



## Letter to Editor

## Asian Pacific Journal of Tropical Medicine

journal homepage: www.apjtm.org



doi: 10.4103/1995–7645.284647

Impact Factor: 1.77

## Non–Iranian travelers may threaten malaria elimination in Iran

Shahrzad Soltani, Masoud Foroutan<sup>✉</sup>, Aliasghar Valipour, Zolfaghar Sabati, Fatemeh Hallajian

Student Research Committee, Abadan Faculty of Medical Sciences, Abadan, Iran

Iran is considered as one of the malaria-endemic countries in the globe. It is estimated that approximately 80% of malaria infections happen only in two provinces, Sistan-Baluchestan and Hormozgan provinces (in southeast and south of Iran, respectively)[1]. Based on formal reports, Iran is in the pre-elimination phase of the infection and elimination of malaria is the final goal, which is targeted by 2020[2]. The total positive clinical cases dropped from 15 378 to 960 between 2002 and 2017 in the country[1]. There are seven anopheline species as primary or secondary vectors of malaria in Iran including, *Anophele (An.) culicifacies* Giles (s.l.), *An. dthali* Patton, *An. fluviatilis* James (s.l.), *An. maculipennis* Meigen (s.l.), *An. sacharovi* Favre, *An. stephensi* Liston and *An. superpictus* Grassi (s.l.). These suitable vectors exist in several provinces[3].

In Iran, the first malaria-training course for antimalarial campaign was launched in 1945 and subsequently was continued between 1948-1956 with several control programs which resulted in significant reduction in malaria infection. In addition, the malaria eradication program was initiated from 1957 and continued till present[4]. It should be noted that a declining trend was observed in terms of malaria incidence in our country, Iran. However, despite continuous efforts and national investments in the past six decades, malaria may appear in some areas as a public health concern[1,4]. However, to achieve malaria elimination, we need to monitor malaria infection among residents of endemic areas and also in immigrants/travelers of border cities. Hence, a descriptive cross-sectional investigation was done in the border regions of Abadan and Khorramshahr counties in Khuzestan province (southwest of Iran) during 2013-2018. The current study aimed to describe the epidemiological aspects of malaria infections in malaria-elimination program regions of southwest Iran.

During the years, a total of 9 517 persons were included in the surveillance program. Briefly, after physical examination by trained physicians, blood samples were taken. One drop of blood sample was placed on a microscopic slide and after Giemsa staining, was examined using light microscope to detect *Plasmodium* parasites. In addition, a structured questionnaire, including some demographic

details, was filled out for each participant. All subjects voluntarily agreed to be tested. An informed consent was obtained from adult persons and parent or guardian of children less than 15 years old. This study received the approval from the Abadan Faculty of Medical Sciences Ethical Committee (IR.ABADANUMS.REC.1397.027).

Upon analysis, only two subjects were found positive (2/9 517; 0.021%) for *Plasmodium* species as follows:

Case 1: Gender: Male; Age: 26 years old; Education level: diploma or lower; Nationality: Pakistani; Country of origin: Pakistan; Job: farmer; Causative agent: *Plasmodium (P.) vivax*; Clinical symptoms/signs: fever and chills; Rapid diagnostic test (RDT): positive.

Case 2: Gender: Male; Age: 35 years old; Education level: diploma or lower; Nationality: Pakistani; Country of origin: Pakistan; Job: laborer; Causative agent: *P. falciparum*; Clinical symptoms/signs: none; RDT: positive.

The infected persons were from Pakistan who have traveled to Iraq for visiting the holy shrines as pilgrims. Thus, both infections were categorized as imported malaria. Moreover, two positive cases were identified in a healthcare center located in the border region of Khorramshahr town (southwest of Iran) and Iraq during November 2017.

Although new positive malaria cases have been observed during past years throughout Iran, the current situation represents a satisfactory elimination in most provinces of the country. Malaria incidence decreased from 0.24/1 000 cases in 2002 to 0.01/1 000

<sup>✉</sup>To whom correspondence may be addressed. E-mail: masoud\_foroutan\_rad@yahoo.com

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** reprints@medknow.com

©2020 Asian Pacific Journal of Tropical Medicine Produced by Wolters Kluwer-Medknow. All rights reserved.

