International Journal of Epidemiologic Research, 2016; 3(1): 86-94.

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Scabies contamination status in Iran: A review

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Received: 4/Jul/2015 Accepted: 6/Oct/2015

Review article

ABSTRACT

Background and aims: Scabies is a common worldwide parasitic contagious disease caused by *Sarcoptes* scabiei of the order of Astigmata of the family of Sarcoptidae. Therefore, this review is to determine the exact status of scabies in Iran in order to manage it better.

Methods: On the whole, out of the 120 articles and books, 56 ones were covered based on items such as study purpose, date of publication, journal's credibility, indication of the subject in them, transmittance, way of prevention, diagnosis, and treatment.

Results: Due to the non-uniform geographical distribution of scabies in Iran, diagnosis and treatment of the disease is different. Studies show that scabies is on increase in Iran. Thus, scabies is a burden to the economy and the health care system. Prevalence of this disease has been rather high in Iran during war, prisons, and geographical humid areas which are variable in different provinces due to various climates.

Conclusion: By regular monitoring and controlling the way the disease spreads, health of the population at risk can be maintained in order to bring health to the society that is among the main aims of every organizations and health providing institutions. This review focuses on scabies in Iran and other countries the entire world over to find ways for preventing and giving health care to control the disease.

Keywords: *Sarcoptes*, Scabiei, Infestation, Environmental factors, Iran.

INTRODUCTION

Scabies is a cutaneous contagious disease caused by mite *Sarcoptes scabiei* D e Geer (*Sarcoptiformes: Sarcoptidae*) which is manifested with popular and nodular skin lesions and intensive itching particularly at night. *Sarcoptes scabiei* are ectoparasites that reside in the stratum corneum of the skin of humans and other mammals.[1-3] Scabies known also as mange is one of the common main cutaneous infestations among the animals.[1] Factors of scabies in human are attributed to the

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sarcoptic and demodectic mites. *Demodex* has various classes living on animals such as dogs and cats which are fatal in dogs, but *Demodex folliculorun* (*Trombidiformes: Demodicidae*) does not bring diseases to human being. *Demodex folliculorun*mites remain scaly patches on the nose, lips, cheeks, chins, forehead and the eye lids,[2] while Sarcoptes scabiei appears mostly on the other parts of the body extending from the neck, truck and the legs.[4,5] Frequency rate of scabies in different communities indicates both health condition and status of general health of the societies subsequently.[6] This disease is one of the most common itching diseases all over the world. It is found in all races and social classes especially in the warm and humid areas of the world.[7-10] About 300 million individuals in the world population are estimated to be suffering from this disease. This disease is mostly common among families and those densely populated communities of the poor. Increasing population size, absence of hygienic facilities, war, famine, and other identical disasters are all contributors to increased scabies frequency.[8,11]

Scabies has been studied by various researchers in Iran.[7-10] However, due to the importance of the matter in the country especially where health and treatment are concerned, considering possible preventive and therapeutic approaches seem to be essential for solving this native and regional problem. Therefore, we try to study scabies along with its related factors in Iran. So, this review is to determine the exact status of scabies in Iran in order to manage it better.

METHODS

This review was conducted in 2014 using key words like scabies, nodular scabies, pruritic, mange, and *Sarcoptes scabiei* (Norwegian scabies). We searched databases of Pub med, Ovid, Web of Science, Medline, and EBM Cochrane Database of Systematic Review for English articles. On the other hand, using key words such as mite, scabies or mange, and hygienic pest we searched the SID database for Persian articles. A total of 120 articles and books were selected at last of which 30 ones were excluded because of their irrelevancy to the aims of this study. In the next step, studying the abstracts, 25 articles not covering the subject were excluded. On the whole, out of the 120 articles and books, 56 ones were covered based on items such as study purpose, date of publication, Journal's credibility, indication of the subject in them, transmittance, way of prevention, diagnosis, and treatment.

