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PREVALENCE AND PATTERN OF SKIN DISEASES AMONG SCHOOL-GOING ADOLESCENTS IN UDAIPUR. A COMMUNITY-BASED STUDY

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ABSTRACT

Background: Skin diseases are among the most common health concerns during childhood and adolescence, especially in low- and middle-income countries. Global estimates indicate that skin and subcutaneous diseases contribute significantly to non-fatal disability. Indian studies have reported a high prevalence of dermatoses among school children, with infectious skin diseases, infestations and acne being predominant. However, limited recent data exist from Western India, especially Rajasthan.
Aim: To assess the prevalence and pattern of skin diseases among school-going adolescents in Udaipur and determine associated demographic and behavioural factors.
Methods: A community-based, cross-sectional study was conducted among 400 adolescents aged 10–19 years (200 boys and 200 girls) from randomly selected government and private schools from April to September 2025. Data were collected using a pre-tested questionnaire and dermatological examination conducted under natural light. Chi-square and relevant statistical tests were applied to determine associations, with $p < 0.05$ considered statistically significant.
Results: Of the 400 participants, 272 (68%) had one or more skin diseases. Prevalence was highest in mid-adolescents (75%) and among government school students (74.5%; p=0.003). Infectious dermatoses (41.2%) and acne vulgaris (20.6%) were the most common clinical categories, followed by infestations (11.8%), eczematous disorders (11.8%) and pigmentary disorders (7.4%). Boys had significantly higher prevalence of infectious skin diseases (p=0.046) and acne (p=0.001). Poor hygiene behaviour, including irregular bathing (p=0.001) and sharing personal items (p<0.001), showed strong association with dermatoses. Facial and scalp involvement was common, and 40.4% had lesions on multiple body sites.
Conclusion: The study demonstrates a high prevalence of preventable skin diseases among adolescents in Udaipur, similar to patterns reported in other Indian and international studies. Strengthening school-based dermatological screening and hygiene-focused health education can

significantly reduce this burden. The findings highlight the need to integrate skin health into adolescent and school health programmes.

Keywords: Adolescent dermatoses, prevalence, school health, acne vulgaris, infectious skin diseases, hygiene behaviour.

INTRODUCTION

Skin diseases are among the most frequent health problems in children and adolescents, especially in low- and middle-income countries. The World Health Organization (WHO) has emphasized that common dermatoses such as scabies, pyoderma, fungal infections and eczemas are highly prevalent in developing settings and constitute an important but often overlooked public health issue.[1] School health programmes and community surveys reviewed by WHO have reported prevalence figures for childhood skin diseases ranging from about 20% to more than 80% in various developing countries, underscoring the magnitude of the problem.[2] More recent global assessments indicate that skin and subcutaneous diseases are a leading cause of non-fatal disability, contributing substantially to years lived with disability (YLDs) worldwide.[3]

In India, the burden of skin disease is particularly high. Analysis of Global Burden of Disease 2017 data showed that skin and subcutaneous diseases account for a significant proportion of YLDs in the country, placing them among the top contributors to non-fatal health loss across all age groups.[3] Within this broad category, many conditions either begin in childhood or have their peak incidence during adolescence. Pediatric and adolescent dermatoses therefore represent an important interface between clinical dermatology and public health.

Hospital-based series from India suggest that children and adolescents constitute a large fraction of dermatology outpatient attendees, with infections, infestations, eczemas, pigmentary disorders and acne being the predominant diagnoses.[4] Jain and Khandpur highlighted that pediatric dermatoses in India are influenced by climatic conditions, overcrowding, malnutrition, poor hygiene and limited access to care, and that many of these conditions are preventable and amenable to simple, cost-effective interventions at the primary care level.[4] At the same time, visible skin disease in adolescents can have profound psychosocial consequences, including low self-esteem, stigma and impaired quality of life.[4]

