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Prevalence of schistosome induced cercarial dermatitis in north of Iran

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PEER REVIEW

ABSTRACT

Peer reviewer

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Comments

The study in which the authors evaluated the prevalence of cercarial dermatitis and relations of between the frequency and epidemiological factors especially job, age, and gender. The results are interesting and suggested that cercarial dermatitis is prevalent and prevention and control attempts will be programmed.
(Details on Page 40)

Objective: To investigate the level of people's infection to cercarial dermatitis in Mazandaran Province (north of Iran), where is susceptible to this disease due to Mazandaran's climate.
Methods: The present descriptive study is a cross sectional one and was done during 2010–2011. The sample and population were 2310 people, randomly chosen in 77 clusters from 4 towns, 30 people in each cluster on average. The survey form was given to people house-by-house and the clinical observation of the positive cases were recorded. The related medicine (calamin ointment) prevention methods were prescribed by the doctors of the research team and freely given to the infected patients. SPSS was applied to analyze the groups of age, sex, job and the part of the body infected. **Results:** Among the 2310 population studied, 139 of them (6.1%) were infected to cercarial dermatitis. Among the 139 people who had cercarial dermatitis, there was a significant difference in the amounts related to the groups of job, age and the part of body infected. Farmers were infected to this disease more than other vocations 74 (53.2%); people between 40–49 years were infected to cercarial dermatitis more than other age groups 38 (27.3%); leg was the most vulnerable bodypart 112 (80.6%). **Conclusions:** It can be concluded that since this farmers and 40–49 years group are more exposed to mud and dirty water, these people are more infected to cercarial dermatitis. Close cooperation among health and environment authorities should be carried out 40–49 years, to control this disease 40–49 years.

KEYWORDS

Cercarial dermatitis, Prevalence, Human, Mazandaran, Iran

1. Introduction

Cercarial dermatitis, is a prevalent disease among farmers^[1]. The skin lesion of cercarial dermatitis is red papules with inflammation and itching and finally scorch after a few minutes until the skin penetration cercarial (larval stage of *Schistosoma* especially animal birds) in the parts of the body that are not covered by clothing^[2]. The symptoms of this disease can be differentiated with the three The row condition which are: the effect of agricultural pesticides (with the spread of the

symptoms in the covered and uncovered parts of the body and Eye symptoms in fresh water), aquatic insect bites (the part that is bitten and the presence of Insect larvae in that and in fresh waters) and the complication jelly fish (in salty waters and just in the covered parts of the body With antenna son the water body). The clinical diagnosis of this disease is based on recognition of these symptoms^[2,3]. This disease is also known under other titles such as swimmer's itch and Paddy itch^[4]. Migratory waterfowls, particularly ducks, from anatidae family act as the final host (Adult worms in blood vessels)

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and lymnaea amphibious snails act as the intermediate host in the life cycle of this Parasite[5]. Thus the migratory birds, contaminate the snails by contaminating the water and Egg excretion, and these snails cercaria excreted in the water and infect the people who are somehow in contact with fresh waters. This disease is a kind of Zoonosis diseases and is reported in the north (Mazandaran and Gilan province) and south(Khuzestan province) of the country[6,7]. Cecarial dermatitis, is regarded a new disease in Europe[8,9]. the aim of the study was to determine the prevalence of cecarial dermatitis among the over 10–year old of the rural areas of Mazandaran province. Since people under 10–year old, are not involved in farming, the present study investigates the prevalence of cecarial dermatitis among the rural population of Mazandran and in the end, gives appropriate strategies to protect the people of this area against this disease.