Before the seventeenth century, scabies was considered as the blood dirtiness; and Ibn al Taher, the Persian physician, was the first that put forward the parasitic factor of scabies. The disease was first reported in 1689 by 2 Italian scientists, Giovanni Comio Bonoma and Diancinto Cestoni which was after wards known as a parasitic disease 200 years later. After invention of microscope in the nineteenth century, Venoxy was the first that watched *Sarcoptes* under microscope and proved that it is caused by a small arachnid.[2,12] Effects of scabies have been recorded during and after the World War by a variety of writers. Sokoloff has described how the Italian soldiers were suffering from scabies at their war against Napoleon. Erasmus Wilson was witness to a wide scabies contamination among the British forces during the war with the Crimean Peninsula citizens, while Milion during the First World War (1914-1918) wrote about the French soldiers that scabies was really like wrath of God among their troops. Scabies is known as a venereal and familial disease because it is not only transmitted between the parents, but also it is transmitted quickly from parents to children and from the children to each other.[11]

Scabies as a cutaneous disease is also associated with secondary infection of the scabietic lesions with B hemolytic streptococci that can lead to glomerulonephritis in children.[13] Also, severe cases of infection of scabies have been reported due to the use of immunosuppressive agents.[14]

Sarcoptes scabiei is able to infect various mammalian hosts. Sarcoptes scabiei species is hardly visible to the naked eye and is seen like a white spot on a black sheet of paper.[11] The males range in size from 213-285 µm long by 162-210 µm wide which is about two thirds the size of the females, that is, 300-405 µm long by 230-420 µm wide.[2] Sarcoptes mites are from different species which are morphologically the same, but physiologically indistinct with various and specific hosts in the mammals.[14] Cause of these specific features for each mammalian and parasitic species is not known yet. The cause is also depended on parasitic needs or immunologic and non-immunologic factors of the host so that any decrease in IgA makes scabies infestation more probable.[15,16]

In the life of the female and male sarcoptes four stages are recognized: Egg, larva, protonymph, and deutonymph. The females lay 2 or 3 eggs daily. After 3-5 days the eggs hatch and a six legged larvae comes out of the eggs. In the molting pouch, a larva molts and matures into an eight-legged nymph which last for 10-13 days.[2] In the nymphal stage, sarcoptes searches for mating partners on the surface of the skin and the male mite dies one or 2 days after mating and the female burrows deeper.[12] Each adult patient is home to 10-12 mites, while for the children, 20 mites are enough to infect them. In the following infestations, this number is reduced to 5-6 mites.[15] Mite is easily transmitted by direct contact, while the indirect transmission occurs whenever mite-infested clothes or bedrooms are used by the healthy people. This disease lasts for some days or two weeks.[17-20]

Scabiei mites live in the skin and infect parts of the body with delicate, wrinkled, and moist skin. Scabies infestation is usually lower in the presence of pilosebaceous glands found in head, face, and armpit. Of course, in the severe cases, the entire body except for head and the face is infected.[12,21,22] The symptoms include cutaneous reddish lesions, cutaneous rashesand subcutaneous tunnels. Noctural itching is the main symptom. The itching occurs when the mite burrows in feeds from or lays eggs in the upper layers of the skin. This may lead to allergic conditions. The itching is intensified in the bed or while bating which may result in wounds, inflammation of lymph nodes, fever and bacterial secondary infections.[23,24] Scabies lesions are caused by burrowing and release of toxic and antigenic secretions of the male mite.[25,26] Early diagnosis of the disease is necessary. Also predictive actions are required to leave out the contamination.[20] This parasite is mostly common in the developing countries.[27,28]

Sarcoptes scabiei is known as a parasite throughout its life but is simply spread and transmitted from one host to the other. Smell of the hosts made them to be chosen by this parasite.[29] Scabies affect individuals regardless of their sex, age, and race. Molecules present in scabies produce IgE in the individuals. This mite is the source of 12 antigens of which 7 ones are useful for the infested hosts with IgE.[30] Mite antigens enter the dermis and stimulate humoral and cellular immune responses.[31] Scabies is mostly common in young children in endemic situations. For instance, scabies has been reported in children under 5 years old by 50-75% in Daka. In the developed countries the entire age groups share the same rate of infestation. Children's

contamination has been decreased by 5-10% in these countries.[32-35] In any healthy individual with a natural immune system, 10-15 mites are seen when infected. However, in the Norwegian or crusted scabies, individuals with poor immune system might be infested with millions of mites. Treatment is very problematic in these conditions. Some specific forms of scabies include Norwegian scabies, animal scabies, nodular scabies, and scabies with syphilis. Laboratorial diagnostic methods used today for this disease include scraping test, deep biopsy for nodular scabies, Burrow Ink Test (BIT) and tetracycline fluorescent test.[36,37]

