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Seroepidemiology of anti-leptospira antibody in Golestan province, north of Iran

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ABSTRACT

Southern margin of the Caspian Sea due to keeping of domestic animals and abundance of surface water reservoirs is prone to infection with *Leptospira* sp.. This study was performed to determine anti-*Leptospira* antibody frequency in Golestan province, southeast of the Caspian Sea in the north of Iran. This study was performed on 1028 people in Golestan province. Sampling was stratified. *Leptospira* antibody (IgG) was measured with DRG (USA) enzyme linked immunosorbent assay (ELISA). 107 cases (10.4%) had anti-*Leptospira* sera antibody. Distribution of positive cases was 59 (10.9%) in women and 48 (9.8%) in men. Most positive cases were in the 35-44 years old group. The frequency of positive cases in the people who was living in the towns and villages in Golestan Province were 9.4% and 11.1%, respectively. No significant difference was seen between the groups. According to the data presented in this study and compared to the published data it was shown that the frequency of antibody against *Leptospira* in Golestan province is lower than both Guilan and Mazandaran provinces in the north of Iran.

1. Introduction

Leptospirosis is one of the most common zoonotic disease which caused by getting into contact with water or soil contaminated with urine of the infected animals such as sheep, horse, cow and rat. Most prevalence of Leptospirosis is in the tropical and subtropical regions, especially in hot and humid regions. Annual incidence is estimated from 0.1-1 per 100,000 in high temperate climates

to 10-100 per 100,000 in the humid tropics (Victoriano et al., 2009; Laras et al., 2002).

Spread of the disease in each region based on the geographical and ecological characteristics of the region. Wild and domestic animal population and abundance of surface water reservoirs are effective in the prevalence of the disease. Leptospirosis is primarily an occupational disease (Zavitsanou and Babatsikou 2008; Levett, 2001).

Frequency of this disease in Iran is not properly clear (Pappas et al., 2008). Some reports

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demonstrating the prevalence of human Leptospirosis in the northern Iran (south of the Caspian Sea) and especially Mazandaran and Guilan provinces. Golestan province also with wet weather conditions, rice cultivation as the dominant and main activities, keeping of domestic animals in rural homes, such as guard dogs, horses and livestock (mainly cattle) and the use of surface water and rivers in most villages, has created favorable conditions for promoting human Leptospirosis. Hence this seroepidemiological study performed to determine anti-*Leptospira* antibodies in Golestan province in the north of Iran.

2. Materials and Methods

This descriptive study was performed on 1028 people in Golestan province, including 539 (52.4%) women and 489 (47.6%) men from one to 88 years old (mean 35.2 ± 17.5) in 2008.

Golestan province with a population of 1660000. In this study, sampling is stratified (Classes, including cities and villages in Golestan Province) and within classes was randomly cluster. The cluster of household was chosen based on head clusters addresses. Golestan province was divided into 50 cluster included of 32000 people, and 20 people from each cluster were chosen randomly with consideration of gender and age.

Blood sampling was done by visiting homes and completed questionnaires containing personal information, feeding type and occupation.

For the people above 25 years according to their job status were divided into five groups (employees, free, unemployed, housewives and others).

Leptospira antibody (IgG) was measured using ELISA (DRG USA International Inc.). The results were analyzed using SPSS software and χ^2 -test and $P < 0.05$ was considered as significant.

3. Result

Anti-*Leptospira* antibodies were seen in 107 (10.4%) individuals [CI 95% (8.54-12.28%)]. Distribution of positive cases were 59 (10.9%) in women and 48 (9.8%) in men and there was no significant relationship between two groups ($P=0.5$). Positive cases were observed in the age group 35-44 (12.8%), but differences between *Leptospira*

infection and age groups was not significant ($P=0.7$)(table 1).

Two cities, Minudasht and Bandar Gaz, had the higher and lower rate of infection with 21.3% and 0%, respectively. The prevalence of leptospiral infection in different cities was significantly different ($P= 0.04$) (Figure 1).

The frequency of positive cases in people who was living in the cities of the province and rural residents was 9.4% and 11.1%, respectively. No significant difference was seen between two groups ($P=0.3$).

Most of the positive people of leptospirosis were seen in the housewives. But the relationship between the data was not significant ($P=0.08$).

The prevalence of anti leptospiral sero-positive cases in people who was living in the south of the province was higher than the north region (Figure 1).

