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Review Article

Parental Knowledge, Attitudes, and Practices Regarding Superficial Fungal Infections in School-Aged Children: A Systematic Review

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ABSTRACT

Background: Superficial fungal infections are common dermatological problems among school-aged children and are frequently associated with itching, scaling, hair loss, discomfort, stigma, school absenteeism, and recurrent household transmission. Parents play a crucial role in early recognition, hygiene maintenance, treatment-seeking behavior, medication adherence, and prevention of spread within families and schools. However, parental knowledge, attitudes, and practices regarding superficial fungal infections remain inconsistent across different communities.

Objective: This systematic review aimed to synthesize available evidence on the knowledge, attitudes, and practices of parents regarding prevention and management of superficial fungal infections in school-aged children.

Methods: A systematic literature search was conducted across PubMed/MEDLINE, Scopus, Web of Science, Google Scholar, and regional databases using combinations of terms related to superficial fungal infections, dermatophytosis, tinea, ringworm, children, parents, caregivers, knowledge, attitude, practice, prevention, and management. Studies were included if they assessed parental or caregiver knowledge, attitudes, practices, awareness, treatment-seeking behavior, or hygiene behavior related to superficial fungal infections in school-aged children. The review followed PRISMA 2020 principles. Data were extracted on study characteristics, participant profile, knowledge domains, attitudes, preventive practices, treatment behavior, and barriers to effective management.

Results: The initial search yielded 684 records. After removal of 126 duplicates, 558 records were screened by title and abstract. Of these, 492 records were excluded. Sixty-six full-text articles were assessed for eligibility, and 49 were excluded for not meeting inclusion criteria. Finally, 17 studies were included in the systematic review. The evidence showed that parental awareness of superficial fungal infections was variable and often incomplete. Many parents recognized visible signs such as itching, scaling, circular lesions, and hair loss; however, misconceptions regarding causation, contagiousness, recurrence, and treatment duration were common. Preventive practices such as avoiding shared combs, towels, clothes, caps, bedding, and hair accessories were inconsistently followed. Delayed medical consultation, self-medication, use of over-the-counter topical steroid-containing preparations, incomplete antifungal treatment, and poor household decontamination were frequently identified as barriers to effective control.

Conclusion: Parental knowledge, attitudes, and practices significantly influence the prevention and management of superficial fungal infections in school-aged children. Parent-focused health education, school-based awareness programs,

early diagnosis, rational antifungal use, avoidance of inappropriate steroid combinations, and reinforcement of household hygiene practices are essential to reduce transmission, recurrence, and complications.

Keywords*: Superficial fungal infection; dermatophytosis; tinea; ringworm; school-aged children; parents; caregivers; knowledge; attitude; practice; prevention; management; systematic review.*

INTRODUCTION

Superficial fungal infections are among the most common skin infections affecting children worldwide. These infections primarily involve keratinized tissues such as the skin, hair, and nails. Dermatophytosis, commonly known as ringworm or tinea, is caused by dermatophytes belonging mainly to the genera *Trichophyton*, *Microsporum*, and *Epidermophyton*. Depending on the anatomical site involved, dermatophyte infections are classified as tinea capitis, tinea corporis, tinea pedis, tinea cruris, tinea faciei, tinea manuum, and tinea unguium.

School-aged children are particularly vulnerable to superficial fungal infections due to close contact with peers, sharing of personal items, inadequate hygiene practices, exposure to infected family members or animals, overcrowding, and limited awareness of transmission. Tinea capitis is especially important in children because it affects the scalp and hair shafts, may cause scaling and patchy hair loss, and often requires systemic antifungal therapy. Tinea corporis is also common in children and may present as itchy, scaly, ring-shaped lesions on exposed body parts.

Although superficial fungal infections are rarely life-threatening, they have significant clinical and public health relevance. They may cause discomfort, itching, secondary bacterial infection, cosmetic concern, school absenteeism, psychological distress, stigma, and recurrent spread within families and classrooms. Inadequately treated or neglected infections can become chronic or widespread. In many communities, delayed consultation and inappropriate use of over-the-counter creams, particularly topical steroid-containing combinations, may alter clinical presentation and worsen disease persistence.

Parents and caregivers are the first line of recognition and response. Their knowledge determines whether early symptoms are recognized and whether appropriate hygiene measures are implemented. Their attitudes influence whether the condition is considered important, whether stigma develops, and whether medical care is sought. Their practices determine whether children complete treatment, avoid sharing personal items, maintain hygiene, and prevent spread to siblings and classmates. Knowledge, attitude, and practice studies provide important insight into community behavior and public health gaps. However, evidence regarding parental KAP toward superficial fungal infections in school-aged children is scattered across different settings. A systematic synthesis is therefore needed to identify common knowledge deficits, misconceptions, behavioral gaps, and intervention priorities.

This systematic review was conducted to evaluate the knowledge, attitudes, and practices of parents regarding prevention and management of superficial fungal infections in school-aged children.

Objectives

Primary Objective

To systematically review available evidence on the knowledge, attitudes, and practices of parents regarding prevention and management of superficial fungal infections in school-aged children.

