



Original Research Article

SCABIES PREVALENCE AMONG SCHOOL CHILDREN RESIDING IN TRIBAL WELFARE HOMES AND MASS DRUG ADMINISTRATION FOR SCABIES CONTROL

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ABSTRACT

Background: Scabies is classified as one of the neglected tropical disease (NTD) which predominantly affects children and older adults. In tribal, endemic regions, the management of scabies is frequently complicated by high rates of re-infestation. To address this challenge, the WHO recommends mass drug administration (MDA) in areas where the prevalence of scabies exceeds 10%. Our aim isto identify epidemiological factors and assess the effectiveness of mass drug administration with ivermectin for scabies in Government Tribal Welfare Ashram (GTWA) Residential School Children in paderu Integrated Tribal Development Agency (ITDA) region.

Materials and Methods: A longitudinal study design was undertaken in GTWA Residential schools, Paderu, Andhra Pradesh State, over a six-month period i.e., from October 2024 to March 2025. Children clinically diagnosed with scabies received two doses of oral ivermectin at 200 micrograms/kg, administered four weeks apart. One month following the second dose, dermatologists evaluated all students to determine the cure rate.

Results: Out of 6230 students, 3043 were diagnosed with scabies. Prevalence of scabies among these students was 48.5%. Among 3043 Scabies cases who were given oral Ivermectin, 2803 (92.11%), were cured with complete cure, 227 (7.45%) were partially cured and 13(0.42%) were not cured respectively.

Conclusions: The observed cure rate with oral ivermectin is 92%. No adverse drug reactions were reported, suggesting that the treatment is safe and easy to administer. To date, MDA studies for scabies control have not been conducted in Andhra Pradesh and represents the first of its kind on MDA for scabies control among tribal school children in this region.

Keywords: Scabies, Ivermectin, Mass Drug Administration, Tribal area.

INTRODUCTION

Scabies is classified as one of the Neglected Tropical Diseases (NTDs).^[1,2] This highly contagious skin condition is caused by *Sarcoptes scabiei* var. *hominis* and is primarily transmitted through direct contact with infected lesions. Clinically, scabies presents with intense, immune-mediated pruritus and visible dermatological manifestations such as papules, pustules, fissures and hyperpigmentation. Secondary infection by

Streptococcus pyogenes and *Staphylococcus aureus* can occur, potentially resulting in complications including impetigo, glomerulonephritis, chronic kidney disease, septicaemia, and possibly acute rheumatic fever.^[3] The severe itching, conspicuous skin lesions, and hyperpigmented patches associated with scabies contribute to significant emotional and psychological distress for affected individuals. Among students, these symptoms may lead to insomnia, diminished academic performance, absenteeism, and school dropout.^[4]

The global prevalence of scabies is estimated to be between 19% and 23%.^[5] Higher rates are observed in cold, humid tropical regions. Scabies remains endemic in areas with low socio-economic status and overcrowding, such as urban slums, military cantonments, prisons, and residential schools. Permethrin 5% topical ointment is widely recognized as the gold standard for treating scabies. However, in endemic regions, identifying and treating individual cases with Permethrin is often impractical and not cost effective.

During skin health camps conducted at tribal residential schools within Integrated Tribal Development Agency (ITDA) Paderu, a scabies prevalence exceeding 10% was noted. The World Health Organization (WHO) expert committee on scabies recommends Mass Drug Administration (MDA) in communities where prevalence exceeds 10%,^[6] as MDA is an important strategy in controlling globally prevalent neglected tropical diseases (NTDs). In settings with high prevalence, MDA using two doses of oral ivermectin has demonstrated up to a 90% reduction in scabies prevalence.^[7] The Skin Health Intervention Fiji Trial (SHIFT) reported a 94% decrease in scabies prevalence one year after ivermectin-based MDA intervention.^[8]

We therefore intend to undertake a comprehensive research study to identify epidemiological factors and assess the effectiveness of mass drug administration with ivermectin for scabies control in tribal residential schools in the Paderu ITDA region.

