Original Article

THE EFFECT OF LIFESTYLE ON BRUCELLOSIS AMONG NOMADS IN KHUZESTAN PROVINCE OF IRAN

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ABSTRACT

Objective: To investigate the effect of lifestyle and related risk factors on brucellosis among nomads in Khuzestan, Iran.

Methodology: It is a descriptive, cross-sectional study conducted in North of Khuzestan, Southern Iran from March 2004 to June 2004. A total of 3594 person took part in this study by randomized cluster sampling. The diagnosis of brucellosis was made by measuring Brucella antibodies. Wright and 2ME with titers equal 1/80 or more were considered positive. Risk factors, such as exposure to animals, ingestion of unpasteurized dairy products were derived from questionnaires.

Results: Two hundred & twenty eight out of 3594 were positive for brucellosis (6.3%). Causative factors included consumption of raw milk (94.7%), fresh cheese (100%), uncooked meat (95.1%), animal skin contact (100%), contact with placenta (27.2%) and living with animal (82%).

Conclusion: This study showed that prevalence of brucellosis among nomads in Iran is high due to their life style.

KEYWORDS: Brucellosis, Life style, Nomads, Khuzestan.

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INTRODUCTION

Brucellosis is a zoonosis and virtually all infections derive directly or indirectly from exposure to animals.[1,2] the disease exists worldwide, especially in the Mediterranean basin, the Arabian Peninsula, the Indian subcontinent, in parts of Mexico and Central and South America. *B. melitensis* occurs primarily in goats and sheep. In animals, brucellosis is a chronic infection that persists for life. Localization of brucellae within the reproductive organs accounts for the major manifestations: abortion and sterility.[2,3] Brucellae are shed in large numbers in the milk, urine, and cystic products of infected animals.[4,5] Consequently, brucellosis has been an occupational risk for farmers, nomads, veterinarians, abattoir workers, and laboratory personnel.[2,3] Routes of transmission to humans include direct contact with animals or their secretions through cuts and abrasions in the skin, by way of infected aerosols inhaled or inoculated into the conjunctival sac of the eyes, or via the ingestion of unpasteurized dairy products.[1,5] Meat products are rarely the source of infection because they are not usually eaten raw and the numbers of organisms in muscle tissue are low.[2] Brucellosis is not rare in children as was once believed, especially in areas where *B. melitensis* is enzootic. The manifestations of brucellosis are similar in neonates, children, and adults.[6,7] It is not uncommon to observe outbreaks of the disease within families, especially when a common food source is involved.[8,9] There are thousands of nomads living in undeveloped areas.

Nomads who are living in the north of Khuzestan because of their life style and close contact to domestic animals such goats are highly infected.[10,11] This study was conducted

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to determine the effect of lifestyle on brucellosis among nomads in Khuzestan.

A variety of serologic tests have been applied to brucellosis, of which the SAT (wright) is the most widely used.[2,12-14] No single titer of *Brucellosis* antibodies is always "diagnostic"; however, most cases of active infection have titers higher than 1:160.[13,14] The Rose Bengal test is a rapid screening method; however, positive sera should always be confirmed by SAT.[2,11]According to epidemiological status of brucellosis in Iran, diagnosis of active brucellosis is based upon positive results for Wright and 2ME tests (brucella antibodies) with titers higher than 1:80.[11]

PATIENTS AND METHODS

This was a descriptive, cross-sectional study, which was done in Khuzestan, a province in south-west in Iran, during spring 2004. In present survey 3594 of nomads who were living in north of Khuzestan, were enrolled in the study. It included 49.9% male and 50.1% female and were selected by randomized cluster sampling. The age ranged between 2-65 years with mean age of 35 years. The diagnosis of infection was made by serologic tests including; Rose Bengal, the serum agglutination test (SAT) named Wright and 2ME (to differentiate immunoglobulin classes). Initially all blood samples were tested for Rose Bengal. Those with positive Rose Bengal tests were retested with Wright. Then those with positive Wright tests were retested with 2ME. Wright and 2ME with titers equal to1/80 or more were concerned positive (active brucellosis). Epidemiological data, such as occupation, exposure to animals, animal gestational products (placenta), living with animals in one place and ingestion of high risk foods (unpasteurized dairy products & uncooked meat) were derived from questionnaires which were filled for every person with active disease. The results were analyzed by descriptive-analytic statistical methods with SPSS software.

