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Malaria prevention among afghan refugees in a malarious area, southeastern Iran

Prévention du paludisme chez les réfugiés afghans dans une zone paludique au sud-est de l'Iran

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Abstract Each year, 24-36% of malaria cases in Beluchestan (area) occur among Afghani refugees. Knowledge about malaria transmission and protection are important for these refugees to enable local Health Services to manage malaria control in the area. Our objective was to explore and investigate knowledge, attitude and practices of Afghan refugees and Iranian residents with respect to malaria transmission and protection. A cross-sectional study was performed and 10% of target groups were selected by systematic random sampling and then interviewed. In this study, 385 Iranian and 390 Afghani refugees participated in the survey. Respondents answered questions about demographic characters, cause and transmission of malaria, belief about severity and complications of malaria, malaria mobility and health care-seeking behavior, perceived control of malaria prevention, beliefs about utility of bed nets, perceived susceptibility to malaria, and whether they use window-screens and bed nets. The majority of Iranians (76.6%) and Afghanis (60.1%) were familiar with typical symptoms of the malaria disease, but about 50% of each group did not know malaria transmission occurs by mosquito bites. About 90% of Afghanis stated they do not use personal protection against mosquito bites over night, while 60% of Iranians used bed net. Only one third of Afghani refugees use local Health Center services.
Conclusion: The cross-border traffic of Afghanis is an important factor for persistence of malaria in Baluchestan but based on our data, life style and protective behavior of refugees with regard to malaria protection are also important factors, particularly because they do not use local Health Services. Therefore, it is important to implement prevention education programs specifics to target Afghani refugees and to employ Afghani public health professionals to asset with elimination and treatment. ***Pour citer cette revue : Bull. Soc. Pathol. Exot. 103 (2010).***

Keywords Malaria protection · Bed net · Afghani refugees · Baluchestan · Iran · Middle South Asia

Résumé Chaque année, 24 à 36 % des cas de paludisme dans la région du Baloutchistan surviennent chez des réfugiés afghans. Il est important que ces réfugiés connaissent les mécanismes de transmission du paludisme et les moyens de protection, pour permettre aux services sanitaires locaux de combattre cette maladie dans la région. Notre objectif était d'examiner et d'analyser les connaissances, les attitudes et les pratiques des réfugiés afghans et des résidants iraniens concernant la transmission du paludisme et les moyens de protection. Une étude transversale a été conduite, et 10 % des groupes cibles ont été sélectionnés par échantillonnage aléatoire systématique, puis interrogés. Dans cette étude, 385 Iraniens et 390 réfugiés afghans ont participé à l'enquête. Les sujets ont répondu à des questions d'ordre démographique et sur la cause et la transmission du paludisme, les croyances sur la gravité et les complications du paludisme, la mobilité du paludisme et la recherche de soins, la façon dont est perçue la prévention du paludisme, les croyances sur l'utilité des moustiquaires, la sensibilité subjective au paludisme et l'utilisation ou non de volets et de moustiquaires. La majorité des Iraniens (76,6 %) et des Afghans (60,1 %) connaissaient les symptômes typiques du paludisme, mais environ 50 % dans chaque groupe ignoraient que le paludisme se transmet par des piqûres de moustique. Environ, 90 % des Afghans ont déclaré ne pas utiliser de protection personnelle contre les piqûres de moustique pendant la nuit, tandis que 60 % des Iraniens utilisaient des moustiquaires. Seul un tiers des réfugiés afghans avaient recours aux

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services sanitaires locaux.
Conclusion : Le trafic transfrontalier des Afghans est un important facteur de persistance du paludisme au Baloutchistan, mais, d'après nos données, le mode de vie et le comportement des réfugiés en ce qui concerne la protection antipaludique sont également des facteurs importants, en particulier parce qu'ils n'utilisent pas les services sanitaires locaux. Il est donc important de mettre en œuvre des programmes spécifiques d'éducation à la prévention visant les réfugiés afghans, et d'employer des professionnels de santé publique afghans pour favoriser le traitement et l'éradication. ***To cite this journal: Bull. Soc. Pathol. Exot. 103 (2010).***