MATERIALS AND METHODS

Study Design: Longitudinal study design.

Study Setting: A total of 15 Government Tribal Welfare Ashram (GTWA) Schools of Paderu division in Alluri Sitarama Raju (ASR) District of Andhra Pradesh state population.

Study population: Children Studying in GTWA Residential Schools of Paderu Division.

Study Sample Size: Drawing on data from our scheduled School Health camps, we estimated the prevalence of scabies in GTWA schools to be 45%. Utilizing a 95% confidence interval (Z score = 1.96) and an absolute precision of 0.02, and applying the Cochran formula ($n = Z^2pq/\alpha^2$), the calculated sample size was 2,377.

Study Duration: Six Months i.e., from October – 2024 to March – 2025.

Inclusion Criteria: Boys and girls studying in GTWA Residential Schools willing to participate in the study.

Exclusion Criteria: Students less than 15kg body weight, students with Hb% < 8 grams, students with any other active co-morbidities, students with known drug allergies.

Outcome Measures: Our primary outcome measure is to know the safety and efficacy of oral ivermectin when administered to all scabies affected children,

whereas our Secondary outcome measure is to decrease in overall prevalence of scabies in these GTWA Schools.

Procedure: Data were collected utilizing a predesigned proforma following approval from the institutional ethical committee, with written informed consent obtained from both school principals and hostel wardens across all participating schools. The predesigned proforma captured demographic information such as name, age, gender, class, section, height, and weight, as well as details regarding bathing frequency, water and soap availability, clothing sharing, bedding changes, room sharing, sleep disturbances related to pruritus, knowledge of scabies and its prevention, past medical history, treatment history, family history, presence of symptoms including itching, skin lesions, lesion distribution, and lesion morphology. A preliminary visit was conducted at 15 selected GTWA schools. During this visit, all students, teachers, wardens, principals, hostel staff, and individuals in contact with students were briefed on the study objectives. Information was provided regarding the causative organisms of scabies, its transmission modes, contributing factors to its prevalence and endemicity, and the importance of personal hygiene, nutrition, geography, and cultural practices in its spread. Various management strategies, including the use of oral ivermectin—its mechanism of action, potential side effects, complications, the rationale for two doses, and expected treatment outcomes—were also explained. A total of 6,230 students from 15 GTWA schools participated in the study. All participants underwent comprehensive examinations by a team of doctors to exclude any co-morbidities. Students presenting with dermatological lesions were further evaluated by specialist dermatologists. Based on the data collected, students presenting with dermatological lesions were identified, and among these, cases of scabies were further distinguished. For instances in which a clinical diagnosis could not be established, samples were examined microscopically following treatment with 10% potassium hydroxide (KOH). The anatomical distribution of scabies lesions was mapped using a body diagram, and disease severity was classified as mild (ten or fewer lesions), moderate (11–49 lesions), severe (50 or more lesions), or crusted, in accordance with established criteria.^[9] Additionally, any secondary changes associated with scabies, such as excoriation, impetiginisation, or eczematization, were documented. The most frequently observed skin lesions included papules, pustules, nodules, erosions, and excoriations. Students presenting with dermatological conditions other than scabies received appropriate treatment from the dermatologists. On the day of the initial dose, students diagnosed with scabies were administered oral Ivermectin at a dosage of 200 µg per kilogram of body weight on an empty stomach prior to breakfast, under supervision by school faculty.

Faculty members were instructed to monitor and report any adverse health events among students for one week following administration. The second dose was provided one month later using the same protocol, with students observed for one week after each administration. In addition to students, teachers and other school staff also received two doses of oral Ivermectin as part of the intervention. One month after the administration of the second dose, all participating students underwent dermatological examination to assess the cure rate for scabies lesions. The outcomes for this study were documented as follows: Cured i.e, complete resolution of skin lesions and pruritus, partially cured i.e, at least a 50% reduction in the number of skin lesions and pruritus, not cured i.e, 50% reduction or less in the number of skin lesions and pruritus.

