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Knowledge, attitude and practice of truck drivers about malaria and its control in Basmaq customs borderline of Iran and Iraq

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Abstract

In order to eliminate the malaria need more data about the knowledge, attitudes and practices of diseases. KAP study was carried out in March to end of May 2012. A total of 225 questioners collected and 20.88% of the population was aged 20-30, 40.88% age 31-40, 26.66% was 41-50 and 8.44% was 51-60 and 3.11% more than 61 years old. Total of drivers as respondents were literate, 77.77 % of them were Iranians and the rest were Iraqi. Although 32% the audience had complete knowledge on vector, only 27.11% had good knowledge due to initial symptoms of malaria. About 35.55% of them were believed to Indoor residual spraying as control method whereas, 21.33 % of them were believed to mosquito nets and only 11.55 % were believed to use of repellents ointment. Health education can reduce the disease by the trade and tourism intervention borderline Iran and western neighboring countries.

Keywords: Study, malaria, transit, Bashmaq customs, Kurdistan, Iran, Iraq,

1. Introduction

260 million malaria cases with 655 thousands mortality reported according to the world malaria report 2011^[1]. More deaths have been reported in African children and mortality reported every 45 seconds^[1]. Malaria is responsible of 20% of deaths of children less than 5 years old and also is known responsible of deaths of children and young people, who have exposed to risk of other infectious diseases such as surgery indirectly^[1, 2]. Malaria is caused by Plasmodium parasites and transmitted with bite of infected *Anopheles* mosquitoes at night or dawn. Malaria eradication program began in 1949 and in Iran and was modified to control in 1985. Malaria was integrated to primary health care program in 1988^[3].

Malaria remains one of the most important parasitic diseases in South and southeastern Iran. About 4,000 malaria cases, comprised 70% Iranian reported in 2007 in Iran^[4, 5]. Out of 90% of malaria cases has been reported in the southern and southeastern provinces of Hormozgan, Kerman and Sistan-Baluchestan provinces. The malaria peaks occurred in September and November and most parasit found as *P.vivax*^[4, 5]. The transmission of malaria in the south and southeast of the country considered as indigenous.

Trend of Malaria cases increased from 1994 to 1996 in Kurdistan Province, western Iran. Totaly 543,633,236 cases reported in 1994, 1995, and 1996 respectively; Moreover, no malaria cases reported in 2009, and only 3 cases stated in 2011 (Ministry of Health and Medical Education 2012, Unpublished data). Many parts of Kurdistan Province are classified in stratum 3, with the imported cases of malaria, without potential indigenous transmission and also some areas stated as stratum 4 with no malaria cases record in the past 3 years. By know, three main vectors have been reported in Kurdistan Province as *Anopheles maculipennis s.l*, *An. sacharovi*, *An.superpictus*^[3, 6]. The second round of IRS application was occurred in August-September and October-November against malaria vectors. Anti-malarial drugs such as chloroquine has been used for many years^[3, 6].

Primary health care system was founded on Kovar plan in order to eliminate the gap between the provision of health services in rural and urban areas of the country. In this plan, the health house cover the entire rural community with a population of approximately 1,500 people and serve the health services to at least 10 satellite villages. Health workers (Behvarz fully) serviced to rural villages and due to malaria and them capable to find the cases with fever, chills and anemia and prepared the blood smear and diagnosed the parasite. They provide the necessary training for prevention and control and treatment based guidelines and protocols to Minsty of health and Medical Education (MOH and ME).

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Travel medicine, especially travel to malaria-endemic areas is important to people so, the study of knowledge, attitude and practices of those who regularly travel to endemic areas of the disease considered as important. Unfortunately, there are no complete effective vaccines against malaria [3]. There are scatter data due to knowledge, attitude and practice of people, especially during the trip in endemic area. Berg *et al.* (2001) reported that only 8% of the tourists who visit their areas prone to malaria prevention medicine practice [7]. On the other hand, Japanese tourists traveling to sub-Saharan Africa had little knowledge of malaria symptoms, prevention methods and route of transmission [8]. Zhang (2011) reported that only 4% of the Chinese tourists who travel to endemic areas were well informed about malaria and only 21.4 % knew that the Anopheles is vector of malaria [9]. Among the tourists, only 12.1% of them used as repellents during travel [8].

