



## INSIGHTS INTO SCABIES PREVALENCE AND RISK FACTORS

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**Abstract** Scabies is an infectious disease of the skin caused by *Sarcoptes scabiei*. In the current study, investigation of scabies epidemiology was accompanied by Peshawar and Karak districts to assess the prevalence and main risk factors accountable for the transmission of scabies. A survey was reported on scabies at DHQ Karak and HMC Peshawar from January 2019 to January 2020. Data was collected every month from HMC Peshawar and DHQ Karak. The total reported cases were 571 during study time. The report showed that the frequency of scabies was high during December and January. While lower in August and October. Infestation rates were more in males than females while children and teenagers (1-20 years) were more prone to this condition. The infection was considerably more common in males (51.1%) than females (49.9%), in lower socio-economic levels (52.0%) than the upper (16%) and middle levels (32%), and in those communities living in uncemented houses (70.7%) than living in cemented houses (29.3%). Family size was of no significance. The present result showed that hands and genitalia were affected more as compared to other body parts. About 24% of patients showed scabies infection at more than two sites. During the study general information about scabies was provided to all patients to give them an idea about the severity of infection. Biopsy was also performed but distortion of mite due to itching made it impossible to study its morphology. It is concluded from the present study that scabies infestation is characterized by parasites that cause itching and scratching sensation at night. The findings scabies prevalence is influenced by seasonal variations, demographic factors, socioeconomic status, and housing conditions, and understanding these factors is essential for developing efficient prevention and control strategies to alleviate the scabies burden in affected populations.

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**Keywords:** Scabies; Prevalence; Age; Gender; Socioeconomic status

### Introduction

Scabies is an infectious parasitic infestation transmitted by the mite known as *Sarcoptes scabiei* var. *hominis* that leads to skin allergic reactions (Shehwana et al., 2021). The manifestation of mite products in stratum corneum energies hypersensitivity in the host that causes an intense rash and pruritis that leads to social stigma, poor concentration, and disturbed sleep (Engelman et al., 2021). Worldwide scabies affect about 300 million persons annually in all races, social classes, and age groups and the highest incidence is supposed to occur in tropical low-resource environments (Sarwar, 2023). It is related to considerable disease among certain patient groups and is prevalent in several subtropical and tropical communities (Seid et al., 2022). Sexual promiscuity, undernourishment, overcrowding, poor hygiene, poverty, and institutionalization have been suggested as substantial risk factors and often epidemics occur in wars when these risk factors increase (Trüeb et al., 2023). Problems of skin caused by scabies and the fact that it helps in the spread of pathogenic microbes such as *Streptococcus pyogenes* and *Staphylococcus aureus* make it a global socioeconomic and epidemiological issue, mainly in developing nations

(Parker et al., 2022). Because of the scabies burden, it was included in Neglected Tropical Disease portfolio by the WHO in 2017, with the endorsement that the management of scabies should be integrated into the universal health coverage package of care (Engelman et al., 2021). For global control of scabies the development of effective strategy needs a rigorous understanding of disease burden, but strong epidemiological data is scarce for many reasons (Jira et al., 2023). The highest burden was observed in several resource-limited situations, predominantly in Pacific nations, with the highest incidence observed in Papua New Guinea (71%) (Collinson et al., 2020). Scabies badly affect the individuals' lives and also affect the daily lives of others living with them (Yildirim et al., 2023); therefore, scabies are regarded as a public health hazard. Particularly, susceptible patients, like elderly people or children, can acquire scabies through contact (Tefera et al., 2020). People with normal immune systems may also acquire scabies, and even do not become immune to the mites after recovery from the infestation (Adji et al., 2020). Therefore, treatment and prevention of scabies are regarded as significant aspects. Scabies can spread among individuals in shared or crowded spaces (Kim et al., 2020). According to an earlier investigation, it