Statistical Analysis:All collected data were systematically entered into Microsoft Excel sheets for initial organisation and record-keeping. Subsequently, comprehensive statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) software, IBM Version 26.0. Quantitative and qualitative variables were presented as numbers, percentages, mean values, and standard deviations to ensure clarity and facilitate interpretation.

To determine the association between categorical variables within the study, the chi-square test was utilised. A p-value of less than 0.05 was considered indicative of statistical significance, aligning with conventional research standards. The summarised results of the analysis were presented in both tabular and graphical formats for ease of comparison and visualisation.

RESULTS

In the current study, 4,358 male and 1,872 female participants were observed, as detailed in Table 1 and Figure 1. Among the 6,230 students assessed, 3,043 were diagnosed with scabies and classified into mild, moderate, and severe categories. Of these cases, 1,348 (44.29%) were identified as mild, 974 (32.00%) as moderate, and 721 (23.72%) as severe scabies. Additionally, 335 students (11%) presented with secondary infections related to scabies, as shown in Table 2 and Figures 2–5. So, out of 3043 Scabies cases who were given oral Ivermectin, 2803 were cured with complete clearance of lesions and pruritus which is 92.11%, 227 students were partially cured which is 7.45% and 13 students were not cured which is 0.42% as detailed in Table 2 and Figure 6. Students diagnosed with scabies accompanied by secondary infection received both topical and systemic antibiotic therapy for seven days. On the eighth day, these students were given first dose of oral ivermectin based on their respective body weight.

A definitive clinical diagnosis of scabies was not possible in 12 students within the study. To further investigate these ambiguous cases, light microscopy examination was performed using a 10% potassium hydroxide (KOH) preparation. This approach revealed the presence of mites in three students, while faecal pellets indicative of mite infestation were detected in the remaining nine cases. These findings highlight the utility of microscopic evaluation in supporting the diagnosis when clinical assessment alone proves inconclusive.

Table 1: Age and gender distribution of students diagnosed with scabies, presented by school

S.no	Name of the school	Number of students screened	Male	Female	Students with scabies	Male	Female	Age <10 years	Age 10-15 years	Age 16 and above
1	GTWA School Guttalaputtu	557	0	557	168	0	168	8	537	12
2	GTWA School Dokuluru	244	244	0	181	181	0	11	225	8
3	GTWA School Raigedda	298	0	298	160	0	160	32	256	3
4	GTWA School Allmputtu	234	234	0	167	167	0	11	223	0
5	Government High School Hukumpeta	527	460	67	237	228	9	0	514	13
6	GTWA School Hukumpeta-1	336	336	0	182	182	0	17	319	0
7	GTWA School Hukumpeta-2	272	272	0	142	142	0	9	247	16
8	GTWA School Sukuru	313	313	0	181	181	0	9	290	14
9	GTWA School Guda	410	410	0	173	173	0	0	386	24
10	GTWA School G.Madugula Boys-1	497	497	0	272	272	0	12	485	0
11	GTWA School Dumbriiguda	314	314	0	113	113	0	0	310	4
12	GTWA School Kinchumanda	217	217	0	80	80	0	0	217	0

13	GTWA School Kantamambasuguda	722	722	0	365	365	0	33	637	52
14	GTWA School Ravalaguda	749	749	0	341	341	0	25	666	58
15	GTWA School Kothaballiguda	540	0	540	281	0	281	0	540	0
	TOTAL	6230	4358	1872	3043	2252	791	167	5852	204