Iran is currently in the pre-elimination stage of malaria. Based on the control and reduction of malaria cases is important. Many of transit drivers traveled to the south and southeast of the country to access to free sea and ocean. This part of the country bordered to Indian Ocean and is highly developed based on commerce, trade and shipping in the region. With regard to importance of malaria transmission in to the south and southeast regions of the country it was decided to study of knowledge, attitude and practice of transit drivers towards malaria and route of control. Further information can be obtained toward programs designed to control of the disease in the next stage of pre elimination especially areas borderline with Afghanistan, Pakistan, Iraq and Turkey areas.

2. Materials and Methods

A cross-sectional study was performed in Bashmaq customs in Marivan County, Kurdistan province ($35^{\circ}36'42''N$ $46^{\circ}1'32''E$) from began of March to end of May 2012. The geography of the region with 1315 meters above sea level is located at a distance of 15 km west of the city of Marivan. The maximum of temperature were recorded as $41.1^{\circ}C$ and the minimum as $-20.6^{\circ}C$ in August and February respectively. The maximum daily precipitation was recorded as 43 mm in May. There are no rainy during the Augest and September. The average relative humidity was 77.8% and agriculture and commercial considered as the main economic activities in Marivan City [9]. Although, Bashmaq customs considered as the boundaries of commercial productivity between Iran and Iraq previously, but have been blocked during the Iran and Iraq war (1980 to 1988). Border customs rebuild after the war based on the governmental policies for the development of border exchange with neighboring countries and actually considered as one of the most transit centers between Iran, Iraq and Syria to Central Asia. The transit rate exceeded 766,988,242 pounds with a value of \$ 695,877,417 in 2010 from Bashmaq customs [10].

Questionnaire included questions related to demographic population of subjects and questions relating to the level of knowledge, attitude and practice on malaria and route of transmission. Pilot studies were conducted to assess the quality of the questionnaire among 8 drivers and then were continued by interviewing of the rest audients. These questions include personal information (age, education, residence, nationality, history and symptoms of disease).

The second part of the questionnaire are crossed to awareness of the malaria control program understanding disease transmission, control and awareness of malaria foci, the breeding place of the mosquito vectors, performance management, the following of symptoms, use of ITNs away and spraying of insecticides.

3. Statistical analysis

All data using Chi-square and analyzed by Spss software and test was approximately 95%.

4. Ethical considerations, Ethical approval from a university ethics committee was obtained.

5. Results

In this study, a total of 225 audients were interviewed and enrolled in the 20.88% of the population aged 20-30 and 40.88% 31-40 years and 26.66% 41-50 and 8.44% 51-60 years and only 3.11% between 61-70 years respectively. 77.77% of the respondents were Iranian and the rest Iraqi. Table 1 indicated the age group, education level, place of residence of the respondents. The most significant transit drivers were in the age group 30-40 years ($P < 0.05$). Iranian drivers were significantly more than Iraqi drivers ($P < 0.05$). In addition, significantly more Iranian were educated than Iraqi drivers. More Iranian drivers have a degree in elementary diploma education and more Iraqi drivers were elementary education ($P < 0.05$).

Table 1: Age group and literacy level of transit drivers in Bashmaq customs, Kurdistan Province, 2011

Age group	Iraqi	Iranian	Total
20 -30	22 (9.77%)	25 (11.11%)	47 (20.88%)
31-40	19 (8.44%)	73 (32.44%)	92 (40.88%)
41-50	8 (3.55%)	52 (23.11%)	60 (26.66%)
51-60	1 (4%)	18 (8%)	19 (8.44%)
61-70	0	7 (3.11%)	7 (3.11%)
Total	50 (22.22%)	175 (77.77%)	225(100%)
Literacy level			
illiterate	0	0	0
Primary	24 (10.66)	27 (12%)	51 (22.66%)
Secondary	9 (4%)	57(25.33%)	66 (29.33%)
High School	11 (4.88)	6(2.66)	17 (7.55)
Diploma	6 (2.66%)	73 (32.44%)	79 (35.11%)
Primary Academic Degree	0	2 (.88%)	2 (88%)
Master Science	0	10 (4.44%)	10 (4.44%)
Total	50 (22.22%)	175 (77.77%)	225(100%)