RESULTS

Two hundred and eighty seven samples out of 3594 were positive for Rose Bengal test (prevalence =7.98%). Two hundred and eighty three out of 3594 were positive for Wright test (prevalence =7.87%). Two hundred and twenty eight of 3594 were positive for 2ME test (prevalence=6.3%). Two hundred and eighty three of 287(98.2%) those with positive results for Rose Bengal were positive for Wright test. Two hundred and twenty eight out of 283 (80.5%) those with positive Wright test were also positive for 2ME test. Demographic characteristics and lifestyle risk factors and distribution of brucellosis among nomads are shown in Tables-I and II.

DISCUSSION

More than 1.5 million nomads live in Iran, of them about 130000 are living in mountains in the north of Khuzestan, a province located in the south-west of Iran. Seroprevalence of brucellosis in Iran is about 3% (according to previous studies).[10, 11]

Our previous study showed that the prevalence of brucellosis infection among nomads in Khuzestan is 7.9% (under publication in IJIDTM), so this population is highly infected, because of their life style (close contact with goats, consumption of unpasteurized dairy products).

Table-I: Demographic characteristics in nomads of Khuzestan

	Number	*percent (%)*
Age:		
0-4	52	22.81
5-14	44	19.30
15-29	49	21.49
30-50	40	17.54
>50	43	18.86
Sex:		
Male	102	44.73
Female	126	55.27
Tribe:		
Majidsoleiman	80	35.08
Behbahan	13	5.70
Shush	119	52.19
Izeh	16	7.01
Education:		
No education	103	45.18
Primary	56	24.56
Guidence	52	22.80
Secondary	17	7.46
Total	228	100

Table-II: Distribution of brucellosis (active disease) based on lifestyle risk factors

Life style risk factors	*number*	*percent (%)*
Living with animals In one place	187	82.01
Raw milk drinking	216	94.73
Boiled milk drinking	12	5.26
Fresh cheese ingestion	228	100
Under cooked meat (Kebab)	217	95.18
Cooked meat	11	4.82
Animal skin contact	228	100
Contact with animal placenta	62	27.19
Total	228	100

Due to their lifestyle, their persistent migration and lack of health service facilities, zoonosis like brucellosis is frequently seen in this population.[10] Since there are no reliable basic data about these parameters and their roles in brucella infection rates, so we conducted this study. Because there is more than one risk factors in their lifestyle it is very difficult to determine the effect of each risk factor separately, but the role of unpastuerized dairy product and closed contact with domestic goats are very prominent. In this study we determined the various risk factors for acquiring brucella infection that are related to life style of nomads, including: living with animals in common place, raw milk drinking, fresh cheese ingestion, under cooked meat (Kebab) ingestion, animal skin contact and contact with animal placenta. Comparing the frequency of brucellosis in normal population in Iran and nomads showed this significant difference ($p<0.05$) in acquisition of infection (3% versus 7.9%). Comparing the frequency of brucellosis among nomads with low risk factors (Izeh and Behbahan) with high risk factors (Masjidsoleiman and Shush) showed significant difference ($p<0.05$) in prevalence of brucellosis in this population (6.8% versus 46.6%). Among these risk factors frequency of ingestion of fresh cheese, animal skin contact and ingestion of undercooked meat or raw milk were higher than others. We believe that although the best way of preventing brucellosis in human is eradication of infection in animals, but it is very expensive for undeveloped population such as nomads.[1,2] So we recommend that decreasing these risk factors, such as separation of animal keeping places from human, boiling milk or pasteurization dairy products, completely cooking meat and avoidance of direct skin contact with animals can decrease incidence rate in nomads.

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