Table 2: Grading and cure rates of scabies by school

S.no	Name of the school	Number of scabies patients identified	Mild scabies	Moderate scabies	Severe scabies	Totally cured	Partially cured	Not cured
1	GTWA School Guttulaputtu	168	96	46	26	161	6	1
2	GTWA School Dokuluru	181	55	64	62	163	17	1
3	GTWA School Raigedda	160	70	45	45	147	12	1
4	GTWA School Allimputtu	167	61	48	58	154	12	1
5	Govt High School Hukumpeta	237	83	87	67	221	14	2
6	GTWA School Hukumpeta-1	182	89	44	49	170	12	0
7	GTWA School Hukumpeta-2	142	67	40	35	135	9	0
8	GTWA School Sukuru	181	71	58	52	162	19	0
9	GTWA School Guda	173	111	45	17	165	8	0
10	GTWA School G.Madugula Boys-1	272	97	81	94	255	17	0
11	GTWA School Dumbriguda	113	41	34	38	98	15	0
12	GTWA School Kinchumanda	80	27	34	19	65	15	0
13	GTWA School Kantamambasuguda	365	138	144	83	345	20	0
14	GTWA School Ravalaguda	341	150	129	62	306	29	6
15	GTWA School Kothaballiguda	281	192	75	14	258	22	1
	TOTAL	3043	1348	974	721	2803	227	13