Table 2 show Transit drivers awareness about malaria symptoms, primary foci of malaria, the number of foci of malaria in transit, transmission, transmission type, control, prevent and treat. The 872.88% of respondents aware of the malaria symptoms including fever, chill and sweat). Out of 32% of the audience heard the name of the disease and route of transmission. Of 35.55% had heard name of the disease, and don't know cause of the diseases. Of 32.44 % of the audients did not know even the name of the disease. 32% of the audience knows the vector of malaria and route of transmission and 68% believed that the disease is transmitted by contaminated food, waste water and garbage. 2.66 % of respondents were aware history of malaria, 8.44% of the audients knows the foci of malaria during the trip. 27.55% of the respondents knew that malaria mosquitoes when more bite and 11.55% of audience knew the location of mosquitoes laying eggs. Although literacy rates of Iraqi drivers were less than Iranian drivers but knowledge of them due to diseases were similar ($P > 0.05$).

Table 2: Awareness, attitude and practice of transit riders about malaria symptoms, route of transmission, prevention and control in Bashmaq customs, Kurdistan Province, 2011

Questions	Iraqi	Iranian	Total
Do you know the symptoms of malaria? (Fever, chills,)			
Yes	16 (7.11%)	45(20%)	61(27.11%)
No	34 (15.11%)	130(57.77%)	164(72.88%)
Do you know the route of transmission? (mosquito bites)			
Yes	19(8.44%)	53(23.55%)	72(32%)
No	31(13.77%)	122(54.22%)	153(68%)
Do you know where the rest of mosquito?			
Yes	16(7.11%)	30(13.33%)	46(20.4%)
No	34(15.11%)	145(64.44%)	179(79.55%)
Do you know what time of the day or night malaria mosquitoes are biting?,			
Yes	21(9.33%)	41(18.22%)	62(27.55%)
No	29(12.88%)	134(59.55%)	163(72.44%)
Do you know where the malaria mosquito laying eggs?			
Yes	12(5.33%)	22(9.77%)	34 (15.11%)
No	38(16.88%)	153(68%)	191 (84.88%)
Do you know the foci of malaria in the transit trip?			
Yes	2(0.88%)	17(7.55%)	19 (8.44%)
No	48(21.33%)	158(70.222%)	206 (91.55%)
Is the health education has received about malaria during transit trip?			
Yes	0	0	0
No	50	175	225
Does the driver have been suffering from malaria?			
Yes	2(0.88%)	4(1.77%)	6(2.66%)
No	48(21.33%)	171(76%)	219(97.33%)
If the driver is aware of malaria?			
Yes, there is good information	19(8.44%)	53(23.55%)	72(32%)
Just is heard the name of the disease	14(6.22%)	66(29.33%)	80(35.55%)
Non	17(7.55%)	56(24.88%)	73(32.44%)
How received health information?			
National media (Radio, TV)	17(7.55%)	78(34.66%)	95(42.22%)
The study	6(2.66%)	12(5.33%)	18(8%)
The personal experience	27(12%)	85(37.77%)	112(49.77%)

Attitude and practice of the audience presented in Table 3. Among the respondents, 35.55% of the audience believed to IRS, 21.33% bed net and 11.55% repellents, 44.88% did not use any means of control. Significantly believed to IRS operational method was more than of other control methods ($P < 0.05$). The study found that 96.88% of drivers during the trip rest at the night and 1.33% at the day. The drivers rest at night, 85.77% were rest inside in the cab truck, 2.22% outside the cabins and outdoor, and 12% both inside and outside the cabin based on the security conditions. Significantly resting behavior inside the truck cab was much more than outside during the night ($P < 0.05$). 68. 88% of the respondents used truck air condition, 13.77% by lowering the truck's windows and 17.33% mix of the two approaches for cooling during the warm seasons when driving and rest at night. Significantly use of truck air condition was more than other methods ($P < 0.05$).

