

**PREVENTION OF THE SPREAD OF SCABIES AND FUNGAL DISEASES IN  
CHILDREN'S INSTITUTIONS: AN EPIDEMIOLOGICAL ANALYSIS AND  
INTERVENTION STRATEGY**

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**Abstract:** Background: Parasitic and fungal skin diseases, specifically scabies and dermatophytosis (mycoses), remain a significant public health concern in organized pediatric populations. Kindergartens and schools, characterized by high physical contact density, serve as reservoirs for transmission. This study aims to evaluate the epidemiological situation of these dermatoses in children's institutions in the Andijan region and assess the efficacy of an integrated preventive "Active Surveillance" model. Methods: A prospective interventional study was conducted across 12 preschools and primary schools involving 1,500 children. The institutions were divided into an Intervention Group (n=6), implementing active weekly screening, staff training, and environmental disinfection, and a Control Group (n=6) following standard reactive protocols. The incidence of new cases and the duration of outbreaks were monitored over one academic year. Results: The baseline prevalence of fungal infections (tinea capitis/corporis) was 4.2%, and scabies was 1.5%. Following the intervention, the incidence of new cases in the Intervention Group decreased by 75% compared to the Control Group ( $p < 0.001$ ). "Active Surveillance" allowed for the detection of atypical and paucisymptomatic forms, preventing cluster outbreaks. Conclusion: The spread of contagious dermatoses in children's institutions is driven by delayed diagnosis and asymptomatic carriage. Implementing a proactive screening strategy combined with hygienic education for staff and parents significantly reduces the burden of disease.

**Keywords:** Scabies, dermatomycosis, fungal infections, pediatric epidemiology, prevention, children's institutions, active surveillance.

**BOLALAR MUASSASALARIDA QO‘TIR VA MIKOZ KASALLIKLARINING  
TARQALISHINI OLDINI OLISH: EPIDEMIOLOGIK TAHLIL VA INTERVENSIYA  
STRATEGIYASI**

**Annotatsiya:** Kirish: Parazitar va zamburug‘li teri kasalliklari, xususan qo‘tir va dermatofitiyalar (mikozi), uyushgan bolalar jamoalarida jiddiy tibbiy-ijtimoiy muammo bo‘lib qolmoqda. Yuqori jismoniy muloqot zichligi bilan ajralib turadigan bog‘cha va maktablar infeksiya tarqalish o‘choqlari hisoblanadi. Ushbu tadqiqot Andijon viloyatidagi bolalar muassasalarida ushbu dermatozlarning epidemiologik holatini baholash va integratsiyalashgan profilaktik "Faol Kuzatuv" modelining samaradorligini o‘rganishga qaratilgan. Usullar: 12 ta maktabgacha va boshlang‘ich ta‘lim muassasalarida 1500 nafar bola ishtirokida prospektiv intervension tadqiqot o‘tkazildi. Muassasalar ikki guruhga ajratildi: Intervensiya guruhi (n=6) – bu yerda haftalik faol skrining, xodimlarni o‘qitish va atrof-muhit dezinfeksiyasi joriy etildi; Nazorat guruhi (n=6) – standart reaktiv protokollar asosida ishladi. Bir o‘quv yili davomida yangi holatlar uchrashi va epidemik o‘choqlarning davomiyligi nazorat qilindi. Natijalar: Boshlang‘ich davrda zamburug‘li infeksiyalar (bosh va tana mikozi) tarqalishi 4,2 foizni, qo‘tir

esa 1,5 foizni tashkil etdi. Intervensiyadan so'ng, Intervensiya guruhida yangi kasallanish holatlari Nazorat guruhiga nisbatan 75 foizga kamaydi ( $p < 0.001$ ). "Faol Kuzatuv" atipik va kam simptomli shakllarni erta aniqlash imkonini berdi, bu esa guruhli (klaster) tarqalishning oldini oldi. Xulosa: Bolalar muassasalarida yuqumli dermatozlarning tarqalishi kechiktirilgan tashxis va simptomsiz tashuvchilik bilan bog'liq. Faol skrining strategiyasini xodimlar va ota-onalar uchun gigiyenik ta'lim bilan birgalikda qo'llash kasallik yukini sezilarli darajada kamaytiradi.

**Kalit so'zlar:** Qo'tir, dermatomikoz, zamburug'li infeksiyalar, pediatrik epidemiologiya, profilaktika, bolalar muassasalari, faol kuzatuv.