2. Methods and materials

The present study is a descriptive cross sectional one which chose randomly 4 towns across Mazandaran province (Chalus, Fereidunkenar, Sari, Behshahr). The sample of each town was calculated through dividing the whole sample of the study (2310 people) by the total rural population of these 4 towns, multiplied with the rural population of each of the aforementioned towns. Based on cumulative household (24786) and Random number (139), 77 clusters were defined and with regard to the amount of the sample (2310 people), 30 people who were over 10–year old, were studied in each cluster and the questionnaires were filled. The population under study that were chosen by random sampling in Mazandaran province, consisted of 2310 people from the 4 towns of (Chalus, Fereidunkenar, Sari, Behshahr) and 64 villages. This population was divided into 77 clusters. Chalus town with 17 villages (18 clusters=540 people), Fereidunkenar town with 18 villages (23 clusters=690 people), Sari town with 20 villages (20 clusters=600 people) and Behshahr town with 9 villages (16 clusters=480 people) were studied and 30 people were put in each cluster. The form for collecting data, was given to people house–by–house and the clinical observation of the positive cases were recorded. The related medicine (calamine –D ointment) was prescribed by the doctor of the research team and was freely given to the infected patients and the prevention methods was trained. The collected data was recorded in SPSS program and was analyzed based on the groups of age, sex, job and the part of the body infected. The age groups were classified in 7 levels and each level was 10 years younger than the next. There were 338 people in age groups of 10–19 years old, 565 people (24.5%) in the group of 20–29 years old, 459 people in the age group of 30–39 years old, 427 people in age group of 40–49 years old, 507 people in the age group of 50–59 years old, 9 people in the age group of 60–69 years old and 5 people in age group of more than 70 years old. From the vocational point of view, the people under study were divided into 5 job groups which are: householders, clerks, farmers, university or school students, other vocations and self–employments. 868 householders, 72 clerks, 478 farmers, 344 university and school students and 548 people from other vocations were studied. Based on the part of the body infected to cecarial dermatitis, 3 groups was developed; namely, hands, legs and hands and legs. Beside this, all the infected people were studied regarding their hands and legs covering with clothes, when in contact with the contaminated water.

3. Results

A total of 2310 people were studied, 139 case (6.1%) of which, were clinically observed and reported to have vecarial dermatitis(42.5% male and 57.5% female). 18 villages of Fereidunkenar town(660 people) were studied in 23 cluster(each containing 30 people). It was reported that 35 of them (5.07%) were infected. 480 people from 16 villages of Behshahr town were studied in 16 clusters and 11.04% of them were reported to be infected. Among the 600 people of 20 villages of Sari town divided into 20 clusters, 78 people were infected. 17 villages of Chalus town was studied in 18 clusters, among the 540 people of Chalus villages studied, 0.74% were reported to be infected. All the infected people were in contact with contaminated water (of paddies).



Picture 1: Swimmer's itch, rash on the legs of a female farmer in Behshahr town(north of Iran).

A total of 1162 people of the population under study were male and 57.5% of the infected cases were male. 1148 people of the population were female and 42.5% of the infected cases were female (Table1) . Based on the results of *Chi*–square test, these two differences in terms of the sex of the infected cases, is meaningful ($P<0.05$).

Table 1

The distribution of the population under the study for cercarial dermatitis in Mazandaran Province which is based on their sex.

Gender	Positive	Negative	Total
Male	80 (6.9%)	1082 (93.1%)	1162 (100%)
Female	59 (5.1%)	1089 (94.9%)	1148 (100%)
Total	139(6.1%)	2171 (94%)	2310 (100%)

P –value=0.047.

Cercarial dermatitis infection was most seen in the age group of 40–49 years old. A total of 427 people of this group were studied and 38 of them (1.6% of the total population) were infected which constituted 27.3% of the whole infected population, 338 people were studied in the age group of 10–19 years old and only 8 of them (0.3% of the total population) were infected. No cases of infections were reported for 2 age groups of

Table 2

The distribution of the population under the study for cercarial dermatitis in Mazandaran Province based on the age groups.

Age group(years)	Total (%)	Positive(%) to the total population	Positive(%) to the total infected cases	Negative(%) to the total population
10–19	338 (14.6)	8 (2.4)	5.7	330 (97.6)
20–29	565 (24.5)	30 (5.3)	21.6	535 (94.7)
30–39	459 (19.9)	32 (7.0)	23.0	427 (93.0)
40–49	427 (18.5)	38 (8.9)	27.3	389 (91.1)
50–59	507 (21.9)	31 (6.1)	22.3	476 (93.9)
60–69	9 (0.4)	0 (0)	0	9 (100)
+70	5 (1.2)	0 (0)	0	5 (100)

Table 3

The distribution of the population under the study for cercarial dermatitis in Mazandaran Province based on the population's vocation.

Job	Total (%)	Positive (%) To the total population	Positive(%) to the total infected cases	Negative (%) to the total population
Householder	868 (37.6)	37 (4.3)	26.7	831 (95.7)
Employee	72 (3.1)	2 (2.8)	1.4	70 (97.2)
farmer	478 (20.7)	74 (15.5)	53.2	404 (84.5)
student	344 (14.9)	6 (1.7)	4.3	338 (98.3)
others	548 (23.7)	20 (3.6)	14.4	528 (96.4)
Total	2310 (100)	139 (6)	100	2171 (94)

60–69 and more than 70 years old (Table 2). Observed differences between age groups based on chi-square test was significant ($P < 0.05$).