Mots clés Protection contre le paludisme · Moustiquaire · Réfugiés afghans · Baluchistan · Iran · Moyen-Orient

Introduction

Nearly 7.3% of malaria cases in the world occur in the East Mediterranean Region (EMRO) and the greatest number of cases in this region occurs in Sudan, Afghanistan, Somalia and Yemen. All of these countries have recently experienced war or civil strife, which has effected on efficacy of their health services and particularly their malaria management programs and resulted in large movements of displaced populations [6]. The distribution and incidence of malaria, as for often communicable diseases, can be affected by dispersal of refugees from one country to another in various ways. Refugees may transport malaria parasites from an endemic area to the host country or they may be more vulnerable when coming from a non-endemic area to an endemic area where they may lack natural immunity to local strains. Epidemic conditions may arise when non-immune immigrants are settled onto sites capable of supporting mosquito breeding [3]. The 23-year conflict in Afghanistan has caused one third of the Afghan population (about 6.2 millions) fled the war to Pakistan and Iran [9].

Malaria is one of the most prevalent endemic diseases in the south, and especially southeastern Iran. There are 18000 to 22000 positive cases reported each year nearly 53% of them in Sistan-Baluchestan province. About 20% to 30% of annual, malaria cases which occur in Sistan-Baluchestan, are Afghani refugees [7].

When the refugees arrived in Baluchestan, malaria was highly endemic, and the health system was unable to cope with the influx. Generally, the Islamic Republic of Iran hosts approximately 1.5-2 million Afghani refugees. They live in camps as well as being dispersed among the general population [5]. An estimated 325000 of the refugees are scattered throughout Sistan-Baluchestan province [4]. Afghani refugees are well settled in urban and rural areas of Baluchestan, but with the long border of this province with Afghanistan and Pakistan, cross-border traffic in this area is a prime factor for persistence of the diseases (7). Education and health system in Afghanistan have been extremely effected by war and civil strife [2], for that reason, illiteracy relatively was high among Afghani refugees.

Transmission of malaria in south and southwestern Iran is seasonal, with two peaks per year. *Plasmodium vivax* is dominant, for more than 82% of cases while about 17% of cases reported are *P. falciparum* malaria [1]. Responsibility for malaria in integrated any different levels of the health care workers are especially among primary health care workers. They identify malaria cases/treatment and are responsible for vector control programs. Before integrating the health services and malaria control programs, knowledge of the residents in Sistan-Baluchestan was poor with respect to malaria [12]. Another study was carried out on knowledge, practice of women relative to malaria prevention in that province [8]. This study showed that women in urban (52.7%) and rural (73.8%) areas never used bed nets mainly because of lack of awareness about transmission of malaria.

The objectives of our study were to explore and investigate knowledge, attitude and practices (KAP) of Afghan refugees and to compare these results with Iranian residents about malaria transmission and protection where they live an endemic area. The results will be helpful to develop a program for control and prevention of malaria among Afghan refugees.

Methods

Study area

This study was performed in Iranshahr district, Sistan-Baluchestan province. The study area is located between latitude 27°50′-26°45′N and longitude 56°00′- 61°60′E in southeastern Iran and has a long border with Pakistan (Fig. 1). The temperature reaches to maximum 35°C in highlands and to 45°C in plan areas during summer but it rarely decline to 5-10°C during winter. The annual rainfall ranged from 80 to 100 mm. Population of Iranshahr estimated to be about 275000 and officially near 26000 Afghani refugees living in this area during this study.

Iranshahr district is an important endemic area in southern Iran, with high risk of disease transmission. Based on a report by local Health Authority, the severity of malaria among Afghani was higher than among Iranian residents, whereas 25% - 36% of total malaria cases per year were in refugees.

Sampling technique

Qualitative and quantitative approaches to undertaking, exploring and developing theory were inductive (bringing

Fig. 1 Location of the study area in southeastern Iran / *Zone de l'étude, sud-est de l'Iran*

knowledge into view) and deductive, and we attempted to capture views, opinions and experiences. A cross-sectional study was designed for the study area and served by PHC. Ten percent of target groups were selected by systematic random sampling interviewed for KAP. Structure interview forms were obtained from Afghan refugees and Iranian residents. The Structure interview form was explained to PHC staff in advance. The completed forms and records were then checked and collected by technicians at the Health Research Center of Iranshahr (School of Public Health and Institute of Public Health, Tehran University of Medical sciences).