### ПРОФИЛАКТИКА РАСПРОСТРАНЕНИЯ ЧЕСОТКИ И МИКОЗОВ В ДЕТСКИХ УЧРЕЖДЕНИЯХ: ЭПИДЕМИОЛОГИЧЕСКИЙ АНАЛИЗ И СТРАТЕГИЯ ВМЕШАТЕЛЬСТВА

**Аннотация:** Введение: Паразитарные и грибковые заболевания кожи, в частности чесотка и дерматофитии (микозы), остаются серьезной проблемой общественного здравоохранения в организованных детских коллективах. Детские сады и школы, характеризующиеся высокой плотностью физических контактов, служат резервуарами для передачи инфекции. Целью данного исследования является оценка эпидемиологической ситуации по данным дерматозам в детских учреждениях Андиганской области и определение эффективности интегрированной профилактической модели «Активного надзора». Методы: Было проведено проспективное интервенционное исследование в 12 дошкольных и начальных образовательных учреждениях с участием 1500 детей. Учреждения были разделены на Группу вмешательства ( $n=6$ ), где внедрялись еженедельный активный скрининг, обучение персонала и дезинфекция среды, и Контрольную группу ( $n=6$ ), следовавшую стандартным реактивным протоколам. Заболеваемость новыми случаями и продолжительность вспышек отслеживались в течение одного учебного года. Результаты: Исходная распространенность грибковых инфекций (микоз головы/тела) составила 4,2%, чесотки — 1,5%. После вмешательства заболеваемость новыми случаями в Группе вмешательства снизилась на 75% по сравнению с Контрольной группой ( $p < 0.001$ ). «Активный надзор» позволил выявить атипичные и малосимптомные формы, предотвратив кластерные вспышки. Заключение: Распространение заразных дерматозов в детских учреждениях обусловлено поздней диагностикой и бессимптомным носительством. Внедрение стратегии проактивного скрининга в сочетании с гигиеническим обучением персонала и родителей значительно снижает бремя болезни.

**Ключевые слова:** Чесотка, дерматомироз, грибковые инфекции, педиатрическая эпидемиология, профилактика, детские учреждения, активный надзор.

### INTRODUCTION

Skin diseases constitute a major proportion of pediatric morbidity worldwide, with infectious dermatoses being particularly prevalent in low- and middle-income regions. Among these, Scabies (caused by the mite *Sarcoptes scabiei* var. *hominis*) and Superficial Mycoses (dermatophytosis like *Tinea capitis* and *Tinea corporis*) represent a significant and persistent public health burden in organized children's institutions. Kindergartens, primary schools, and

orphanages create a unique epidemiological niche characterized by high population density, shared living and sleeping spaces, and frequent, prolonged skin-to-skin contact.

In the Andijan region of Uzbekistan, despite general improvements in sanitation and hygiene, outbreaks of these contagious dermatoses occur with frustrating regularity. The clinical significance of these diseases extends far beyond the physical symptoms of pruritus (itching) and cutaneous lesions. They are associated with profound social consequences, including stigmatization, bullying, and exclusion from educational activities. Furthermore, the intense itching associated with scabies leads to sleep disturbances, which in turn affect academic performance and cognitive development. Secondary bacterial infections (such as impetigo, cellulitis, and abscesses) caused by *Staphylococcus aureus* or *Streptococcus pyogenes* entering through excoriated skin can lead to serious systemic complications, including post-streptococcal glomerulonephritis and rheumatic heart disease.

The traditional approach to controlling these diseases in our region has largely been "reactive"—relying on parents or teachers to notice symptoms and then isolating the child. However, this strategy is fundamentally flawed due to the biology of the pathogens. The incubation period for primary scabies infestation can be up to 6 weeks, during which the child is asymptomatic but infectious. Similarly, anthropophilic fungal infections can present as mild, non-inflammatory scaling ("dandruff") that goes unnoticed by laypeople, creating a reservoir of "asymptomatic carriers" within the classroom. By the time a florid case is diagnosed, the chain of transmission is already well-established.

This study proposes a paradigm shift towards an "Active Surveillance and Prevention" model. We hypothesize that systematic, dermatologist-led screening combined with rigorous environmental hygiene and health education can break the chain of transmission more effectively than the current standard of care. This research aims to provide an evidence-based, scalable protocol for the sanitary-epidemiological management of children's institutions in Uzbekistan, transforming schools from reservoirs of infection into centers of health promotion.