Table 3: Practice of audience of transit riders about malaria symptoms, route of transmission, prevention and control in Bashmaq customs, Kurdistan Province, 2011

Control measures	Iraqi	Iranian	Total
Mosquitoes bed net	6 (2.66%)	42 (18.66%)	48 (21.33%)
Indoor residual spraying	10 (4.44%)	70 (31.11%)	80 (35.55%)
Repellents	10 (4.44%)	16 (7.11%)	26 (11.55%)
No control	32 (14.22%)	69 (30.66%)	101 (44.88%)

None of the respondents did not have drug to prevent and treat

malaria. In this study, significantly drivers had no information about medicines to prevent and treat malaria ($P < 0.05$).

When asked of the audience about referred to health center after the onset of malaria symptoms significantly all of them were prevail to the hospital than the health centers. 42.22% of the drivers were acquaintances the health information from the radio, 8% from reading newspapers and magazines and 49.77% from talking with friends of the experience was and. Most significant drivers own health information from their personal experiences ($P < 0.05$).

6. Discussion

In our study, the knowledge of drivers' about malaria and its symptoms were less than of residents in malaria endemic regions of Sistan and Baluchestan Province in southeastern of Iran [10, 15]. Okeich (2008) reported that 98% of residents in the endemic areas for malaria in Africa had good information about malaria and 70% of them know the diseases symptom [11]. Midzi *et al.* (2011) reported 19.2% of African respondents had a good knowledge about malaria and routes of malaria control [12, 13].

On the other hand information of local people in indigenous area about malaria and malaria control were more than those of non-indigenous [14]. Similar studies showed that information of non-indigenous truck drivers were much lower than other natives in endemic area. Previous studies in southern and south-eastern of Iran indicated 96% of the respondents had more information about Malaria [10]. Other studies in India [16], showed lower level of awareness about malaria, but levels of awareness of indigenous has been relatively high from Turkey [17], Zimbabwe [18], and Guinea [19].

In our study, awareness of transit riders was less than indigenous of India [16], Guinea [19], Mexico [20], West Colombia [21]. The knowledge about route of transmission of malaria of transit drivers were much lower than among indigenous- Bashaghard in southern Iran [22]. Paulander *et al* (2009) reported that 97.2% of respondents aware at least one of the symptoms of diseases in malaria-endemic regions, where 85.9% of people had at least one bed nets to rest [23]. Maiga *et al.* (2010) reported 84.8% of Aboriginal people were aware of the malaria symptoms [13].

In our study, public awareness of transit drivers about the disease vector was very low in comparison with other studies carried out in malaria endemic areas such as southern Iran [10], Mexico [20], Colombia [21], and Guinea [19].

In our research, Information of the drivers about the route of parasite transmission was low in comparison by other study. Kaliyaperumal and yesulf (2009) were express 85.2% of the audience knew that the parasite was transmitted by mosquito bites [24]. In southern Iran 72.1% of indigenous knew the route of parasite transmission by mosquitoes bites at night [22]. 48.8% of respondents knew that mosquitoes are the vector of parasite in endemic regions [23].

The use of mosquito nets and the use of personal protective measures are directly related to income levels. In our study, although the purchase of mosquito nets and protective devices was easy by drivers but it did not used significantly ($P < 0.05$). Although Knowledge of indigenous peoples about benefits use of ITNs were high but, the use of mosquito nets and personal protective measures varies in different parts of the world such as southern Iran [10], Zimbabwe [18], Mexico [20], and Colombia [21].

Okeich (2008) cited that 90% of the respondents agree with the use of nets but only 81% people could buy it [1]. In similar study, Kaliyaperumal and yesulf (2009) reports, 92.4% of the audience agrees with the use of bed nets where only 57.8% of

them will be able to buy it [24]. In another study, 8.6% of the indigenous –endemic area have mosquito Bed net [21]. Okech (2008) reported that 35% of people resting under the air condition and fan, 31% used ointment, 31 % used coil Spenser, 11 % used Aerosol, and 6% protect by Curtain. In our study, significantly, most of transit drivers used truck air condition during the warm season [11].

In our study, a few respondents intent to treatment themselves after the emergence of the symptoms and more than 90% of the audience willing to refer to health centers, similarity Okech (2008) cited the 97% of the audiences intent to go to health centers for medical treatment ($P < 0.05$) [11].