Community-based and school-based studies provide more accurate estimates of the true burden of skin disease than clinic-based data. A landmark school survey from northern India by Dogra and Kumar reported that 38.8% of 12,586 school children aged 6–14 years had at least one identifiable skin condition at the time of examination, most commonly infections, pityriasis alba, eczemas and infestations.[5] Subsequent Indian studies have documented considerable variation in prevalence, reflecting differences in age groups studied, geography, socio-economic conditions and methodology. A rural school survey from Salem district in Tamil Nadu found that over half of the children examined had one or more dermatoses, again with infections and infestations dominating the clinical spectrum.[6] In semi-urban Puducherry, a cross-sectional study among school-going children aged 5–15 years reported a very high prevalence of skin disorders (72%), with infectious dermatoses accounting for more than half of all diagnoses.[7] In the Kashmir valley, school-based work has described a wide spectrum of dermatoses including infections, pigmentary changes, eczemas and acne among children and adolescents living in a temperate climate.[8] More recently, a study from rural Bangalore comparing hospital and school settings showed that the prevalence of pediatric dermatoses was much higher in the school-based sample than among children presenting to hospital, reinforcing the notion that clinic data capture only the “tip of the iceberg”.[9]

Evidence from other low- and middle-income countries mirrors the Indian experience. For example, a study from a rural hospital in southern Ethiopia found that nearly half of children under five years of age presenting to the facility had at least one skin problem, with scabies, impetigo and eczema

being the most common diagnoses.[10] Such findings highlight the extent to which preventable, easily diagnosable dermatoses contribute to morbidity in young populations and demonstrate the potential benefits of integrating basic dermatological care into child health and school health services.[1,2,10] Similarly, Indian data from special schools for differently-abled children have shown that more than half of students had skin problems, predominantly infections, acne and dermatitis, emphasizing that vulnerable child populations may carry an even higher burden of dermatoses.[11]

Adolescence is a distinct developmental stage characterized by rapid physical growth, hormonal changes, evolving health behaviours and increasing social pressures. These factors make adolescents particularly susceptible to certain dermatoses such as acne vulgaris, seborrhoeic conditions, superficial fungal infections, pediculosis and polymorphic light eruptions. At the same time, body image concerns and peer acceptance become central, magnifying the psychological impact of visible skin disease. Studies from India and elsewhere have linked adolescent skin conditions with embarrassment, stigma, school absenteeism and impaired social interactions, suggesting that the burden of dermatoses in this age group is under-recognized both by families and by health systems.[2–4] School-going adolescents are also exposed to environmental and behavioural risk factors such as crowded classrooms, shared sports equipment, tight or occlusive clothing, poor sanitation facilities and variable hygiene practices, all of which may influence the pattern of skin disease.

The pattern and prevalence of adolescent dermatoses are shaped by local climatic, socio-cultural and economic determinants. Rajasthan, including Udaipur district, is characterized by a predominantly hot, semi-arid climate with intense sunlight, high temperatures for much of the year and substantial dust exposure. Such conditions may predispose to photosensitive dermatoses, miliaria, fungal infections and xerotic skin changes. At the same time, rapid urbanization, changing lifestyle patterns, increasing use of cosmetics and stress related to academic competition may be contributing to a rising burden of acne and other non-infectious dermatoses among adolescents. However, most Indian epidemiological studies of pediatric skin disease have either focused on younger children or have included broad age ranges (for example 0–14 or 5–16 years) without detailed analysis of the adolescent subgroup.[5–9,11] Furthermore, there is limited recent community-based data specifically addressing skin diseases among school-going adolescents in western India, and very little published information from Udaipur district.

Robust, community-based data on the prevalence and pattern of skin diseases among adolescents are essential for planning school health services, designing health education interventions and orienting primary-care providers towards common dermatoses that can be managed at the peripheral level. They are also needed to benchmark local patterns against existing literature from other parts of India and comparable settings worldwide.[3–9] The findings are expected to be broadly comparable with those reported from other Indian regions and international studies, while providing much-needed, locally relevant evidence on the prevalence and pattern of skin diseases among school-going adolescents in Udaipur.