is evaluated that scabies badly affects about 6 to 27% population per annum, which mostly live in resource-deficient regions of the world (Perveen, 2021). In Pakistan, most scabies cases are diagnosed in dermatology clinics (Majeed et al., 2023). An increasing burden of population coupled with a rapid urbanization process has terrifically boosted the health issues of the Pakistani communities living (Ullah et al., 2022). The data obtained from the Pakistan district health information system shows that scabies prevail in all provinces (Perveen, 2021). The Renaissance of infection embraces the prospective of causing economic and social losses at the cost of manhood's health (Bottalico et al., 2023), therefore, doubling the disease burden and subsequent in a poverty-ridden and unhealthy society. Despite sufficient literature presented on the epidemiology of this infectious infestation in developing and impoverished nations comparatively rare studies have been conducted on the epidemiological risk factors in Pakistan (Perveen, 2021). As scabies is prevalent highly in low socioeconomic communities, the low-middle socioeconomic Pakistani population is at high risk for this infection (Tahira et al., 2023). The studies exposing scabies frequency among the native population of Peshawar and Karak are lacking. The current study, hence, explores the frequency of the infection among outdoor patients visiting Hayatabad Medical Complex (HMC) Peshawar and DHQ Karak, so a proper strategy for community education could be considered for control and prevention against scabies.

## Materials and Methods

### Study Area

The study embraced various areas of Peshawar and Karak, Khyber Pakhtunkhwa, which has about 1.97 million and 706,299 population, respectively. The data of all patients who visited the dermatology clinic at Hayatabad Medical Complex (HMC) Peshawar and DHQ in Karak during a period of one year (Jan 2019 to Jan 2020) was collected in the study.

### Data Collection

Month-wise data collection was carried out from the hospitals. Questions were asked during consultation with all patients with the help of a dermatologist at the hospital where the study was conducted. These questions were about name, age, sex, residence, family size, monthly income, personal hygiene, and living habits. After obtaining verbal consent from respondents the information was collected and enrolled by inclusion-exclusion criteria on the pre-designed questionnaire. Inclusion Criteria: The skin patients of OPD were enrolled and information was collected from patients of scabies. Exclusion Criteria: Those patients were excluded that were not willing to contribute to the study or had other skin issues.

### Prevalence of Scabies

The total number of patients examined in the survey was 571 belonging to different areas which were Hayatabad, Civil Colony, Qamar Din Gari, Bara,

Board (Peshawar) and Hakeem Khel, Sarat Khel and Chokara (Karak). The patients were further divided into five age groups (0-10 years, 11- 20 years, 21 – 30years, 31-40years and 41–and above).

### Diagnosis

The patients were looking for medical care of their own accord or medicines that were prescribed by doctors in clinics. The scabies diagnosis was done according to the conventional criteria (Alsamarai, 2009). The diagnosis of scabies was based on symptomatic complaints and examination of the affected site. The whole body of patients was examined. The visualization of scabies burrows was done with ink or mineral oil. Biopsy of patients with pruritic, nodules, and popular rashes was carried out to confirm the presence of mite and to study their morphology. The lesion was gently scraped to remove top most skin cells. Next the skin particles were boiled in a 5% potassium hydroxide solution to clear the specimen (Zorbozan et al., 2020). Then by making slides was observed under a microscope. Skin particle samples including adult mites, their eggs or faces were referred to as positive. Negative samples were examined once more.

### Data Analysis Procedure

After entering data from respondents, the statistical investigation was done by SPSS version 20.0. All the variables were shown in percentages. Data is displayed in charts and graphs. The p-value was taken as 0.05.

## Results

### Prevalence of scabies

The total scabies infections reported were 571 during the research study from January 2019 to January 2020. Out of the total cases reported 236 (41%) were children and teenagers, 172 (30%) were adult male and 163 (29%) were adult female patients (figure.1). the results showed a higher prevalence rate in children followed by males and low in females.

