

# Prevalence and Demographic Profile of Skin Disorders in School-Going Children of Urban and Rural Jaipur

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## ABSTRACT

**Introduction:** Skin disorders are common in children but have not been regarded as a public health problem even though they put a large burden on health care systems worldwide. About one-third of children in India are affected by skin disorders at any given time. Climatic factors, poor hygiene, poor access to water, household overcrowding and close contact lead to this high prevalence. However there is a relative paucity of data in comparison to this high prevalence. Study objective was to determine the prevalence and pattern of skin disorders amongst school going children aged 6 to 17 years in rural and urban Jaipur and their nutritional, socio-economic and standard of sanitation correlates.

**Material and Methods:** Descriptive cross-sectional study carried out in 410 children aged 6-17 years from ten randomly selected schools, five rural and five urban, in Jaipur from 1<sup>st</sup> January 2017 to 30<sup>th</sup> June 2018. Detailed history including grading of socioeconomic status and standard of sanitation as well as physical examination were done with due regard to privacy. Clinical diagnosis was made.

**Results:** The prevalence of skin disorders was found to be 48.3%, more in girls (59.6%) and more in rural areas (58.1%). Seborrhoea capitis (15.4%) was the most common followed by Acne vulgaris (13.2%), Pityriasis alba (4.4%), Tinea (all types) (3.9%), Pediculosis capitis (3.2%), and Furunculosis, Scabies and Pityriasis versicolor (<2% each). Prevalence had a significant correlation with level of sanitation whereas not with literacy of parents, socioeconomic status (Kuppuswamy score) and type of school. Only one fourth of symptomatic children took treatment.

**Conclusion:** High prevalence of skin disorders exists in school-going children of Western India, especially non-infectious dermatosis. Rural residence and level of sanitation are significant attributes.

**Keywords:** Prevalence and Pattern of Skin Disorders, School Children, Socio-Economic Status, Standard of Sanitation, Demographic Profile.

underlying clue to a more severe disease. These superficial skin disorders such as Acne vulgaris, Seborrhea capitis, Pityriasis alba are diagnosed clinically and can be managed on an outpatient basis. Basic health education is needed to identify these disorders at the primary health care centre which can help us in reducing the morbidity substantially.

WHO<sup>3</sup> reported a high prevalence (21- 87%) of skin disorders in general population of developing countries of the world after reviewing 18 prevalence studies. 13 studies provided data specific to children and 4 studies were on school children. The epidemiology pattern varies; acne, atopic dermatitis and eczematous conditions are more common in the developed countries<sup>4-7</sup> whereas infections and infestations in the developing countries.<sup>8-12</sup> The prevalence among Indian children varies from 8-37% in school based studies.<sup>13</sup> In recent studies, the prevalence ranges from 30-60%.<sup>14-20</sup> The incidence of these disorders appears to be increasing and is influenced by age, social, economic, public health, nutritional, environmental, and climatic factors, as well as the genetic make-up of the population studied.<sup>21</sup> In our country, poor sanitation, overcrowding, poverty, poor personal hygiene, socioeconomic status, literacy, health awareness, access to health care are major attributes. Children are more prone to skin disorders due to overcrowding and poor hygiene. There is a paucity of large scale population based studies studying the epidemiology of skin disorders which estimate the true burden of skin disease in the community.

National Health Family Survey-4<sup>22</sup> showed that children below 15years constitute 31.2% of the Rajasthan's population. A study from northern India showed that about one third of the children are affected by skin disorders at any given time.<sup>23</sup> For estimating the prevalence in the community, we have opted for the school survey which is representative of large geographical areas as opposed to studies done in specialized dermatology centres, hospitals, health centres and institutions like orphanages which are not representative of community

## INTRODUCTION

Skin diseases especially those affecting the superficial layer despite being very common are seldom the target of any public health programme or strategies due to the assumption that they are benign and not life threatening. They cause considerable discomfort, morbidity, parental anxiety, unnecessary absence from school and other psychosocial side effects such as embarrassment, feeling of stigmatisation, loss of confidence, disruption of social relations.<sup>1,2</sup> These diseases also act as a window to many systemic disorders like systemic lupus erythematosus, tuberous sclerosis; viral exanthemes like measles, chicken-pox hence provide an

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Rajasthan is a state with extreme weather conditions and with a clear socio-economic divide between urban and rural school population. A knowledge of the pattern and prevalence of skin disorders in both the urban and rural school children and their contributory factors such as socio-economic status, nutritional status and standard of sanitation will help us to strategise our health plan in this state. The present study was a step in this direction and hopes to provide help in the better management of skin disorders at the primary health care level in the community.