METHODOLOGY

Study Design and Setting: A community-based, cross-sectional study was conducted to assess the prevalence and pattern of skin diseases among school-going adolescents in Udaipur, Rajasthan. The study was carried out over a period of six months, from April 2025 to September 2025, in selected government and private schools within the urban field practice area of Udaipur.

Study Population and Sample Size: The study population consisted of adolescents aged 10–19 years enrolled in the selected schools. A total sample size of 400 adolescents was included, with equal representation of boys (n = 200) and girls (n = 200). The sample size was determined considering prevalence rates reported in previous Indian school-based studies and ensuring adequate power to estimate the prevalence with acceptable precision. Adolescents present on the day of the survey and willing to participate were included. Those with severe systemic illnesses or unwilling to undergo examination were excluded.

Sampling Technique: A multistage sampling technique was employed. In the first stage, schools were selected using simple random sampling from a list of government and private schools in Udaipur. In the second stage, students from selected classes were chosen using systematic random sampling to ensure proportional distribution across age groups and gender. School authorities were contacted beforehand, and schedules were arranged to prevent disruption of academic activities.

Data Collection Tools and Procedure: Data were collected using a pre-tested, semi-structured questionnaire and a clinical examination proforma developed based on previous epidemiological dermatology surveys. The questionnaire captured sociodemographic variables such as age, gender, class, socioeconomic status (using a standardized scale), personal hygiene practices, clothing habits, cosmetic use, and family history of skin diseases.
All participants underwent a detailed dermatological examination conducted in natural daylight by trained investigators under the supervision of a qualified dermatologist. Lesions were inspected, palpated, and classified based on standard dermatological diagnostic criteria. Whenever required, magnifying lenses were used to enhance visualization. Laboratory investigations were not routinely performed but were advised in selected doubtful cases, following parental consent.
Study Variables: The primary outcome variable was the presence of any dermatological condition during the examination. Secondary variables included type of dermatosis (infectious, non-infectious, inflammatory, pigmentary, infestations, acne, photodermatoses, etc.), distribution of lesions, and associated factors such as hygiene practices and environmental exposures. Demographic characteristics and gender-wise differences were also assessed.
Quality Control Measures: Prior to data collection, all investigators received training in uniform dermatological assessment to minimize inter-observer variability. The questionnaire was pre-tested in a pilot sample of 20 adolescents from a non-study school, and necessary modifications were made. Regular supervision was done to ensure adherence to study procedures and maintain data accuracy. Data entry was double-checked, and inconsistencies were resolved using source documents.

Statistical Analysis: Data were coded and entered into Microsoft Excel and analysed using Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistics were used to compute frequencies, percentages, means, and standard deviations. The prevalence of skin diseases was calculated as the proportion of adolescents diagnosed with at least one dermatological condition. Chi-square test was applied to assess associations between categorical variables such as gender, hygiene practices, clothing habits, and occurrence of dermatoses. Continuous variables were compared using Student's t-test or Mann–Whitney U test depending on normality. A p-value of <0.05 was considered statistically significant.

Ethical Considerations: The study was conducted following the principles of the Declaration of Helsinki. Prior permission was obtained from the school authorities before initiating the study. Written informed consent was secured from parents or guardians of the adolescents, and assent was obtained from the students themselves. Participants were informed about the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any point without any academic consequences. Confidentiality was maintained by anonymizing data and using unique identification codes. Students identified with treatable skin conditions were counselled and referred to the dermatology outpatient department of the affiliated medical college for appropriate management without any cost. Since the study involved non-invasive procedures and posed minimal risk, it was classified as low-risk research. Approval from the Institutional Ethics Committee was obtained prior to data collection.

RESULTS

A total of 400 school-going adolescents were examined (200 boys and 200 girls). Overall, just over two-thirds of the students had at least one clinically detectable skin disease. The prevalence was higher in mid-adolescents (14–16 years) compared with early and late adolescents, and in students

from government schools compared with private schools. Residence in slum areas and lower socioeconomic status showed a trend towards higher prevalence, though without statistically significant association. Details are presented in Table 1.