■ Male ■ Female ■ Children

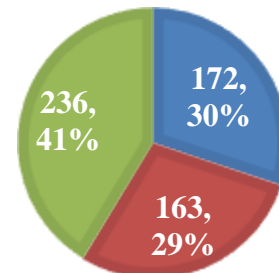


Figure. 1 Frequency of scabies

### 2.1 Prevalence of scabies month wise

Total cases documented in January 2019 were 78,56 in February, 33 in March, 30 in April, 25 in May,45 in June, 35 in July, 15 in August, 24 in September, 17 in October, 31 in November, 84 in December and 98 in January 2020 (table. 1). Month wise prevalence of scabies was high in January 2020 (16.8%) followed

by December 2019 (14.4%) and January 2019 (13.3%) and lowest in the month of August 2019 (2.5%). A comparative assessment of month-specific rates showed a higher rate of infection in cold months than in hot months. The data pooled over all months

showed that scabies infection was considerably more prevalent in winter than summer season ( $\chi^2 = 21.34$ ;  $df = 10$ ;  $P < 0.012$ ).

**Table. 1 Month-wise Prevalence of scabies**

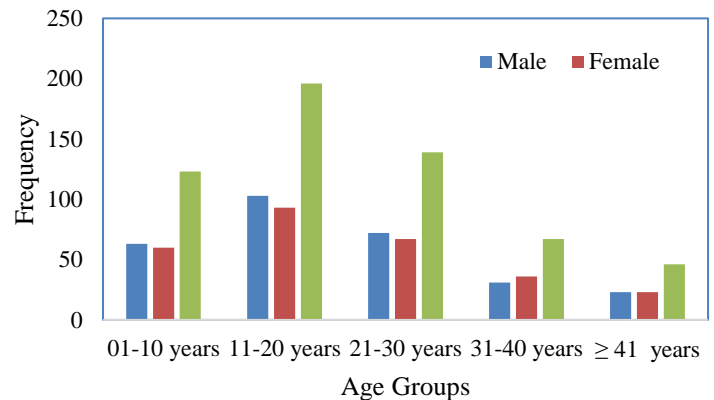
Months	Total		Female		Male		Children and Teenager	
	No.	%age	No.	%age	No.	%age	No.	%age
Jan- 2019	78	13.3	23	29.4	36	46.1	19	24.3
Feb- 2019	56	9.6	17	30.3	15	26.7	24	42.8
Mar- 2019	33	5.6	11	33.3	10	30.3	12	36.3
Apr-2019	30	5.1	07	23	07	23	16	53.3
May-2019	25	4.2	08	32	06	24	11	44
June-2019	45	7.7	07	15.5	08	17.7	30	66.6
July-2019	35	6.0	10	28.5	12	34.2	13	37.1
Aug-2019	15	2.5	03	20	03	20	09	60
Sep-2019	24	4.1	07	29.2	07	29.2	10	41.6
Oct-2019	17	2.9	04	23.5	05	29.4	08	47.0
Nov-2019	31	5.3	08	24.2	11	33.3	12	36.3
Dec-2019	84	14.4	25	29.7	26	30.9	33	39.2
Jan-2020	98	16.8	33	33.7	26	26.6	39	39.7
<b>Total</b>	<b>571</b>	<b>100</b>	<b>163</b>	<b>28.6</b>	<b>172</b>	<b>30.1</b>	<b>236</b>	<b>41.3</b>

No; Number, %age; percentage

**Age and sex-wise prevalence of scabies**

Sex-wise prevalence information categorized by a 10-year interval of age is documented in Table 2. Age-wise scabies infestation was higher in the age class 11-20 (34.3%) followed by age group 21-30 (24.3%) and 1-10 (21.5%) and lowest in the age-group  $\geq 41$  (8.0 %). A comparative assessment of age-specific rates showed maximum prevalence in children and teenagers than in adult females and males. In the age classes below 30, the infestation rate was higher in males than females. In the age classes above 30, there was a noteworthy difference with females presenting a higher occurrence than males (figure.2). The age group data showed that infection was considerably more in females than males and there was no significant association between months and sex ( $\chi^2 = 20.586$ ;  $df = 22$ ;  $P < 0.641$ ). The values results obtained from Chi-square indicate that there is statistically a significant relationship between gender and age group ( $P <$

0.005). Therefore, the study concludes that there is an association between age group and gender ( $\chi^2 = 14.49$ ;  $df = 4$ ;  $P < 0.0057$ ).