**How to cite this article:** Soltani S, Foroutan M, Valipour A, Sabati Z, Hallajian F. Non-Iranian travelers may threaten malaria elimination in Iran. Asian Pac J Trop Med 2020; 13(6): 281-282.

**Article history:** Received 9 December 2019      Revision 11 December 2019  
Accepted 11 December 2019      Available online 3 June 2020

in 2017. It is worth mentioning that autochthonous cases decreased from 45.70% in 2002 to 9.27% in 2017, while the imported cases have increased from 44.41% to 90.73% during these years[1].

In the current study, 9 288 Iranian and 229 non-Iranian subjects were screened. Among them, only two positive cases with Pakistani nationality were identified through microscopic method and then confirmed by RDT. In a recent retrospective study by Salmanzadeh *et al.*[5] in Khuzestan province (southwest of Iran), a total of 541 patients with *Plasmodium* infection were recorded between 2001-2014. Of these, 82 (15.16%) and 459 (84.84%) belonged to Iranian and foreign subjects, respectively. They concluded that "proximity to endemic countries has made the malaria campaign difficult; thus, regular monitoring of travelers and several rigorous control programs should be continued constantly until infection elimination in the province and, of course, in Iran". They also highlighted the key role of travelers which may contribute to the maintenance of malaria in malaria-elimination programmed areas of southwest of Iran[5]. The same findings were reported from other provinces[6,7]. In a recently published article in southeast of Iran (Saravan and Chabahar town in Sistan-Baluchistan province), among 765 immigrants, seven positive malaria cases (0.9%) were detected. Five and two subjects had *P. vivax* and *P. falciparum*, respectively[2].

The border counties of Khuzestan province (Abadan and Khorramshahr counties) are the main gateway for traffic of foreign nationals from Iraq, and thus, annually receives several millions of immigrants, pilgrims, and tourists. Accordingly, the risk of malaria incidence exists and needs more attention by policy makers. In the future years, more meticulous control programs should be implemented in the border towns of Khuzestan province.

### Conflict of interest statement

The authors declare that there are no conflicts of interest.

### Acknowledgments

We sincerely appreciate all staff at the healthcare centers in Abadan and Khorramshahr counties who assisted to collect the samples.

### Funding

This study was financially supported by Student Research Committee, Abadan Faculty of Medical Sciences, Abadan, Iran (Grant No. 97St- 429).

### Authors' contributions

SS and MF designed the study protocol; SS, AV, ZS, and FH collected the data and involved in statistical analysis; MF drafted the manuscript. MF and SS critically revised the manuscript. All authors read and approved the final version of the manuscript.

### References

- [1] Vatandoost H, Raeisi A, Saghafipour A, Nikpour F, Nejati J. Malaria situation in Iran: 2002-2017. *Malar J* 2019; **18**: 200.
- [2] Hassanpour G, Mohebbali M, Mirhendi H, Zeraati H, Raeisi A, Keshavarz H. Asymptomatic malaria infections among immigrants in malaria-elimination programmed areas of south eastern Iran may threaten malaria eradication. *Travel Med Infect Dis* 2019; **31**: 101426..
- [3] Azari-Hamidian S, Norouzi B, Harbach RE. A detailed review of the mosquitoes (Diptera: Culicidae) of Iran and their medical and veterinary importance. *Acta Trop* 2019; **194**: 106-122.
- [4] Edrissian G. Malaria in Iran: Past and present situation. *Iran J Parasitol* 2006; **1**: 1-14.
- [5] Salmanzadeh S, Foroutan-Rad M, Khademvatan S, Moogahi S, Bigdeli S. Significant decline of malaria incidence in Southwest of Iran (2001-2014). *J Trop Med* 2015; **2015**: 523767.
- [6] Saghafipour A, Noroozi M, Karami-Jooshin M, Poudat A. Epidemiological features of malaria in Qom province from 2001 to 2011. *Zahedan J Res Med Sci* 2012; **14**: 70-73.
- [7] Khalili MB, Anvari-Tafti M, Sadeh M. Epidemiological pattern of malarial disease in the province of Yazd, Iran (Since 1986-2006). *World J Med Sci* 2009; **4**: 41-45.