Infectious dermatoses and acne constituted the bulk of the disease burden, followed by infestations, eczematous and pigmentary disorders. Boys had a higher frequency of infectious dermatoses and especially acne, with a statistically significant association for both, while eczemas and pigmentary disorders were more evenly distributed between the sexes (Table 2 and Table 3).

Personal hygiene and behavioural factors showed significant associations with the presence of skin disease. Irregular bathing, infrequent changing of school uniform and sharing of towels/combs were all associated with higher prevalence of dermatoses (Table 4). The face and scalp were the most frequently involved sites, followed by upper limbs, trunk and lower limbs, with a substantial proportion of adolescents having lesions at multiple body sites (Table 5).

Table 1. Socio-demographic profile and prevalence of skin diseases among school-going adolescents. (n = 400)

Variable	Category	Total n (%)	With skin disease n (%)	Without skin disease n (%)	χ^2 value	p-value
Overall	—	400 (100.0)	272 (68.0)	128 (32.0)	—	—
Sex	Boys	200 (50.0)	140 (70.0)	60 (30.0)	0.563	0.453
	Girls	200 (50.0)	132 (66.0)	68 (34.0)		
Age group (years)	10–13	120 (30.0)	72 (60.0)	48 (40.0)	9.145	0.010*
	14–16	200 (50.0)	150 (75.0)	50 (25.0)		
	17–19	80 (20.0)	50 (62.5)	30 (37.5)		
Type of school	Government	220 (55.0)	164 (74.5)	56 (25.5)	8.969	0.003*
	Private	180 (45.0)	108 (60.0)	72 (40.0)		
Place of residence	Urban (non-slum)	260 (65.0)	168 (64.6)	92 (35.4)	3.479	0.062
	Urban slum	140 (35.0)	104 (74.3)	36 (25.7)		
Socioeconomic status (Modified Kuppuswamy)	Upper	40 (10.0)	22 (55.0)	18 (45.0)	6.749	0.150
	Upper-middle	120 (30.0)	78 (65.0)	42 (35.0)		
	Lower-middle	140 (35.0)	100 (71.4)	40 (28.6)		
	Upper-lower	80 (20.0)	60 (75.0)	20 (25.0)		
	Lower	20 (5.0)	12 (60.0)	8 (40.0)		

*Statistically significant ($p < 0.05$)

Table 2. Pattern of skin diseases among affected adolescents (total dermatoses = 340)

Type of dermatosis	Number of lesions (n)	Percentage of total dermatoses (%)
Infectious dermatoses (total)	140	41.2
• Fungal infections	70	20.6
• Bacterial infections	45	13.2
• Viral infections	25	7.4
Infestations (total)	40	11.8
• Scabies	18	5.3
• Pediculosis capitis	22	6.5

Table 2. Pattern of skin diseases among affected adolescents (total dermatoses = 340)		
Acne vulgaris	70	20.6
Eczematous dermatoses (total)	40	11.8
• Atopic dermatitis	10	2.9
• Seborrhoeic dermatitis	12	3.5
• Contact dermatitis	8	2.4
• Other eczemas	10	2.9
Pigmentary disorders (total)	25	7.4
• Pityriasis alba	15	4.4
• Melasma	5	1.5
• Post-inflammatory hyperpigmentation	5	1.5
Disorders of sweat glands (miliaria, etc.)	10	2.9
Miscellaneous (urticaria, photodermatoses, others)	15	4.4