The use of mosquito nets among transit riders were 21.33%. In contrast, Moosa-Kazemi *et al.* (2007) cited 97% of the indigenous use of protective equipment in Chabahar city, south eastern Iran [4]. The uses of mosquito nets among the indigenous – peoples of Bashaghard were 59.5% [22], but have been reported 80% in Africa [25].

Our study showed that the level of knowledge and awareness of malaria prevention and control was low among the transit riders, so increase the level of Knowledge, attitude and practice of the audience could help to prevent of malaria transmission during their travel.

Health education program conducted by the health centers can be managed to increase knowledge, attitude and practice of effective transit drivers. The educational program manages the respondents and active participation regarding the use of personal protective measures, repellents and help to carries malaria preventive medication.

In conclusion, development of interventions program to eliminate malaria, monitoring of applied research recommended. However, health education programs, design the malaria control program, performing of similar studies in other parts of the country, especially south and South-East of the country are recommended.

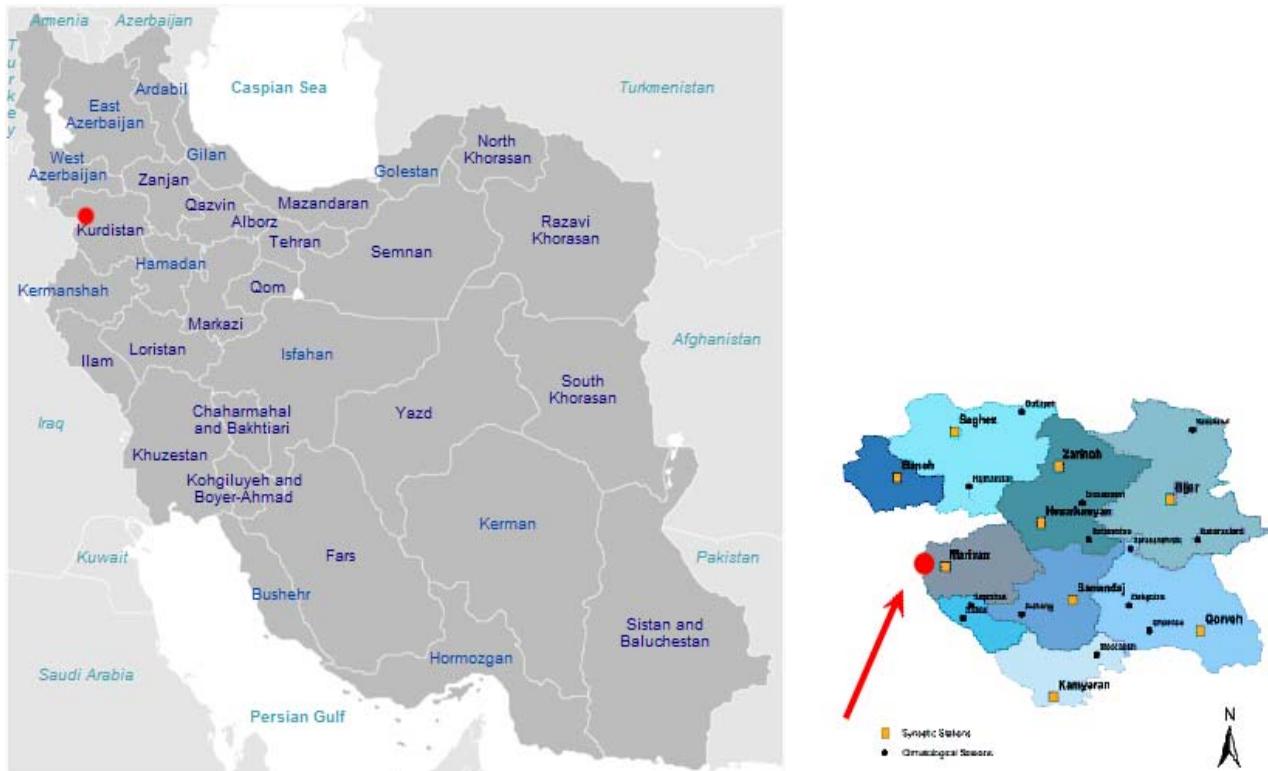


Fig 1: Map showing the study villages in the Kurdistan Province, Iran.

7. Conflict of interest statement

The authors declare that we have no conflict of interest.

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