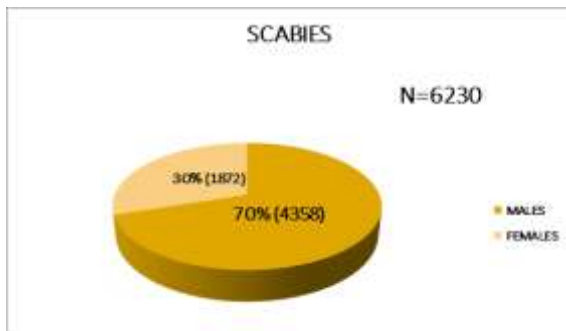


Figure 1: Gender Distribution Across Fifteen Schools

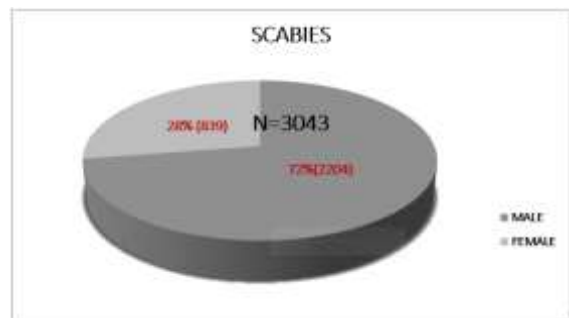


Figure 3: Gender distribution of students diagnosed with scabies

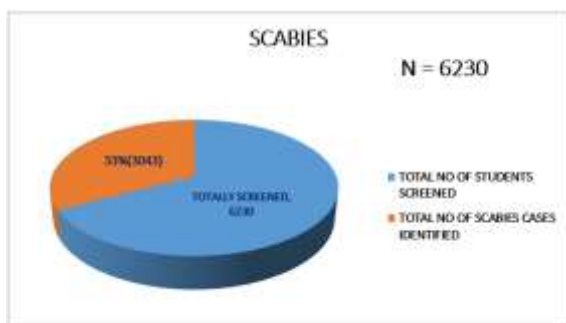


Figure 2: Prevalence of scabies among children

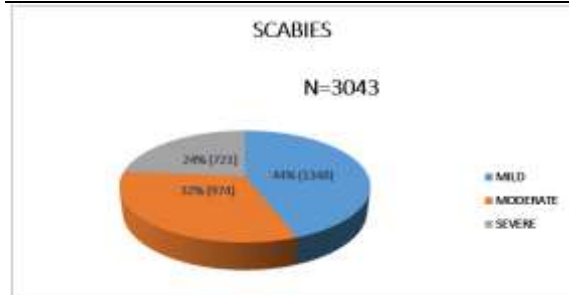


Figure 4: Distribution of scabies severity across 15 schools

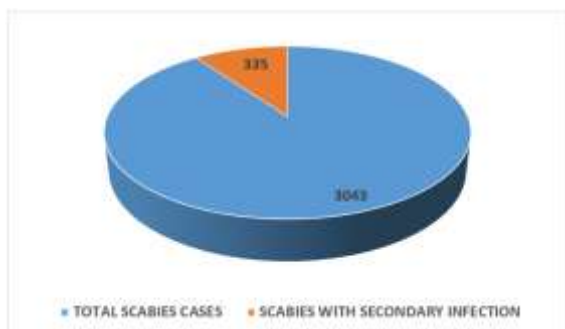


Figure 5: Incidence of secondary infections among children diagnosed with scabies

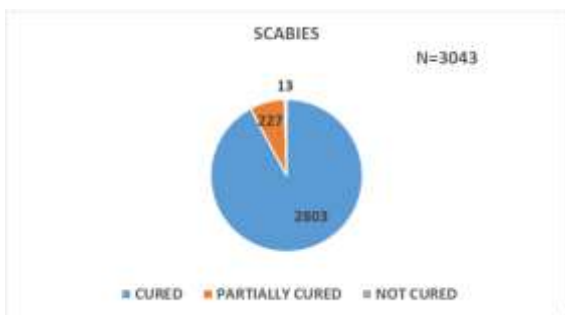


Figure 6: Cure Rates Across 15 Schools

DISCUSSION

In the present study, the majority of participants were aged 10–15 years, with a higher proportion of males compared to females. This distribution aligns with findings from studies conducted in Cameroon, the Solomon Islands, and Ethiopia, but contrasts with results reported in Iran.^[11-14]

In our study, the prevalence of scabies was 48.5%, which is notably high compared to a study conducted among children in a Malaysian welfare home (31%).^[15] Several studies performed in prison settings have also reported high prevalence rates, ranging from 41% to 57%.^[16,17] However, these rates are lower than those observed in a Bangladeshi Islamic religious school (61–62%),^[18] and a displacement camp in Sierra Leone (67%).^[19]

Few studies have reported treatment failures when a single dose of oral ivermectin at 200 micrograms per kilogram body weight is used, compared to two doses. This is attributed to the drug's lack of ovicidal action and its efficacy limited to certain stages of the parasite cycle.^[20] Therefore, it is recommended to administer ivermectin two to three times, at intervals of one to two weeks.^[21] In our study, we administered two doses at a four-week interval regardless of lesion clearance, aligning with previous research findings.^[22-26]

Our study demonstrates that oral ivermectin is safe and well tolerated, with no side effects reported. This contrasts with findings by Cartel et al.,^[27] who observed major side effects when using ivermectin for mass prophylaxis of lymphatic filariasis. Additionally, Chouela et al. noted occurrences of hypotension, abdominal pain, and vomiting associated with ivermectin use.^[28] Mass drug

administration (MDA) remains an effective strategy for controlling several neglected tropical diseases (NTDs), including scabies. In high-prevalence settings, two doses of ivermectin-based MDA have been shown to reduce prevalence by up to 90%; our results similarly indicate a 92% decrease over six months. These outcomes are consistent with studies by Romani et al., which reported reductions of 88% (AIM Trial, azithromycin–ivermectin MDA) and 94% (SHIFT Trial) after one year of intervention.^[29] Furthermore, our study observed a decline in impetigo cases or secondary infections, supporting previous findings regarding the positive impact of MDA and its role in preventing serious complications.^[30]

The current study indicates that the literacy rate among the parents of the children surveyed is 3%, and their awareness regarding scabies is minimal. Approximately 99% of this population initially seek treatment from village 'gurus' or traditional medicine practitioners, utilizing indigenous remedies such as plant extracts and turmeric paste as recommended. Furthermore, our findings reveal that 92% of the children lack knowledge about scabies and its available treatment options.