Table 3. Distribution of major dermatoses by sex (n = 400; 200 boys, 200 girls)				
Type of dermatosis	**Boys (n = 200) n (%)**	**Girls (n = 200) n (%)**	**χ^2 value**	**p-value**
Infectious dermatoses (any)	80 (40.0)	60 (30.0)	3.967	0.046*
Infestations (scabies/pediculosis)	22 (11.0)	18 (9.0)	0.250	0.617
Acne vulgaris	48 (24.0)	22 (11.0)	10.823	0.001*
Eczematous dermatoses (any)	18 (9.0)	22 (11.0)	0.250	0.617
Pigmentary disorders (any)	12 (6.0)	13 (6.5)	0.033	0.856
Disorders of sweat glands/miliaria	6 (3.0)	4 (2.0)	0.387	0.534
Miscellaneous	8 (4.0)	7 (3.5)	0.053	0.818

*Statistically significant ($p < 0.05$)

Table 4. Association of selected personal hygiene and behavioural factors with presence of skin disease (n = 400)						
Factor	**Category**	**Total n**	**With skin disease n (%)**	**Without skin disease n (%)**	**χ^2 value**	**p-value**
Bathing frequency	≥ 1 bath/day	280	176 (62.9)	104 (37.1)	10.570	0.001*
	< 1 bath/day	120	96 (80.0)	24 (20.0)		
Sharing towels/combs	Yes	150	120 (80.0)	30 (20.0)	15.012	<0.001*
	No	250	152 (60.8)	98 (39.2)		
Changing school uniform	Daily	260	164 (63.1)	96 (36.9)	7.640	0.006*
	Less frequently (≥2 days same)	140	108 (77.1)	32 (22.9)		

*Statistically significant ($p < 0.05$)

Table 5. Distribution of skin lesions by body site among affected adolescents (n = 272)

Body site / region	Number of affected students (n)	Percentage of affected students (%)
Face	180	66.2
Scalp	120	44.1
Neck	80	29.4
Upper limbs	90	33.1
Trunk	75	27.6
Lower limbs	70	25.7
Hands and feet	65	23.9
Flexural areas (axilla/groin)	55	20.2
Generalized / multiple sites involved	110	40.4

DISCUSSION

The present community-based cross-sectional study assessed the prevalence and pattern of skin diseases among 400 school-going adolescents in Udaipur. The overall prevalence of dermatoses in this study was 68%, which falls within the wide range (20–80%) reported in WHO-supported surveys and community studies in developing countries[1,2]. This confirms that adolescent skin disease continues to represent a substantial, yet often under-recognized public health issue. The prevalence observed in our study is also comparable to findings from large school-based Indian surveys such as Dogra and Kumar's study in North India (38.8%)[5], the Salem district survey reporting dermatoses in over half the students[6], and the Puducherry study that reported a prevalence of 72%[7]. These findings reinforce that dermatological morbidity among Indian school children and adolescents remains significant across geographical regions.

In the present study, the prevalence was highest in mid-adolescents (14–16 years), consistent with the known peak of acne vulgaris during this age owing to hormonal influences. Acne constituted 20.6% of all dermatoses recorded, with boys showing significantly higher prevalence than girls. Similar findings have been described in Indian and global adolescent dermatology research, where acne has emerged as one of the leading causes of dermatology visits and a major contributor to psychosocial distress[3,4]. The higher prevalence among boys may be related to greater sebaceous gland activity, outdoor exposure, sweating, and differences in skincare habits, as also reported in previous literature[4].

Infectious dermatoses were the most common group (41.2%) in our study, with fungal infections being the predominant subtype. These findings align closely with the pattern described in prior Indian school-based studies where dermatophytosis, pyoderma, and viral infections constituted the major share of morbidity[5–9]. Factors such as hot climate, overcrowding, poor ventilation in classrooms, shared sports equipment, and rapid urbanization likely contribute to this burden. Rajasthan's climatic profile—with prolonged dry heat, dust exposure, and variability in hygiene—may further predispose adolescents to infections and sweat-related disorders. Similar ecological associations were noted in international studies such as the Ethiopian rural hospital study, which reported scabies, impetigo, and eczema as major problems[10]. Although infectious dermatoses were more common among boys in the present study and the association was statistically significant, the sex distribution across different dermatosis categories has varied in the literature, reflecting cultural, behavioural, and environmental differences across study populations.

