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Original Article

Risk factors and diagnostic criteria for scabies in a population of Khyber Pakhtunkhwa, Pakistan: Unmatched case-control study

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Abstract

Objective To find out the risk factors associated with a high prevalence of scabies in patients who visited LRH (Lady reading Hospital) Peshawar, Khyber Pakhtunkhwa, Pakistan.

Methods A total of 177 scabies patients and 354 control individuals took part in this study. We found a high rate of the disease at the age of 21-50 years OR: 1.70, 95% Cl [1.18-2.45] compare to individuals of other ages.

Results The risk of the disease was higher in crowded areas such as schools and big families. This disease risk was lower in individuals having good living condition OR: 0.43, Cl 95% [0.28-0.64], good hygiene OR: 0.26, Cl 95% [0.172-0.397], and good income OR: 0.489, 95% [0.330-0.724]. Illiterate was more affected compared to literate (P<0.0001). Topical and oral treatment was found more common and effective (78.0%), topical treatment was prescribed to (20.3%), and oral treatment was prescribed to (1.7%) patients.

Conclusion It is evident from the result that the risk of scabies upsurges in congested areas, poor hygiene, and low income. Furthermore, topical and oral treatment is more common and effective to treat the disease.

Key words
Scabies, Risk Factors, Diagnostic criteria, LRH.

Introduction

Scabies is a dermal infestation, caused by a tiny mite known as *Sarcoptes scabiei* (obligatory ectoparasite). Every year almost 300 million population suffers dermal infestation worldwide.[1] In all the developmental stages (larvae, nymphs, and adult) of *S. scabiei*, *it* can live 3-10 days outside the host.[2] A *S. scabiei* female can survive up to 30 days in the body of the host, penetrate the superficial layer of the skin and lay eggs there.[3] Hands, feet, arms, breasts, genitals, umbilicus, and buttocks are the most affected areas of the host body.[4] Symptoms of scabies are skin itching like an allergic response. In the first infestation, the symptoms appear after 2 to 6 weeks, but if the person infected second time later in life, symptoms may begin earlier (1 to 4 days).[5] Communities of the lower standard population (unhygienic condition) and overcrowded areas are mostly affected by this parasitic disease.[6] Scabies is diagnosed clinically by examination (nocturnal, itching and looking burrows, papules/ pustules on the body of the infected person and confirmed by microscopy of skin scraping. The presence of the mites and its feces or eggs confirms the disease. The treatment of scabies is by applying scabicides, such as permethrin, lindane, benzil benzoate and sulphur.[7]

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Material and Methods

Study area and design This study was approved by the Board of study Research Department of

Zoology Abdul Wali Khan University Mardan (Approval No SS01) and was conducted in LRH (Lady Reading Hospital), Peshawar, Khyber Pakhtunkhwa, Pakistan. The duration of the study was nine months. The total area of Khyber Pakhtunkhwa is 39,282 $mi^{2,}$ with 35 districts and a population of 35,525,047. The literacy rate in KPK is 88.6%.[8]

Data collection method and analysis

Dermatologists investigated and confirmed 177 scabies patients by scraping the skin portion and examining the scrapings in a microscope for the existence of feces, mites, or eggs. Data were collected by face-to-face interview. Both the new cases and previously diagnosed cases included in this study. Among 184 patients, 177 were included in this study. Among 367 control individuals, 354 agreed to participate in this study. A case was defined as a scabies patient diagnosed by a dermatologist. Both the case and control groups belong to Khyber Pakhtunkhwa were included in this study. The sample size was estimated by Epi info stat calc. Statistical analysis was carried out by IBM SPSS Statistics Software (Version 21). A chi-square test and logistic regression were used. The *P*-value<0.05 was measured as statistically significant. Statistical analysis was divided into two parts: Descriptive statistics were used to analyze the history of contact, diagnostic criteria and treatment prescription. For the comparison of cases and controls, chi-square (χ^2) tests and Logistic regression (95% confidence interval) were used.

Results

During the present study, the risk of scabies was found high in the age of 21-50 years (OR: 1.70) compare to 1-20 and 51 or above years. Students were more affected by the disease (OR: 1.71), while the risk was lower in the shopkeepers (OR: 0.49). Individuals with poor hygiene were at high risk of having scabies (OR: 48.1), while its risk was lower in individuals with good personal hygiene (OR: 0.43). People with good income (OR: 0.489) were less affected compared to individuals with average and lower-income **(Table 1)**.

Table 1 Scabies in relation to age, occupation, living condition, personal hygiene, and income.

Variables	*Cases n (%)*	*Control n (%)*	*OR (95% Cl)*	*P-Value*
Age (Years)				
1-20	41 (32.2%)	110 (31.1%)	0.66 (0.44-1.01)	0.060
21-50	103 (58.2%)	159 (44.9%)	1.70 (1.18-2.45)	0.004
51 or above	33 (18.6%)	85 (24.0%)	0.72 (0.46-1.13)	0.184
Occupation				
Student	50 (28.2%)	66 (18.6%)	1.71 (1.12-2.62)	0.014
Shopkeeper	26 (14.7%)	92 (26.0%)	0.49 (0.30-0.79)	0.003
Labourer	25(14.1%)	34 (9.6%)	1.54 (0.89-2.86)	0.143
Housewives	43 (24.3%)	77 (21.8%)	1.15 (0.75-1.76)	0.511
Government servants	33 (18.6%)	84 (23.7%)	0.73 (0.46-1.15)	0.222
Living condition				
Poor	26 (14.70%)	08 (2.30%)	7.44 (3.29-16.82)	0.0001
Average	107 (60.5%)	192 (54.2%)	1.29 (0.89-1.86)	0.194
Good	44 (24.9%)	154 (43.5%)	0.43 (0.28-0.64)	0.0001
Personal Hygiene				
Poor	38 (21.5%)	02 (0.60%)	48.1 (11.45-202.1)	0.0001
Average	102 (57.6%)	174 (49.2%)	1.40 (0.978-2.024)	0.0660
Good	37 (20.9%)	178 (50.3%)	0.26 (0.172-0.397)	0.0001
Income				
Low	17 (9.6%)	24 (6.8%)	1.46 (0.763-2.797)	0.301
Average	112 (63.3%)	177 (50.0%)	1.72 (1.190-2.494)	0.004
Good	48 (27.1%)	153 (43.2%)	0.489 (0.330-0.724)	0.0001