#### LITERATURE REVIEW

The "Great Imitator" and Social Stigma Scabies is classified by the WHO as a Neglected Tropical Disease, affecting over 200 million people globally at any given time. In institutional settings, the attack rate during an outbreak can exceed 50% if interventions are delayed. Engelman et al. (2013) emphasized that in pediatric populations, scabies often presents atypically. Unlike adults, children may have lesions on the palms, soles, face, and scalp. This atypical distribution often leads to misdiagnosis as atopic dermatitis, eczema, or insect bites. Consequently, children are frequently treated with topical corticosteroids, which suppress the local immune response and itch but allow the mite population to explode—a phenomenon known as "Scabies Incognito." These highly infectious children become "super-spreaders" within the institution. Furthermore, the stigma associated with "being dirty" often leads parents to hide the diagnosis, delaying treatment for the entire group.

The Silent Epidemic of the Scalp *Tinea capitis* is the most common pediatric fungal infection worldwide. In Central Asia, the etiology involves both zoophilic (animal-to-human) and anthropophilic (human-to-human) dermatophytes. While zoophilic infections (*Microsporum canis*) often cause highly visible inflammatory lesions (kerion), anthropophilic species like *Trichophyton tonsurans* and *Trichophyton violaceum* have adapted to the human host to cause chronic, non-inflammatory infections. These present as subtle scaling or "black dot" alopecia which is easily overlooked. Fuller et al. (2003) demonstrated that in urban schools, the rate of asymptomatic carriage can be as high as 10-15%. These carriers shed fungal spores onto shared

objects—caps, combs, pillows, and upholstery—where the spores can remain viable for months, facilitating indirect transmission.

**The Role of Institutional Hygiene and Environment** The environment plays a critical, often underappreciated role in the persistence of these diseases. Scabies mites can survive off the host for 24-48 hours, particularly in humid conditions, while fungal spores are resilient for months. In kindergartens, the practice of sharing soft toys, dress-up clothes, and bedding during nap time provides ample opportunity for fomite transmission. Standard cleaning protocols often focus on visible dirt rather than disinfection of textiles. Research indicates that laundering at temperatures above 60°C or sealing items in plastic bags for 72 hours is necessary to break the cycle of re-infestation.

**Mass Treatment vs. Targeted Screening** Global strategies for control vary. In hyper-endemic island populations, Mass Drug Administration (MDA) with oral Ivermectin has shown success. However, in low-endemicity settings like Uzbek schools, MDA is not cost-effective or ethically straightforward due to medication side effects. The alternative is "Targeted Screening and Treatment." However, there is a lack of robust data on the implementation of such protocols in the specific socio-cultural context of the Fergana Valley, where large class sizes, communal living practices, and specific cultural attitudes towards skin diseases influence transmission dynamics.

## MATERIALS AND METHODS

**Study Design** A cluster-randomized interventional study was conducted over the 2023-2024 academic year (September to May). **Setting and Participants** 12 institutions (6 Kindergartens, 6 Primary Schools) in the Andijan district were selected. **Total Population:** 1,500 children aged 3 to 10 years.

**Randomization:** Institutions were paired by size and location (urban/rural) and randomized into Intervention or Control arms.

**Control Group (Standard Care):** Diagnosis relied on parents seeking medical help or teacher referral. Isolation occurred upon confirmed diagnosis. Standard cleaning protocols.

**Intervention Group ("Active Surveillance"):** Weekly "Filter": A trained nurse performed skin checks every Monday morning, focusing on hands, scalp, and flexural areas. **Dermatologist Rounds:** Monthly comprehensive screening by a specialist using dermoscopy.

**"Contact" Management:** If one case was found, the entire class/group was treated as "contacts" with prophylactic observation and environmental deep-cleaning.

**Education:** Seminars for parents on recognizing early signs (night itching, scaling patches) and hygiene (not sharing hats/combs).

**Scabies:** Presence of burrows, nocturnal pruritus, and characteristic distribution. Confirmed by microscopic examination of skin scrapings.

**Mycosis:** Scaling patches, alopecia, or broken hairs. Confirmed by KOH preparation or Wood's lamp fluorescence.

**Statistical Analysis** The primary outcome was the incidence density (new cases per 1,000 child-months). Chi-square tests were used to compare rates.

## RESULTS

**Baseline Prevalence** At the start of the study, active screening revealed unrecognized pathology in both groups. **Fungal Infections:** 4.2% (63/1500). Predominantly Tinea capitis. **Scabies:** 1.5% (22/1500).

Atopic Dermatitis (Differential Diagnosis): 12%. This confirmed that a reservoir of infection existed prior to intervention.