Scabies is studied in most countries to improve the public health status in societies. Scabies has been reported in the African countries more than in the other continents. For instance, scabies prevalence had been 16.5% in Nigeria which may be pertained to social economical and hygienic conditions in that country.[31] Findings in Malawi and Egypt also confirm that scabies is more common among densely populated families.[38-40] They reported that prevalence of scabies in the regions with higher economical level comparing that in the regions with lower economical level had a significant difference from 1.8 to 5.6%. Also, Landwehr et al. reported a prevalence of 16.5% for scabies probably associated with social-economic status. Contagious state of scabies may cause various difficulties in social communities like epidemic of scabies in a prison in the north of Tanzania and a prison in India with a prevalence of 1.8%.[41,42] Epidemic scabies was reported by Leppard et al. in a penitentiary in the north of Tanzania. Of 1053 prisoners 1014 (95%) individuals had scabies and 16 (1.4%) prisoners were affected with crusted scabies, 802 (69.5%) were faced with regular form of scabies and 196 (24%) of them had severe pyoderma. Out of the 251 staff in the prison 65 (26%) had scabies.[41] According to Biu and et al. the highest rate of scabies was observed among the unemployed patients (65.5%) in Nigeria and the lowest rate was seen among the commercial vehicle drivers (0.3%). This study indicated that there was a significant drop in scabies in 2007 with a 9.5% prevalence compared to 2004, 2005 and 2006 with 19.3%, 40.6%, and 30.6% respectively.[43] All the age groups are usually infested with scabies but in the poor communities rate of this infestation is higher especially in children. For example 77% of children under 5 have scabies in Bangladesh whereas scabies threatens only 5% of the children in the developed countries.[44,45] In a study conducted by Landwehr and colleagues in Malawi and Cambodia (1998) epidemiology of scabies was about 4% (0.7% for Malawi and 3.4% for Cambodia) in boy schools with a total of 61735 individuals.[46] Majority of other studies confirm that scabies is more prevalent among children under 10 years old.[34,39,40] In a four-year review on the prevalence of human scabies on 983 patients in Borno State, Nigeria conducted by Biu et al. between 2004 and 2007, prevalence of human scabies was higher in children (77.2%) than adults (22.8%). Also, they concluded that scabies was more prevalent in July and October.[43]

Studies demonstrate that scabies exists as a sexual parasitic disease in Iran and its prevalence vary in different provinces due to various climates.[4,6] A study on the military forces all over the country showed that scabies had infested 1915 individuals within 3 years. Provinces of Gilan and Mazandaran had the highest prevalence. Gilan in years 1997 (69%) and 1999 (87%) and Mazandaran in 1998 (68%) were mostly infested by scabies in a three-year study in the dermatology clinic of Razi Hospital a high prevalence of scabies in Rasht was

reported (9%).[47-49] Also, in a study on 3545 prisoners in the central prison of Kerman, scabies had a prevalence of 1.2%.[6] Rahmati and Malekzade et al. reported a prevalence of 2.2% for scabies among 1404 prisoners in a prison in Ghazelhesar region.[50] In a study by Dehghani and colleagues conducted on 2899 cases referred to parasitological laboratory of Isfahan during 1996-2002, scabies prevalence among the males was reported three times greater than that among the females. Prevalence of scabies in 1996 was 25%, while in 2002 it was 5.6%.[51] Daliri et al. in their study on pupils of elementary schools in Bandar anzali reported scabies prevalence as 5.93 and 7.22% for the urban and rural schools respectively.[24] Gholchai et al. in their study in Gilan concluded that scabies was more prevalent among pupils with the most populated families. Those pupils were mostly involved at the age of 9 (45%).[23] Also, Rahdar and colleagues in Ahvaz came to this conclusion that scabies was more prevalent among children under 10 years of age.[52] Scabies is mostly common in time of wars, famine and drought. In Iran it was mostly prevalent during the war.[5] However, scabies has been detected after the war and various cases have been reported in Khorasan and other provinces.[8,22-24,53]