Table 2 Scabies in relation to Gender, Education and Family members.

Variables	*Cases n (%)*	*Control n (%)*	*P-Value*
Gender			
Male	90 (50.8%)	174 (49.2%)	0.714
Female	87 (49.2%)	180 (50.8%)	
Education			
Literate	75 (42.4%)	102 (57.6%)	0.0001
Illiterate	231 (65.6%)	121 (34.4%)	
Family members			
1-5	27 (15.3%)	150 (84.7%)	0.0001
6 and above	198 (55.9%)	156 (44.1%)	

Table 3 Scabies in relation with history of contact, criteria of its diagnosis and treatment.

	Frequency	*%age*	*Valid %age*	*Cumulative %age*
History of contact				
< 3 months	171	96.6	96.6	96.6
> 6 months	6	3.4	3.4	100.0
Total	177	100.0	100.0	
Criteria for diagnosis				
Nocturnal itching	3	1.7	1.7	1.7
Genital involvement	3	1.7	1.7	3.4
Night itching & burrows	3	1.7	1.7	5.1
Night itching & family history	39	22.0	22.0	27.1
Night itching & genital involvement	12	6.8	6.8	33.9
Night itching & burrows	3	1.7	1.7	35.6
Night itching, family history & genital involvement	84	47.5	47.5	83.1
night itching, family history & burrows	9	5.1	5.1	88.1
Night itching, family history, genital involvement & burrows	12	6.8	6.8	94.9
Night itching & genital involvement	9	5.1	5.1	100.0
Total	177	100.0	100.0	
Treatment				
Topical treatment	36	20.3	20.3	100.0
Oral treatment	3	1.7	1.7	79.7
Topical & oral treatment	138	78.0	78.0	78.0
Total	177	100.0	100.0	

This study found no significant association between scabies prevalence and gender (*P*:0.714). The risk of scabies was high in illiterate individuals (*P*<0.0001). This study also found that big families are at high risk of having scabies (*P*<0.0001) **(Table 2)**.

Based on the history of contact the frequency of scabies was high in those having <3 months history of contact with their family members (96.6%), while the rate was low in those having >6 months of history of contact with their family members (3.4%). After diagnosis it was found that Night itching, family history and genital involvement was found more in scabies patients (47.5%), night itching and family history was (22%), night itching and genital involvement was (6.8%), night itching, family history, genital involvement and burrows was (6.8%), night itching, family history and borrows was (5.1%), night itching and genital involvement was (5.1%), night itching was (1.7%), genital involvement was (1.7%), night itching and borrows was (1.7%), and night itching and burrows was (1.7%) respectively. Topical and oral treatment was found to be more effective

(78.0%) as compared to topical treatment (20.3%) and oral treatment (1.7%) **(Table 3)**.

Discussion

Scabies is an infectious disease caused by *Sarcoptes scabiei* mite, which is widespread in developing countries. We conducted the current study at LRH (Lady Reading Hospital) Peshawar, Pakistan. The doctor investigated a total of 184 patients. The findings of the present study were, the age group of 21-50 years has a high rate of the disease (*P*=0.004). This study found no significant association of scabies with gender. A study from Iraq reported that scabies rate decrease with increase in the age group while the risk of scabies was higher in female compared to male individuals,[9] but another study reported a high rate of scabies in males to compare to female.[10] During the present study, the disease rate was significantly higher in illiterate individuals (*P*=0.0001) because they have less knowledge about hygiene. Furthermore, we found a high rate of scabies in big families which has six or more than six members (*P*=0.0001). This study revealed that individuals with poor living conditions are at risk of scabies (P=0.0001). Moreover, poor hygiene and poor income were also associated with increased risk of scabies. These results get favor from another study in which they reported a high rate of scabies in big families (P= 0.004).[11]

By occupation, the scabies was more common in students because scabies is a contagious skin disease and can be easily spreading in crowded areas such as schools. This study further revealed that the frequency of scabies was high in those having <3 Months history of contact (96.6%), while the frequency was low in those having >6 Months history of contact with their family members (3.4%). As a result, we found that the treatment of scabies is more effective with oral and topical agents (78.0%) than topical treatment (20.3%) and oral treatment alone (1.7%).

This is the first case-control study from Khyber Pakhtunkhwa that reports the association of different risk factors with scabies. This study also provides information that a large population develops scabies because of poor living conditions, poor hygiene, and poor income. Our study has some limitations. It was almost impossible to recruit a big sample size.

Conclusion

This study concluded that to reduce the burden of scabies; there is a need for improvement in living conditions, hygiene, and income. There is also a need to aware the public about the disease risk factors. The frequency of scabies can be reduced by controlling vectors, improving health education, personal hygiene, living condition and awareness about scabies among people. We can apply different types of treatments for scabies.

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