Infestations such as scabies and pediculosis together accounted for 11.8% of dermatoses. This is slightly lower than reports from semi-urban Puducherry and rural Tamil Nadu studies where infestations comprised a major proportion of childhood dermatoses[6,7]. The reduction may reflect better hygiene awareness and increased availability of over-the-counter treatments in urban Udaipur. However, the significant association of dermatoses with poor hygiene practices such as irregular

bathing and sharing of personal items indicates persisting behavioural risk factors. Similar behavioural associations have been highlighted by WHO guidelines and community dermatology research, suggesting that structured health education interventions can substantially reduce communicable skin diseases among school children[1,2].

Eczematous disorders (11.8%) and pigmentary disorders (7.4%) were also documented in this study, consistent with previous reports from North India, Kashmir, and Bangalore school surveys[8,9]. Atopic dermatitis, seborrhoeic dermatitis, and pityriasis alba were frequent presentations, reflecting climatic influences, genetic predispositions, and chronic sun exposure—factors widely documented in pediatric dermatology literature[4,8]. Miliaria and sweat gland disorders (2.9%) were also observed, which correlate with Udaipur's hot, dry summer climate.

Socio-demographic factors showed meaningful trends. Government school students had a significantly higher prevalence of skin diseases compared with private school students, similar to findings in Salem district and Puducherry[6,7]. The likely contributors include larger class sizes, less access to clean water, and lower socioeconomic background. Although lower socioeconomic status showed greater prevalence, the association was not statistically significant—possibly due to sample distribution or the inclusion of predominantly urban adolescents. Residence in slum areas showed a stronger trend towards higher dermatosis burden, echoing the environmental and social determinants highlighted in prior Indian and WHO-reported studies[1,2,5].

The anatomical distribution of lesions in our study—predominantly involving face, scalp, upper limbs, and trunk—is consistent with the exposure patterns of adolescents in India and findings from other school-based studies[5–9]. High involvement of the face and scalp corresponds to acne, seborrhoeic dermatitis, and fungal infections, all of which are common in warm climates. The presence of lesions on multiple sites in 40% of affected adolescents further emphasizes the need for early diagnosis and school health-based management strategies.

One of the important contributions of this study lies in its community-based school approach, which allows the detection of asymptomatic or early-stage dermatoses that may not present to healthcare facilities. This aligns with the observations from Bangalore, where school-based prevalence was significantly higher than hospital-based detection rates, underscoring that clinic-based data represent only the "tip of the iceberg"[9]. Our study likewise demonstrates that many adolescents with dermatological conditions may not seek medical care, possibly due to embarrassment, normalization of symptoms, or lack of awareness.

Overall, the findings from Udaipur are consistent with established patterns across India and other low-income settings. The burden of preventable dermatoses remains high; infectious skin diseases and acne continue to dominate; and modifiable behavioural factors play a key role. These results highlight the importance of school-based dermatological screening, routine health education focusing on personal hygiene, early identification of communicable dermatoses, and strengthening of primary care capacity for basic dermatological management. In line with global guidance and previous community dermatology research[1–3], integrating skin health into school health programmes can significantly improve adolescent well-being and reduce dermatological morbidity.

CONCLUSION

This community-based study highlights a substantial burden of skin diseases among school-going adolescents in Udaipur, with a prevalence of 68%, comparable to previously reported national and international findings. Infectious dermatoses and acne accounted for the majority of cases, and hygiene-related behaviours such as irregular bathing and sharing of personal items were significantly associated with dermatological morbidity. The higher prevalence among mid-adolescents and government school students further underscores the role of environmental, socioeconomic and behavioural determinants. The study findings reaffirm that most adolescent dermatoses are preventable, easily recognizable, and treatable at the primary care level. Strengthening school health programmes, implementing periodic dermatological screening, promoting hygiene education, and ensuring timely referral pathways may significantly reduce disease burden. The study provides

valuable baseline evidence from Western India and emphasizes the need for targeted public health interventions to improve skin health and overall well-being during adolescence.

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