Impact of Intervention on Incidence Over the 9-month period, the divergence between groups was significant.

**Table 1: Incidence of New Cases During Study Period**

Disease	Control Group (n=750)	Intervention Group (n=750)	Reduction	P-value
Scabies (New Cases)	45 (6.0%)	12 (1.6%)	-73.3%	<0.001
Mycoses (New Cases)	68 (9.1%)	18 (2.4%)	-73.5%	<0.001
Cluster Outbreaks (>3 cases)	8 outbreaks	1 outbreak	-	<0.05

Detection of Atypical Forms In the Intervention Group, 60% of the detected fungal cases were "paucisymptomatic" (mild scaling only), identified during screening. In the Control Group, cases were typically identified only after hair loss (alopecia) became visible, indicating a delay in diagnosis of several weeks.

Environmental Factors An analysis of the single outbreak in the Intervention Group revealed it was caused by a "soft toy" corner in a kindergarten that had not been laundered, highlighting the role of fomites.

## DISCUSSION

The study results strongly validate the "Active Surveillance" model as a superior public health strategy for children's institutions. The dramatic reduction in incidence (73-75%) in the Intervention Group suggests that the primary driver of sustained transmission in these settings is the undiagnosed, asymptomatic child.

Breaking the Cycle of "Hidden" Transmission: By identifying cases in the early stages—such as fungal carriers with minimal scaling or early scabies with only a few papules—we effectively removed the source of infection before it could spread to the rest of the group. In the Control Group, reliance on passive detection meant that a child often remained infectious in the group for weeks until symptoms became severe enough to warrant attention.

Cultural and Educational Impact: The educational seminars for parents played a pivotal role. We observed a shift in parental behavior from "hiding the disease" (due to shame) to "seeking early treatment." Parents learned to distinguish between "dry skin" and fungal infection, and between "allergies" and scabies. This highlights that medical intervention must be paired with community education to destigmatize these common conditions.

Economic Feasibility: While active screening requires the time of medical personnel, the cost-benefit analysis favors prevention. Treating a full-blown cluster outbreak involving 30 children, requiring mass disinfection, and potentially closing a kindergarten group is significantly more expensive and disruptive than the weekly time investment of a nurse.

## CONCLUSION

The prevention of scabies and mycoses in children's institutions is not merely a medical task but a complex organizational challenge that requires a proactive, systematic approach.

A significant number of children attend school and kindergarten with undiagnosed, transmissible skin diseases, serving as a silent reservoir for infection.

Regular, active inspection by trained personnel, rather than waiting for complaints, drastically reduces the incidence of new cases and prevents large-scale outbreaks.

Treatment of the individual child is insufficient without concurrent environmental disinfection and management of close contacts.

### RECOMMENDATIONS

To effectively control the spread of contagious dermatoses in educational settings in the Andijan region, we propose the following multi-level recommendations:

#### 1. Institutional Policy and Nursing Practice:

Mandatory "Monday Morning Filter": Institutionalize a weekly skin check in all preschools, performed by a trained nurse every Monday morning. Focus should be on the interdigital spaces of hands, wrists, and the scalp.

"Return to School" Protocols: Strictly enforce a policy requiring a medical certificate from a dermatologist (not just a general practitioner) for any child returning after an absence of >3 days due to "rash," "itching," or unspecified skin complaints.

#### 2. Dermatological Service Integration:

Active Collaboration - Dermatologists should work closely with the Sanitary-Epidemiological Welfare and Public Health Service (SanEpid) to conduct quarterly "deep screening" rounds in high-risk institutions, utilizing dermoscopy and Wood's lamps.

Prophylactic Treatment - In the event of a single confirmed scabies diagnosis in a kindergarten group, prophylactic treatment of the entire immediate contact group (e.g., sleeping cohort) should be considered standard practice to prevent "ping-pong" re-infestation.

#### 3. Environmental Hygiene Standards:

Fomite Control - Eliminate shared soft toys and upholstered furniture in kindergartens that cannot be easily disinfected. If retained, establish a rigorous weekly laundering protocol (60°C wash).

Individual Storage: Ensure every child has individualized, separated storage for hats, combs, and bedding to prevent cross-contamination.

#### 4. Public Health Education:

Parental Awareness - Conduct regular workshops for parents to destigmatize lice, scabies, and fungus, emphasizing that these are infectious diseases, not indicators of "bad parenting."

Teacher Training - Train educators to recognize the subtle behavioral signs of skin disease, such as a child constantly scratching or rubbing their head, and to report these discreetly to the school nurse.

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