DISCUSSION

In recent years, scabies has appeared in many societies such as developing countries.[54] Contamination to scabies is non-uniform geographical distribution in Iran and Prevalence of scabies has been rather high which is of course different in various provinces due to different climates. For instance, this prevalence is higher in the Northern provinces compared to other provinces in Iran which could be because of population density, climatic conditions, and high humidity of the Northern provinces comparing with other ones. Hosseini-Shokouh et al. reported that prevalence in humid province is the highest than that in the dry provinces and the prevalence is variable of 1 to 5 in 1000 people.[55] Findings of Dehghani et al. demonstrated that prevalence of scabies depends on different factors such as sex, age, social status, climatic conditions, and weather.[51] Although scabies has been seen in both sexes, however some studies show that it has been dominant among males while some other confirms that it has been mostly prevalent among females.[23,36] The difference between the two sexes seems to be due to socio-economic status and overcrowding. Since in some societies men have more social freedom compare to women and consequently sexual relations and moral corruptions are more likely among men than women, therefore, high prevalence of scabies among men as a result of sexual contact may be because of the freedom and latitude of men rather than women in those societies.[19,56] In addition to the effect of health status on the prevalence of the disease, number of individuals in every family is also contributable to the incidence of the disease, so that scabies is higher in the densely populated families than that in the small families. This can be showed that beside the main factors such as age, sex, living in crowded and poorly hygienic places, rough sexual relations, poverty and malnutrition and other factors like weather change or in other words reduced atmosphere temperature because of wearing more clothes and/or reduced times of bathing are effective factors in spreading this disease.[36] Some reports have indicated high prevalence of scabies among soldiers.[53] which may be mostly probable due to rough sexual relations, high density in barracks, lack of personal hygiene, etc. This group is usually less literate than other groups of the society and is at the peak of its sexual

pressure. In countries with compulsory military services, this age group includes individuals between 18-22 years of age separated from their families and therefore not monitored by their parents. Consequently, this can be a main cause for their contamination.[56] Undoubtedly, the more the individual is aware of ways of scabies transmission, the more attentively he observes hygienic matters.

Due to the concerns of the ministry of health in Iran, it seems that prevalence of scabies is to be decrease in coming years. Of course, in case of neglecting the matter, scabies will be prevalent duo to other phenomena such as war, famine, poverty, etc.

CONCLUSION

Sarcoptes scabiei contamination is different in various parts of Iran. So that in provinces such as Golestan and Mazandaran and Gilan, it is more prevalent than that in the southern and central region. Thus, it can be inferred that this contamination is more frequent in the humid regions of Iran. Due to the high prevalence of scabies in the Northern regions of Iran, this disease is still one of the challenging hygienic issues in these regions. So, appropriate strategies are required to prevent and control the disease. It is recommended that individuals in the educational institutions and garrisons should be trained about this disease and other sexual diseases to improve their awareness in this regard. Cross-sectional and periodic reviews can help determinate scabies dimensions of spreading especially in the regions with high prevalence and recurrence. Studying status of different regions in term of prevalence of contamination may stimulate health system to control the problem. Attempts of health organizations are of vital importance in managing the epidemiology. Individuals in charge of health units must be trained. Bed sheets in public places must be thoroughly washed. The most effective ways to eliminate the disease including: application of benzyl benzoate, mitigal, tetmosol, and lindane for the infected people. Promotion of public awareness of health status in order to prevent mental and economic consequences of the scabies is also necessary.[6,21] In the case of any epidemiology in vast scale, abrupt investigation and physical examination of pupils, dormitory residents, and other public places such as prisons, hospitals, barracks, camps, and sanitariums are of vital significance. All the suspicious cases should be considered and treated soon. Otherwise, the disease will involve those not infected yet and bring about vast epidemiology. Application of Malathion in beds, walls and infested animals is of value. Putting infested clothes in disinfectant solutions like Dettol 10% or boiled water for at least one hour is another good way for disinfecting scabies.[19]

CONFLICT OF INTEREST

There is no Conflict of interest in this study.

ACKNOWLEDGEMENT

The authors appreciate the women participated in this study.

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How to cite the article: Dehghani R, Ghannaee Arani M, Seyyedi Arani HR, Zarghi I. Scabies contamination status in Iran: A review. Int J Epidemiol Res. 2016; 3(1): 86-94.