A study conducted by Armitage EP et al. and Mimouni D et al. identified a strong correlation between rainfall or cold climate and the incidence of scabies, which aligns with the findings of our research.^[31,32] Paderu is a predominantly tribal forest region situated at an elevation of 3,040 feet above sea level, with average temperatures ranging from 20°C to 28°C and annual rainfall between 17 and 32 cm. Due to the consistently cold and damp weather conditions, only 10% of inhabitants report bathing daily, whereas 74% bathe once every two to three days and 6% bathe weekly. Habitual daily bathing was not observed in 98% of the population.

The majority of these children live in remote villages without access to potable water, relying primarily on streams and ponds for their water supply. They generally experience low socio-economic conditions, and residing in residential hostels is nearly compulsory for all students.

Several factors have been identified as contributing to the high prevalence of scabies among the students in this study. A significant concern is the lack of established cultural habits that promote hygiene, compounded by the irregular availability of hot water in hostels, which limits student's ability to maintain cleanliness. Additionally, there is an absence of strict supervision and guidance regarding hygiene practices within the hostel environment.

The common practice of sharing clothes, soaps, and undergarments further exacerbates the risk of transmission. It was noted that only 10–15% of students regularly washed their clothes with soap. Furthermore, 90% of students reported that bed sheets and towels are changed only once in every one to two months, typically coinciding with parental visits. Winter garments and blankets are

often replaced just once per year, indicating infrequent laundering of essential items.

Overcrowding is another key issue, as classrooms are frequently converted into dormitories at night, resulting in cramped living conditions that facilitate the spread of scabies. Most students were also found to be undernourished, suffering from micronutrient deficiencies and anaemia, which may further predispose them to infection.

The findings from this study, along with similar research conducted in developing countries, highlight the unsatisfactory state of hygiene practices and limited knowledge of scabies prevention among students. These observations are consistent with studies from the Philippines and Kolkata.^[33,34] Notably, improvements in personal hygiene have been shown to have a significant impact in reducing the incidence of scabies.^[35]

Based on our study, we recommend the following measures to prevent scabies: Parents should be informed and counselled during mandatory parent meetings regarding the symptoms and transmission of scabies. Additionally, the significance of blanket treatment in controlling the spread of the disease should be emphasized using pamphlets or brochures in the local language. Enhanced laundry and personal hygiene protocols include soaking clothing in hot water for approximately 40 minutes every 15 days, and washing and changing bed linens at least once per week. Active supervision of the laundry process by hostel wardens is encouraged. Personal hygiene should also be promoted, with an emphasis on daily bathing with soap and refraining from sharing clothing with others. It is advisable to ensure that students have access to lukewarm water for bathing, as well as sufficient supplies of soap and towels. Regular hygiene education should be provided to both students and staff, utilizing visual aids and demonstrations to underscore the importance of cleanliness. Prompt medical evaluation and monitoring are essential for identifying any student exhibiting symptoms of scabies; timely and appropriate treatment should be administered, including temporary isolation when necessary to prevent disease transmission. Coordinating with local health authorities to arrange periodic health checkups for students and staff can significantly contribute to disease control. Additionally, Assistant Tribal Welfare Officers (ATWOs) should conduct regular inspections of hygiene practices and submit monthly reports to the Project Officer to maintain compliance.

CONCLUSION

In summary, our study demonstrated a cure rate of 92%, indicating strong efficacy in the management of scabies among residents of GTWA hostels. Additionally, no adverse drug reactions were reported by treated students, highlighting both the

safety and tolerability of the therapeutic regimen utilized.

Based on these observations, it is evident that oral ivermectin is suitable for Mass Drug Administration (MDA) as an effective strategy for controlling scabies outbreaks in similar settings. In addition to pharmacological intervention, it is crucial that students adhere to general hygienic measures to prevent reinfection and support overall disease eradication efforts. Through the concurrent implementation of MDA with oral ivermectin and sustained hygiene practices, scabies can be effectively eliminated from GTWA Residential hostels.

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