Data collection, methods, instruments used, measurements

Structure questions consisted of open and closed questions and was designed in several parts, including client details, history of malaria infection and treatments, habitation, mobility, self protection used, facilities, access to health services (in Afghanistan, Iran). The questionnaire was in Farsi language and so a few questions were expanded and broken into two questions in order to make them more understood by local people. The final questionnaire consisted of 46 questions. Eight questions were for demographic and background data. The remaining 39 questions were designed to assess subjects' knowledge about routes of transmission, control measures and signs and symptoms of malaria, their perceptions of their susceptibility to malaria and the severity of the disease; and their practice of malaria prevention measures, including sources of information about the disease. The interviews were conducted in the native language and dialects by questioners.

The validity of questions was checked in Statistics Department, School of Public Health, Tehran University of Medical Sciences. Data were analyzed under supervision of the Statistics Department, School of Public Health.

Results

In this study, 775 questionnaires were completed, 385 from Iranian residents and 390 from Afghani refugees. Participants consisted of 426 (55%) men and 349 (45%) women from both groups. The mean (SD) age of subjects was 29.6 (14.2) years at ranging from 14 to 80 years. There were differences between Iranian and Afghani participants with respect to ratio of illiteracy. About one-fifth of Iranian participants were illiterate, while nearly three-quarter of Afghanis were illiterate. The demographic characteristics are presented in Table 1. The majority of participants from both groups were familiar with malaria symptoms. Fever, chill and muscle ache were the most frequently signs of malaria reported by both Iranians and Afghanis, but overall had significantly differences between both groups (χ^2 = 245.7, $p < 0.001$). However the most familiar symptom was fever by 83.1% from Iranians and 76.1% from Afghanis (Table 2).

The majority of participants in both groups knew that mosquitoes transmit malaria significantly more Iranian residents (χ^2 = 142.2, $p < 0.001$) believed that transmission of the disease was the result of mosquito bites (Table 2).

Malaria was thought to be preventable by 88.6% Iranians and 87.1% of Afghanis (Table 3). Among those in both groups who believed that malaria is preventable, the majority of Iranians (77.1%) but not Afghanis mentioned self-protection using bed nets, while 71% of Afghanis did not believe anything was available for self-protection. Unexpectedly, about 90% of both groups stated that residual insecticide is the best way to control malaria and its vectors (Table 3).

Iranians and Afghanis differed significantly in their behavior regarding to mosquito biting prevention. Only 4.6% of Afghani participants reported constantly using mosquito nets, while 22.6% of Iranian used this method of preventions (Table 3).

Discussion

The majority of Afghani refugees were illiterate or poorly educated and this most probably is due to occurrence of

Table 1 Main demographic characteristics of Iranian and Afghanis participants / *Principales caractéristiques démographiques des Iraniens et des Afghans participant à l'étude*

Characteristic	Iranian residents		Afghani refugees	
	No.	%	No.	%
Sex				
Males	251	65.2	175	44.9
Females	134	38.8	215	55.1
Age (years)				
< 25	150	39.0	233	59.8
26-45	173	44.9	112	28.7
46+	62	16.1	45	11.5
Education level				
Illiterate	81	21.0	281	72.0
Primary school	108	28.1	92	23.6
High school	142	36.9	14	3.6
University	54	14.0	3	0.8

Table 2 Knowledge of Iranian and Afghani participants about symptoms and cause of malaria / *Connaissance des symptômes et des causes du paludisme chez les Iraniens et les Afghans participant à l'étude*