## MATERIAL AND METHODS

This descriptive cross-sectional study was conducted on 410 randomly selected school children of either sex, aged 6 to 17 years, from ten schools, five rural and five urban, in Jaipur from 1<sup>st</sup> January 2017 to 30<sup>th</sup> June 2018 after obtaining due clearance from Institutional Scientific Committee and Institutional Ethical Committee and written permission from the principals of all the ten schools. Informed consent of parents/guardians was also taken. For the purpose of this study skin disorders refers to diseases involving the superficial layers of skin.

1. Superficial skin infections: Impetigo, furuncle, carbuncle, tropical ulcer.
  2. Ectoparasitosis: Scabies, Pediculosis.
  3. Superficial Mycosis: Dermatophytosis, Candidiasis, Pityriasis versicolor.
  4. Benign Viral disorders: Verrucae, Molluscum contagiosum.
  5. Dermatitis: Irritant, allergic, atopic.
  6. Nutritional dermatosis.
  7. Disorders of pigmentation: Vitiligo, Post-inflammatory.
  8. Acne vulgaris.
  9. Disorders of keratinization: Psoriasis, Keratosis pilaris.
  10. Hair disorders: Alopecia areata etc
  11. Nail disorders: Koilonychia, Paronychia, Clubbing etc
- Deep skin and soft tissue infections such as erysipelas, cellulitis, abscess and burns and traumatic sores were excluded. Diseases like leprosy and filariasis with systemic manifestations as well as exanthematous illness like measles,

chicken pox and dengue fever were excluded.

A detailed history, including age, sex, socio-demographic data including the education, occupation, income of parents (for Modified Kuppaswamy score)<sup>24</sup> and standard of sanitation<sup>25</sup> (Briscoe score) were obtained. Information regarding duration, number, progression, symptoms and family history of skin disorders was obtained. History of past illness, allergy, atopy, treatment taken and dietary history were also recorded in the proforma.

Complete general physical examination and systemic examination was done paying regard to privacy to exclude any systemic disease. Both primary and secondary skin lesions along with their distribution were recorded in the proforma. Examination of hair and nails was also done. A clinical diagnosis was made by an experienced dermatologist with more than thirty years' experience and findings reconfirmed. Sample size was calculated to be 322 assuming a prevalence of 30%. 410 children were included. A higher sample size was taken to account for any increase in prevalence.

## STATISTICAL ANALYSIS

The data was analysed statistically using the computer software IBM SPSS package 17. Quantitative variables were compared using unpaired t-test. Qualitative variables were correlated using chi-square test. The Pearson Correlation coefficients were used to assess correlations. P value < 0.05 was considered significant.

## RESULTS

We included 410 children between 6-17 years, males constituted 60.7% while females were 39.3%. The prevalence of skin disorders amongst school going children (aged 6-17 years) in Jaipur, Rajasthan was found to be 48.3%. Skin disorders were more common in female school children (59.6%) as compared to male school children (41%). 26.5% had one skin disorder, 10.65% had two and 1.15% had three skin disorders.

Seborrhoea capitis was the commonest disorder (prevalence rate of 15.36%) accounting for 31.8% of all skin disorders, followed by Acne vulgaris (prevalence rate of 13.1%)

N=410	Number (%)	Number (%)
Sex distribution	Males 249 (60.7%)	Females 161 (39.3%)
Skin disease	Yes 198 (48.3%)	No 210 (51.7%)
Sex distribution in those with skin disease	Males 102	Females 96

**Table-1:** Distribution of cases of skin disorders according to sex

Skin disease (n=198)	Number (Percentage)
Seborrhoea capitis	63 (31.8%)
Acne vulgaris	54 (27.27%)
Pityriasis alba	18 (9.09%)
Tinea	16 (8.08%)
Pediculosis capitis	13 (6.56%)
Furunculosis	8 (4.04%)
Scabies, Molluscum contagiosum	6 (3.03%)
Pityriasis versicolor	4 (2.02%)