4. Discussion

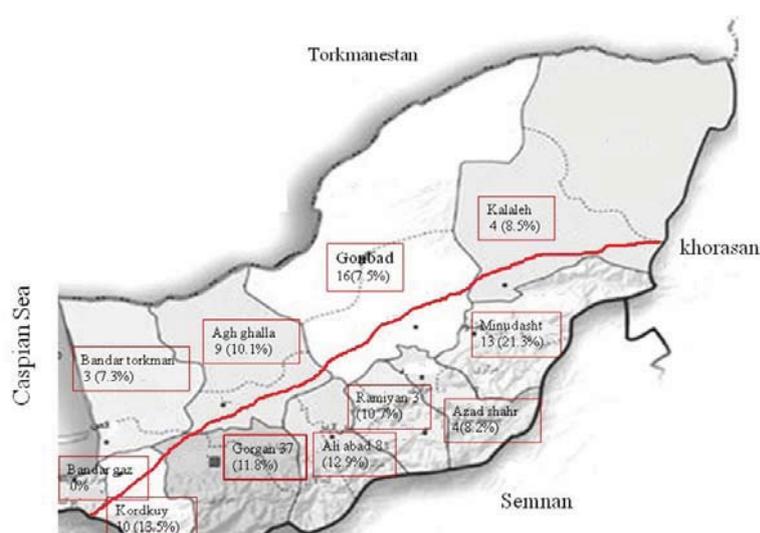
Leptospirosis is a zoonotic disease with global distribution, caused by pathogenic *Leptospira*. It is more prevalent in tropical, subtropical and high temperate regions and some part of these areas is endemic for human Leptospirosis (Honarmand et al., 2007; Michel et al., 2002).

In this study, serological prevalence of leptospiral infection in healthy individuals was 10.4%. The study which has been carried out by Rahimi and colleagues on 552 people (cultivators and animal husbandmen) in Guilan province showed that 21% had positive serum reaction to *Leptospira* Spp (Rahimi et al., 2007). In the study by Baba Mahmoudi and colleagues in Mazandaran province in the north of Iran the prevalence of positive cases was shown to be 29.4% (Babamahmodi et al., 2004). These results show that two other provinces in northern Iran (Mazandaran and Guilan) has higher percentage of leptospiral infection as compared with Golestan province.

The frequency of anti-*leptospira* antibodies in healthy individuals in other parts of Iran is not available and most studies have been shown the presence of antibodies in individuals with Leptospirosis. The frequency of serologic leptospiral infection in the other part of Iran was higher than in our region. For example, serological study in Farsan and Koohrang cities in Iran which

Table 1: The age distribution of leptospiral infection of healthy people in Golestan Province, north of Iran

Age groups	Anti leptospiral IgG antibody		Total
	Negative	Positive	
<5	55(88.7%)	7(11.3%)	62
5-14	105(89%)	13(11%)	118
15-24	168(93.3%)	12(6.7%)	180
25-34	177(89.8%)	20(10.2%)	197
35-44	136(87.2%)	20(12.8%)	156
45-54	140(89.7%)	16(10.3%)	156
55-64	100(87.7%)	14(12.3%)	114
>65	40(88.9%)	5(11.1%)	45
Total	921(89.6%)	107	1028

**Figure 1:** Map of Golestan province, northern Iran; distribution of positive cases of Anti-Leptospira antibody (number and percent)

has been performed on 400 people showed that 48.5% was positive to anti-leptospira antibodies (Ebrahimi et al., 2003). In the other study by Honarmand and colleagues in Guilan Province in 2003 showed that from 995 people suspected of leptospirosis, 37.7% were IgG positive (Honarmand et al., 2007). In a study by Talei and colleagues which has been performed on 80 people from Veysian paddy the number of 31 (48.7%) people was shown to be IgG positive (Talei et al., 2007).

Variation in the prevalence of leptospirosis in Iran returns to geographical and ecological characteristics of the region. So that, human leptospirosis is common in the margin of Caspian

Sea which is humid and some cases of leptospirosis are diagnosed every year.

Our study showed that the frequency of positive cases of leptospiral infection in the people who lives in villages is more than residents of towns. As most of rural resident had paddy and most farmers in the paddy work with bare feet and skin scratch on hands and feet provides favorable conditions for leptospiral infection. Keeping animals in homes in rural areas is also the other risk factor. Perhaps the cause of proximity of seroepidemiological infection level, in residents of cities and villages of Golestan province may be due to the distance of the cities and villages. Because of this low distance, many people in these cities, being engaged in agriculture and this may be one of the reason that why there is no

significant difference in the frequency of the disease in the cities and villages. On the other hand, it is marked that pollution level in housewives is more than others in this province. It has been shown that most positive cases have been among agriculturalists and rural housewives (Honarmand 2007). As in the villages the women in addition of home activities, they actively involve in agriculture, animal husbandry and petting, therefore they are in a high risk of contamination as was seen in our study.

Finally we can showed that the prevalence of sero-positive cases living in north of province was markedly higher than people living in south regions, this may be due to more rain, nearing to forest and more suitable condition for agriculture and water supply.

In conclusion, according to the data presented here and compared to the published data it is concluded that the frequency of antibody against *Leptospira* in Golestan province is lower than both Guilan and Mazandaran provinces in the north of Iran.

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