**Figure. 2 Age and Gender wise distribution of scabies**

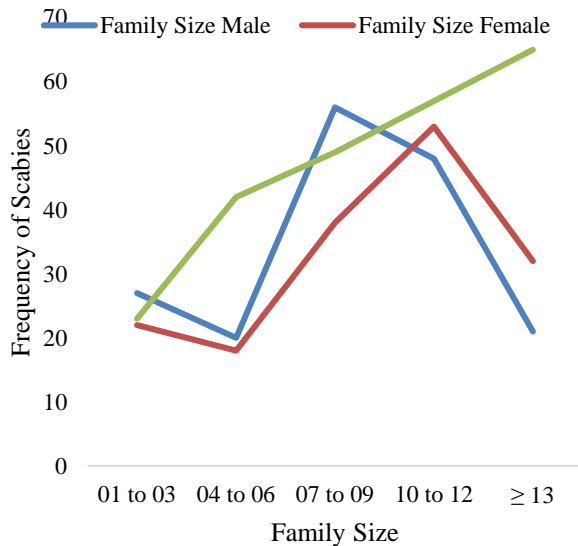
**Table. 2 Age Wise Prevalence of Scabies**

Months	Gender	Total	1-10	11-20	21-30	31-40	$\geq 41$
Jan-2019	Male	44	09	15	12	05	03
	Female	34	12	10	06	02	04
Feb	Male	28	06	11	08	01	02
	Female	28	06	10	08	03	01
March	Male	18	03	09	04	00	02
	Female	15	01	05	05	02	02
April	Male	15	02	05	07	01	00
	Female	15	02	06	03	03	01
May	Male	13	02	04	03	03	01
	Female	12	01	05	03	02	01
June	Male	23	10	06	05	00	02
	Female	22	07	04	07	02	02
July	Male	19	05	06	00	05	03

	Female	16	05	05	04	01	01
<b>Aug</b>	Male	08	02	01	03	02	00
	Female	07	01	01	03	02	00
<b>Sep</b>	Male	11	02	03	03	01	02
	Female	13	01	02	05	03	02
<b>Oct</b>	Male	08	02	02	03	01	00
	Female	09	03	03	01	02	00
<b>Nov</b>	Male	16	03	09	03	01	00
	Female	15	04	05	03	01	02
<b>Dec</b>	Male	43	10	17	08	05	03
	Female	41	11	18	06	03	03
<b>Jan 2020</b>	Male	46	07	15	13	06	05
	Female	52	06	19	13	10	04
<b>Total</b>		571	123	196	139	67	46
<b>Total Percentage</b>		100	21.5	34.3	24.3	11.8	8.0

**Scabies Prevalence in relation to family size**

The total patients (571) were categorized into five sets according to the family size. As scabies infection was more prevalent in males than females, sex-wise rates were deliberated while examining prevalence in association with family size. The study showed high infection rates in those families having a size of 10-12 (27.6%), followed by 7-9 (25%), and the lowest rate was observed in those having family size 1-3 (12.6%) as shown in the figure. 3. Hence, family size did not seem to be a substantial factor in the scabies prevalence (P=1.00).

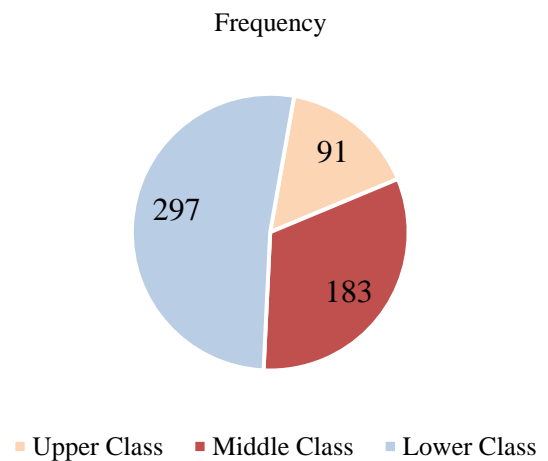


**Figure. 3 Scabies Prevalence according to Family Size**

**Association of socio-economic condition with scabies**

To study an association between the socioeconomic status of the subject and scabies, the patient’s socioeconomic state was categorized into groups according to their monthly income in rupees: lower class (below 6, 000), middle class (6, 000-10,000), and upper class (above 10, 000). The data relating to the scabies occurrence in association with socio-