**Table-2:** Pattern of skin disorders

Total=410, with Skin disease-198	Number /(%) with skin disease	Significance
Rural -210 Urban -210	Rural 122/ (58.1%) Urban 76/ (38%)	P value <0.001
Sanitation Briscoe score Poor 94 Fair 153 Good 163	61 (64.9%) 89 (58.2%) 48 (29.4%)	P value <0.001
Government -169 Private - 241	88 (52.1%) 110 (45.6%)	P value 0.228
Skin diseases-198 Asymptomatic Symptomatic	90 (45.46%) 108 (54.54%)	P value <0.001
Asymptomatic-90 Symptomatic-108	Treatment taken 17 (5.6%) 30 (27.8%)	P value <0.001

**Table-3:** Distribution of cases of skin disorders according to rural/urban area, standard of sanitation, government/private school, symptomatic/asymptomatic, treatment taken/treatment not taken

accounting for 27.27% of all skin disorders.

Skin disorders were more common in rural children (58.1%) as compared to children from urban schools (38%). Skin disorders were more common in low socioeconomic status children (Kuppuswamy class IV)-55.7% compared to higher socioeconomic status children (Kuppuswamy class I)-40.41% but the results are not statistically significant. There was no statistical significance seen with literacy levels. 108 /198 (54.54%) of children with skin disorders were symptomatic while 90/198 (45.46%) were asymptomatic. 11.5% of the total children sought treatment out of which 27.8% of them were symptomatic while 5.6% were asymptomatic.

## DISCUSSION

Skin disorders are an important cause of health loss on global level and put a large burden on health care systems worldwide. Highly prevalent skin disorders with a small individual burden may lead to a high burden on a population level. Therefore, prevention of skin disorders should be prioritized.<sup>26</sup> In the present study, the prevalence of skin disorders was found to be 48.3% which is comparable to many other Indian studies which show a prevalence ranging from 30-70%.<sup>14-20</sup> Skin ailments are more common in the adolescent age group<sup>27-29</sup> hence we included the age group of 6-17 years in the present study. Commonest skin disorders were Seborrhea capitis (15.36%), Acne vulgaris (13.17%), Pityriasis alba (4.39%), Tinea (all types) (3.90%), Pediculosis capitis (3.17%), Furunculosis (1.95%), Molluscum contagiosum (1.46%), Scabies (1.46%), and Pityriasis versicolor (0.97%). Other disorders were Post-inflammatory hyperpigmentation, Beau's lines, Photosensitive dermatitis, Dyshidrosis, Atopic dermatitis, Eczema, Hand dermatitis, Vitiligo, Urticaria, Impetigo contagiosa, Fungal cheilitis, peri-oral dermatitis, premature greying of hair and erosive peri-anal dermatitis in decreasing order of frequency. 26.5% had one skin disorder, 10.65% had two and 1.15% had three skin disorders. The results are comparable to some international as well as Indian studies.<sup>6,23</sup>

The male to female prevalence ratio in this study was 1.06:1 comparable to few other studies<sup>17-20</sup> although disorders such

as Pediculosis capitis are seen to be more common in females due to their long hair and infrequent washing. Karthikeyan et al reported a higher female prevalence of skin diseases.<sup>28</sup> Non-infectious dermatosis such seborrhea and acne vulgaris were more common in this study (58%) compared to infectious causes such as tinea and scabies (25%). These results mimic those seen in western countries.<sup>4,6</sup> The higher prevalence of acne vulgaris and seborrhea capitis in our study was comparable to studies which also included older children.<sup>11,14,15</sup> Acne vulgaris is predominantly a disease of the adolescence and this could explain the higher prevalence in our study. Atopic dermatitis is the most common endogenous eczema whose prevalence in western countries varies from 18-34%.<sup>4,7</sup> Pityriasis alba was the second most common endogenous eczema as per the study by Sharma *et al.*<sup>19</sup> with incidence rate of 4.9% comparable to our study. Altered life style, dietary habits of children and exposure to many allergens in early age could explain the high incidence of disease.<sup>27</sup>

The present study is in stark contrast to the general pattern of dermatosis in Indian school going children wherein infectious dermatosis are the commonest form 30-85%.<sup>27-31</sup> The most common dermatosis found in most Indian studies which included school going children were scabies, pediculosis and pyoderma<sup>14,15,23</sup> which are secondary to poverty, overcrowding, under nutrition, poor hygiene and lack of health education. The incidence of scabies had varied from 5.1% to 22.4% in studies done by Negi *et al*<sup>31</sup> and Bhatia *et al.*<sup>30</sup> The lower prevalence of bacterial and fungal infections and infestations in this study could be explained due to relatively better hygiene practices and better socio-economic status in our study population.