Variables	Iranian residents		Afghani refugees		Total responds
	Frequency	%	Frequency	%	
Symptom					
Fever	320	83.1	297	76.1	617
Chill	279	72.5	245	62.8	524
Muscle ache	163	42.3	63	16.2	226
Vomiting	68	17.7	26	6.7	94
Cough	43	11.2	7	1.8	50
Diarrhea & abdominal pain	56	14.5	6	1.5	62
Others	2	0.5	53	13.6	55
Cause					
Contaminated water	104	27.0	39	10.0	143
Mosquito bites	336	87.3	258	66.2	594
Contaminated food	10	2.6	30	7.7	40
Others	5	1.3	87	22.3	92

n = total number of respondents

several decays war in Afghanistan. Therefore, to give hand out, brochures, or pamphlets to Afghani may be useless to increase awareness of them regarding to malaria protection and vector control. Thus, health workers at different levels of the health care delivery system should disseminate relevant information about malaria and mosquito vector directly within the community. They also need to encourage Afghani communities with a view to extend control measures beyond treatment to other issues, including environmental management and insecticide-treated bed nets. In addition, the culture and language of Afghani refugees are different from Baluchi residents so they may be less inclined to become involved in local Health Services programs.

Although we found that awareness of Iranian and Afghani about the symptoms of malaria was significantly different and Iranian residents knew more about malaria in general, most respondents in both groups were familiar with at least one of the classical symptoms.

The majority of participants knew that malaria was transmitted by mosquito bites, but the number of Iranian respondent was significantly higher than Afghanis. More Beluchi people attended to local Health Services for treatment for

Table 3 Attitude of Iranian and Afghani participants regarding to preventive of malaria and vector control measurements / *Attitude des Iraniens et des Afghans participant à l'étude à propos des mesures de prévention contre le paludisme et de lutte antivectorielle*

Variables	Iranian residents		Afghani refugees	
	Frequency	%	Frequency	%
Malaria is preventable				
Agree	341	88.6	337	86.4
Disagree	10	2.6	4	1.0
Don't know	34	8.8	49	12.6
Self protection				
Chemoprophylaxis	21	5.5	22	5.6
Mosquito net	284	73.8	64	16.4
Nothings	72	18.7	277	71.0
Others	8	2.0	27	6.9
Control measures				
Residual insecticide spraying	354	91.9	353	90.5
Elimination mosquito breeding places	340	88.3	320	82.1
Use of bed net				
Yes	87	22.6	18	4.6
No	239	62.1	350	89.7
Sometimes	59	15.3	22	5.6

malaria; therefore they had a better chance to get health education directly from Health workers in their native languages.

In addition, 77.1% of the native resident believed bed nets to be effective in preventing malaria transmission, while the majority of Afghani participants did not believe self-protection to be effective (Table 3). Similar beliefs and behavior were previously reported in Afghanistan [10]. Nevertheless, the majority of participants and particularly Afghanis did not use bet nets or even window screen. Thus their knowledge about mosquito bite and protection against malaria transmission was not transferred to affect on prevention behavior. In pervious study, similar results were found among women in Sistan-Bluchestan province [8]. They explained that the people avoided using bed net because of hot weather during night. It is also possible that for Afghanis malaria is not a major health problem. It is important to understand the reasons for this so that appropriate methods to educate the public may be implemented.

Most refugees had unequipped shelters and stated that they sleep indoors without screen and any self-protection. Malaria transmission occurs during 9-10 months in Baluchestan and is transmitted mainly by *Anopheles culicifacies*, and *A. stephensi* vectors. These two Anopheleses are mostly endophilic and endophagous [11] and therefore the Afghanis are more exposed to mosquito attack. This reason, as well as assessing their behavior for treatment, may imply why malaria occur more in Afghani.

Conclusion

However, cross-border traffic of Afghanis such as population movements in malarious countries, is an important factor for persistence of malaria in Sistan-Baluchestan area; Baluchi people (native residents) also cross the border to Pakistan for trade as well as to visit relatives. Therefore, life style travel and absents of preventive behavior among Afghanis should be addressed to reduce the number of malaria cases among this population in an endemic area.

Thus, effective communication among the health care providers and the Afghani community will help community members to be involved more in malaria control. All these depend in part on providing people with relevant information on malaria transmission, treatment and prevention. The results of our study have helped to determine the educational needs for target people and particularly Afghan refugees and some of the affiliated factors in malaria prevention behavior.

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Conflit d'intérêt : aucun.

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