economic state is shown in Figure 4. It was thought that socio-economic status might have some relation with scabies infections because poor economic state leads to overcrowding. The study pooled over both the genders showed that the middle and upper class was having lower prevalence (16% and 32%) comparing the lower class (52%) as shown in the figure. 4. Comparison assessment of groups showed a highly substantial difference ( $\chi^2 = 111.75$ ;  $df = 2$ ;  $P < 0.001$ ). It is thus determined that the infection was more common among the middle and lower socio-economic classes.

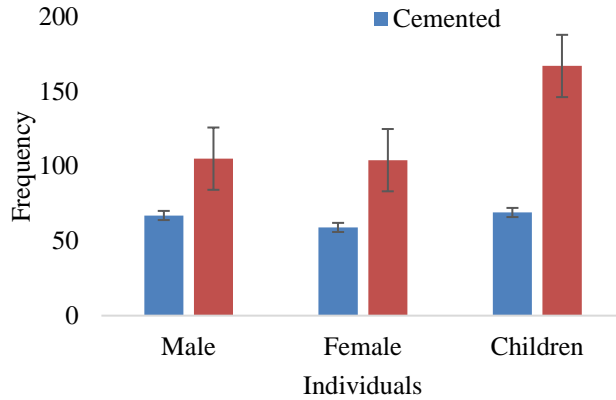


**Figure. 4 Scabies Prevalence according to Socio-economic Condition**

**Scabies prevalence in association to housing condition**

Data relating to the scabies prevalence in association with housing in main two classes, uncemented and cemented (figure.5). Comparative assessment of prevalence among populations of two classes showed significant difference ( $P < 0.001$ ;  $df = 1$ ;  $\chi^2 = 57.34$ ). These two classes vary as the prevalence in inhabitants of uncemented and cemented houses showed a big variation i.e. (70.7% Vs 29.2 %). The housing state thus appears to play a key role in the scabies occurrence. As anticipated the scabies rate

reduced with improved condition of the housing (Figure 5). The housing conditions are a sign of the socio-economic status seemed as a key factor in scabies epidemiology. The statistic that parallel difference for housing status was validated in adult males, females, and children lends credibility to the relationship of the variables –occurrence of scabies and housing condition.



**Figure. 5 Scabies Prevalence according to housing condition**

**Body parts affected most by *Sarcoptes Scabiei***

Our study shows that all of our studies during the study time frame were that of ordinary scabies. Symptoms included itching that is reported frequently to be more intense during night hours. Crusted and nodular scabies were not observed. Body parts affected include webs of fingers, wrists, elbows, buttocks, ankles, abdomen and back. The study presented here shows that hands, legs and feet, arms, breast, trunk, head and axillae are common sites of burrows. Number of patients whose different body areas were affected by *S. scabiei* infestation is given in the following table.3. Hands, legs and feet were affected most. Secondly, most of the patients have more than two body parts affected.

**Table. 3 Distribution of Patients according to Body Parts affected**

Body Parts	Number of cases	Percentage
Head	25	4.3
Axillae	20	3.5
Arms	45	7.8
Hands	98	17.1
Trunk	32	5.6
Legs and feet	98	17.1
Infection in 2 sites	112	19.6
Infection in more than 2 sites	110	19.2
Breast	31	5.4