The present study tried to correlate the causative factors with skin diseases such as socioeconomic status and level of sanitation for better understanding of the epidemiology. The validated Modified Kuppuswamy Scale uses the educational status, occupation and income of parents to classify the socioeconomic status into five grades I-V in descending order. As expected, the rich-poor divide was evident. 97.9% children in private schools belonged to Kuppuswamy class

I, while 86.4% children in government schools belonged to Kuppuswamy class IV. However, the prevalence rate of skin disorders on correlating with socioeconomic status as well as literacy levels did not yield significant results. Kumar AS et al<sup>14</sup> in a study from Hyderabad showed that there was an association between the mother's educational status and skin infections but it was not statistically significant. Inanir et al<sup>9</sup> in a study from Turkey showed socioeconomic status to be significant factor affecting the prevalence. Skin diseases were also statistically more prevalent in rural areas which may be attributed to the low socio-economic status, low hygiene of these patients, and the scarcity of clean water. In the present study we have objectively assessed the standard of sanitation and its attributes to skin disease using a well validated tool called Briscoe scale which classified the levels of sanitation into three grades as poor, average and good. In a study by Dongre AR, et al<sup>32</sup> improvement in hygiene status over 1 year showed significant reduction in prevalence of Pediculosis capitis (42.8%), Scabies (36.6%) and multiple boils (8.9%) to 18.8%, 17.9% and 8% respectively. A recent study from Hyderabad<sup>14</sup> reported a significant correlation between personal hygiene of students with the prevalence of skin disorders. Only half of those with skin diseases were symptomatic and only one fourth of them sought treatment, reasons could be consideration of these disorders to be benign, inability to afford medical care or simply non-availability of a medical facility nearby. WHO<sup>3</sup> in a review showed that Scabies and Pyoderma were more likely to result in patients seeking treatment than other skin diseases such as tinea, viral warts, pityriasis alba. The lower prevalence of scabies, pyoderma in this study can explain the same.

The strengths of the present study are that it was representative of the general population, included both rural as well as urban population. Children were allocated into this study using random sampling eliminating any bias. Precise clinical diagnosis was made using standard definitions. We tried to determine the various attributes of prevalence of skin disorders objectively such as the nutritional status, socio-economic and standard of sanitation which is required to formulate standardized recommendations for treating the common skin diseases and better planning of health strategies. Only clinical diagnosis was made, investigation of patients like KOH smear or culture for skin infections was not done

The higher prevalence of non-infectious dermatosis like acne vulgaris, seborrhea, and pityriasis alba and no documentation of nutritional dermatosis in this study is a surprising discovery given the hot humid climate of Rajasthan, overcrowding, scarcity of water and poor living conditions. We need more studies in this region including a larger population to confirm these findings, further screening and management guidelines can be formulated on the basis of results found.

The burden of skin disease is high in both high- and low-income countries, indicating that prevention of skin disease should be prioritized. All skin conditions combined were the fourth leading cause of non-fatal disease burden at the global level.<sup>26</sup> The present study highlights the high prevalence

of skin disorders in school going children of Jaipur. There is a strong correlation between the standard of sanitation / hygiene and skin disorders. The need of the hour is basic health education about personal hygiene and training of personnel to identify these conditions with as well as regular periodical examination of the children which can go a long way in curbing the morbidity due to these diseases.

## CONCLUSION

The present study is the first such study from the state of Rajasthan, covering both Rural/Urban, Government/Private school children; showing a very high prevalence (48.3%) of skin disorders in school children aged 6-17years. The non-infectious skin disorders (Seborrhea capitis, Acne vulgaris and Pityriasis alba) constitute 67% of the skin disorders in school children of district Jaipur. There is a strong correlation between prevalence of skin disorders and the standard of sanitation, more so in rural areas where water is scarce and stored in unhygienic conditions.

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