Picture 2: Rash on the legs of a female farmer in Behshahr town (north of Iran).

Regarding the vocational groups, farmers were reported to have cercarial dermatitis more than other jobs. 74 of the farmers (53.2% of the farmers) were infected which is 3.2% of the total population of the study; The vocational group that had the least infection among others, were university and school students (0.3%)(Table 3). The results of *Chi*-square test showed that this difference is statistically meaningful ($P < 0.001$).

Table 4

The distribution of the population under the study for cercarial dermatitis in Mazandaran province based on the part of the body being infected

Part of the body being infected	The number of infected people (%)	Percentage to the total of population
Hand	11(7.9)	0.48
Leg	112(80.6)	4.8
Both hands and legs	16(11.5)	0.69
Total number of the infected people	139(100)	6



Picture 3: Swimmer's itch, rash on the hand of a male farmer in Freidonkenar town(north of Iran).

Among the 139 people who had skin lesion (cercarial dermatitis), 11 of them (7.9%) had it just on their hands, 112 of the infected people (80.6%) had it on their legs and 16 of them (11.5%) had this lesion on their hands and legs (Table 4 and Figure 4) and differences based on chi-square test was significant ($P < 0.001$).

4. Discussion

Paddy's infection to cercarial dermatitis makes them temporarily disable and causes secondary infections which follow it. Since Mazandaran's climate is a good condition for the life cycle of cercarial dermatitis, and different areas of this

province are appropriate places for the migratory birds to spend their winters, and a considerable number of these birds come from middle Asia to the northern provinces of the country and can contaminate the regional waters (point of water), snails and finally spread this disease among the people of the region, especially paddy, this disease is known as “Tilbakhorde” among the local people^[10,11]. Cercarial dermatitis has been recorded in Canada, 11.8%, US, 17.3% and Chile, 3%^[12]. In the present study, 6.1% of the population were infected but in Dr. Farahnak *et al*'s study for investigating the prevalence of cercarial dermatitis in Khuzestan province (among the inhabitants of the north of Ahvaz), 1.1% of the population was infected^[7]. Because of rainfall, high humidity and bird's winter migratory in this province, we have more infected people. As was mentioned in the results, the highest level of infection was seen among the people who were in the age groups of 40–49 years old. In this age groups because more people are farmer they have constant contact with contaminated water. Farmers, who work on rice fields, are more likely to get cercarial dermatitis because they do not use any cover for their hands and legs. The lesions caused by cercarial dermatitis, are seen most on the legs for this part of the body is longer in contact with the water and mud and all the infected people were in contact with the contaminated water of paddies.

Thus, regarding the prevalence of this disease, there should be a close cooperation among the health and environment authorities and jihad agriculture province, to control it. In the end, there should be public education and informing the ones who are exposed to this disease about how it spreads and how to protect people from being infected to it. The evaluation of the role of birds and snails in transferring cercarial dermatitis in the region is also under considered.

Conflict of interest statement

We declare that we have no conflict of interest.

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Comments

Background

Cercarial dermatitis is occurred due to cercariae penetration of birds and mammals schistosomes species. The cercariae liberated from the especial snail into freshwater in suitable time of year. Individuals are infected due to exposure to contaminated water. Farmers employed in rice cultivation of Northern, Iran are exposed to the water. The clinical manifestations are usually burning, tingling, and intense itching.

Research frontiers

Studies are being performed in order to determine the prevalence of Cercarial dermatitis in Southern and Northern

parts of Iran. The life cycle of *Schistosoma* Spp. discovered in different snails as intermediate host and buffalo, cattle and bird as definitive hosts.

Related reports

In past reports, the authors reported the adult and larvae stages of the animal Schistosomes in these regions. But in these areas, human manifestations are not reported.

Innovations & breakthroughs

This study was undertaken to determine the prevalence of cercarial dermatitis based on epidemiological factors. In this paper, the prevalence rate is based on observation of clinical manifestations of individuals in the regions. The relation between the disease and water contact due to different jobs was assessed. Age is another epidemiological factor that is evaluated.

Applications

The result of this research was applied in control and prevention programs.

Peer review

The study in which the authors evaluated the prevalence of cercarial dermatitis and relations of between the frequency and epidemiological factors especially job, age, and gender. The results are interesting and suggested that cercarial dermatitis is prevalent and prevention and control attempts will be programmed.

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