully reduced the burden of malaria in this region [3,8]. Another LSDI study conducted in 2009 reported good knowledge of malaria among the participants and good IRS coverage in sentinel sites in Swaziland in compliance with WHO recommendations [9]. A study conducted in 2005 demonstrated a moderate-to-high level of awareness and a successful implementation of protective practices among study participants living in India [10]. A cross-sectional study of 1330 households in rural areas of Nepal conducted in 2004–2005 showed that 86% of participants had heard about malaria. However, they had limited knowledge about the preventive measures such that only 4% of the participants

demonstrated any knowledge of the importance of using insecticide impregnated bed nets and only 23% of these individual actually used nets [11].

Although numerous studies to assess the level of malaria KAP have been done in different regions of the world, to the best of our knowledge, no studies have been reported in the southern part of Saudi Arabia. Therefore, we conducted this household survey to assess the level of malaria KAP of the people living in southwestern Saudi Arabia. The ultimate goal was to provide local evidence to inform policy makers in developing strategies to reduce the incidence of malaria in this region. This study provides baseline data for future investigations regarding malaria prevention and control. The study findings also provide baseline data that could be used for evaluating the effectiveness of strategies following implementation of malaria control programs.

Methods

Study setting

The study was conducted in 19 villages (clusters) selected randomly in the Jazan region located in the southwest corner of Saudi Arabia. The area is located directly north of the border with Yemen, close to the Red Sea coast and occupies approximately 14,000 km². The population of Jazan is approximately 1.5 million people. Appendix A shows the maps of the study area.

Study design, data collection and ethical approval

This was a household based cross-sectional survey. A structured questionnaire was developed and administered to 258 selected households with a total of 1374 residents in the 19 cluster of randomly selected villages. The selected interviewee was the head of household; however, if they were not available on the interview date, any other adult older than 18 years was interviewed. The structured interview questionnaire was administered at the home of the respondent by a trained research team. The questionnaire contained 34 questions consisting of two parts. The first part was designed to obtain background information including demographic characteristics (age, gender, and relationship to the head of the family, number of family members, level of educational qualification, history of previous malaria infection and history of travel to endemic areas). The second part of the survey consisted of questions that addressed the KAP concerning malaria. The study proposal was approved by the Ethics Committee of Jazan University Medical Research Center, the institute that also provided us with the technical support to assist with data collection and data entry.

Data analysis

The data collected were analyzed using SPSS version 20. For categorical variables, data were presented as frequencies and percentages, while for continuous variables data were presented as mean \pm standard deviation (SD). The differences between respondents' characteristics were analyzed using chi-squared test, and *P*-values of ≤ 0.05 were considered statistically significant.

Results

Background of respondents

Table 1 shows the characteristics of the 258 respondents and their households. The mean age of respondents was 26.7 ± 16.6 years. A majority of respondents were male (93.8%), and more than two-fifths (41.5%) belonged to the 20- to 40-year-

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