**Discussion**

The present study was intended to examine the prevalence, and considerations of populations based in a region, which was driven by the assumption that poor socioeconomic situations, unhygienic and

overcrowding conditions may work as breeding ground for the communicability and emergence of the mite commonly neglected tropical skin infestation but no consistent data on scabies ailment for this specific region has been observed. Therefore, the current study can better be considered representative of other resource-deficient and deplorable Pakistani communities. As concerns demographic factors, practices facilitate, behavioral and social attitudes, poor hygiene and housing, frequent illiteracy, and low income play important roles in the spread of a parasitic mite (Hay et al., 2012). The target community was dwelling in miserable, congested and unhygienic living conditions which were observed as the main contributing factors to scabies prevalence (Mimouni et al., 2003; Hay et al., 2012). In an earlier study investigated the IDPs (Internally Displaced Persons) camp of located in Muzaffarabad, Pakistan, agreed well with current results that poor hygiene along with deplorable socio-economic levels were the basic root of scabies (Perveen, 2021). Crowded environments detected in the current study have been observed mitigating the high scabies rate in the target community that is agreeing with findings of the earlier studies observed in Malaysia (Zayyid et al., 2010), the UK (Downs et al., 1999), Brazil (Heukelbach et al., 2005) and Pakistan (Chaudhry et al., 2018). Congested and poor standards of living in tropical regions have been frequently documented in the literature as the chief risk factors for scabies proliferation (Chosidow et al., 2010).

The current study concludes that infections of scabies were distributed randomly among communities. All the community was exposed equally to scabies infection. The current work explored that the infection is correlated positively with sex and age of the patient. Several earlier studies also documented that scabies is usually detected in younger age (Karimkhani et al., 2017) and in older age groups (Feldmeier et al., 2009; Romani et al., 2015). This array is considerably less distinct in Western Europe and North America which are the areas with the lowest burdens of scabies. In all low-burden areas, prevalence is distributed evenly in all ages, like elderly people the scabies outbreaks have arisen in care homes (Scheinfeld, 2004; Hewitt et al., 2015).

In the Current study, the scabies occurrence was correlated positively with the overcrowding. Several previous workers (Feldmeier and Heukelbach, 2009; Zeba et al., 2014) documented crowding as a projecting characteristic for the scabies transmission. The current study showed that infection was prevalent more among middle and lower socio-economic classes comparing upper classes which is in line with Green (1989). Zeba et al. (2014) observed that approximately 70% of infected persons belonged to a lower category of socio-economic group. The study revealed that the housing state is significant in the scabies epidemiology. Higher prevalence in community inhabitants of uncemented houses was

observed owing to their poor socio-economic condition. Previously, various researchers also observed comparable relationships. [Yasmin et al. \(2016\)](#) documented that infection was reduced in communities living in cemented houses. In contrast, Feldmeier and [Heukelbach \(2009\)](#) specified that low education standards and illiteracy are the factors accountable for the scabies prevalence. For the appropriate eradication, it is essential to treat the close contacts, they may remain asymptomatic for some time after getting infected and thus can transmit the infection unsuspectingly ([Association for Consumer Research, 1988](#)).

### Conclusion

Analysis of scabies prevalence based on different factors delivers a cherished comprehensions into the epidemiology of infection. The scabies prevalence fluctuated over the study period, with higher rates examined during colder seasons. The study showed a significant relationship between seasonal variations and scabies infection, with higher prevalence in winter compared to summer months. Children and teenagers displayed the highest scabies prevalence, followed by adult males and females. The study suggests that scabies are more common amongst younger age groups, with males revealing somewhat higher rates than females in the younger age group. Moreover, there is a strong association between scabies prevalence and socioeconomic status, with lower socioeconomic classes presenting higher rates of infection. Poor living conditions and overcrowding in lower socioeconomic classes pay for the higher scabies prevalence in these populations. Overall, the results highlight the multifactorial nature of scabies epidemiology, affected by seasonal socioeconomic status, demographic factors, variations, and housing conditions that will help in the development of effective control and prevention strategies for scabies infection.

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#### Declarations

#### Conflict of Interest

The authors have declared no conflict of interest

#### Declaration of Interest Statement

We declare that we have no financial and personal relationships with other people or organizations that can inappropriately influence our work.

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#### Author's contributions

KN conducted research and wrote initial draft of manuscript. KN,SK and A.B collected the literature and wrote the manuscript and edit the manuscript in original. All authors have read and approved the final manuscript.

#### Ethics approval and consent to participate

Not applicable

#### Consent for Publication

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