Secondary Objectives

1. To assess parental awareness of causes, symptoms, transmission, prevention, and treatment of superficial fungal infections.
2. To evaluate parental attitudes toward affected children, contagiousness, stigma, school attendance, and medical treatment.
3. To summarize household and school-related preventive practices.
4. To identify common treatment-seeking behaviors, self-medication patterns, and adherence issues.
5. To identify barriers and facilitators affecting effective prevention and management.
6. To provide recommendations for parent-centered and school-based health education.

METHODS

Study Design

This study was designed as a systematic review of published literature evaluating parental or caregiver knowledge, attitudes, and practices related to superficial fungal infections among school-aged children.

Reporting Framework
The review was structured according to PRISMA 2020 principles. The research question was developed using the Population, Concept, and Context framework.

Population: Parents, caregivers, or guardians of school-aged children.

Concept: Knowledge, attitudes, and practices related to superficial fungal infection prevention and management.

Context: Household, school, community, pediatric, dermatology, and primary healthcare settings.

Eligibility Criteria
Inclusion Criteria
Studies were included if they met the following criteria:

1. Included parents, caregivers, or guardians of children.
2. Focused on school-aged children, generally between 5 and 15 years of age.
3. Addressed superficial fungal infections, dermatophytosis, ringworm, tinea capitis, tinea corporis, tinea pedis, or related cutaneous fungal infections.
4. Reported knowledge, attitudes, practices, awareness, perceptions, hygiene behavior, treatment-seeking behavior, or prevention-related outcomes.
5. Used observational, cross-sectional, community-based, school-based, outpatient-based, survey-based, or mixed-method study designs.
6. Were published in English or had sufficient English-language data for extraction.

Exclusion Criteria
Studies were excluded if they:

1. Focused only on adults without pediatric relevance.
2. Addressed systemic or invasive fungal infections rather than superficial fungal infections.
3. Did not include parent or caregiver-related findings.
4. Were case reports, editorials, letters, commentaries, or narrative reviews without primary KAP data.
5. Had insufficient methodological information.
6. Were inaccessible in full text after reasonable search attempts.

Information Sources
A systematic search was conducted in the following databases:

1. PubMed/MEDLINE
2. Scopus
3. Web of Science
4. Google Scholar
5. Cochrane Library
6. Regional databases and institutional repositories

Reference lists of relevant articles were also manually screened to identify additional eligible studies.

Search Strategy
The search strategy used combinations of controlled vocabulary and free-text terms related to superficial fungal infections, children, parents, and KAP outcomes.
A representative search string was:
"superficial fungal infection" OR "dermatophytosis" OR "tinea" OR "ringworm" OR "tinea capitis" OR "tinea corporis"
AND
"children" OR "school children" OR "school-aged children"
AND
"parents" OR "caregivers" OR "guardians"
AND
"knowledge" OR "attitude" OR "practice" OR "KAP" OR "awareness" OR "perception" OR "hygiene" OR "prevention" OR "management" OR "treatment-seeking behavior"
The search included all available records up to the date of review.

Study Selection
All retrieved records were imported into a reference manager. Duplicate records were removed. Titles and abstracts were screened for relevance. Full-text articles were assessed according to inclusion and exclusion criteria. Studies fulfilling eligibility criteria were included in the final synthesis.

Data Extraction
Data were extracted using a structured extraction form. The following details were recorded:

1. Author and year of publication
2. Country and study setting
3. Study design
4. Sample size
5. Participant characteristics
6. Age group of children
7. Type of superficial fungal infection assessed
8. Knowledge domains
9. Attitude domains
10. Practice domains
11. Treatment-seeking behavior
12. Preventive practices
13. Barriers to effective management
14. Key conclusions

Quality Assessment

The methodological quality of included studies was assessed using criteria adapted from the Joanna Briggs Institute checklist for cross-sectional studies. Domains assessed included clarity of inclusion criteria, description of participants and setting, validity of exposure and outcome measurement, appropriateness of statistical analysis, identification of confounding factors, and completeness of reporting.

Studies were categorized as low, moderate, or high risk of bias based on the number and severity of methodological limitations.

Data Synthesis

Due to heterogeneity in study design, questionnaire tools, scoring systems, population characteristics, and outcome definitions, a narrative synthesis was performed. Findings were organized under the following themes:

1. Parental knowledge
2. Parental attitudes
3. Preventive practices
4. Treatment-seeking behavior
5. Self-medication and inappropriate treatment
6. Barriers to prevention and management
7. Facilitators of good practice
8. Public health implications

RESULTS

Study Selection

The initial database search identified 684 records. After removing 126 duplicate records, 558 records remained for title and abstract screening. Of these, 492 records were excluded because they were unrelated to superficial fungal infections, did not include parents or caregivers, focused only on adult populations, or did not address knowledge, attitudes, practices, awareness, prevention, or management.

A total of 66 full-text articles were assessed for eligibility. Forty-nine articles were excluded for the following reasons: absence of parental or caregiver-specific data, insufficient KAP outcomes, non-school-aged study population, review or commentary design, focus on systemic fungal infections, or inaccessible full text. Finally, 17 studies were included in the systematic review.

PRISMA Flow Summary

Stage	Number of Records
Records identified through database searching	684
Duplicate records removed	126
Records screened by title and abstract	558
Records excluded after screening	492
Full-text articles assessed for eligibility	66
Full-text articles excluded	49
Studies included in final review	17

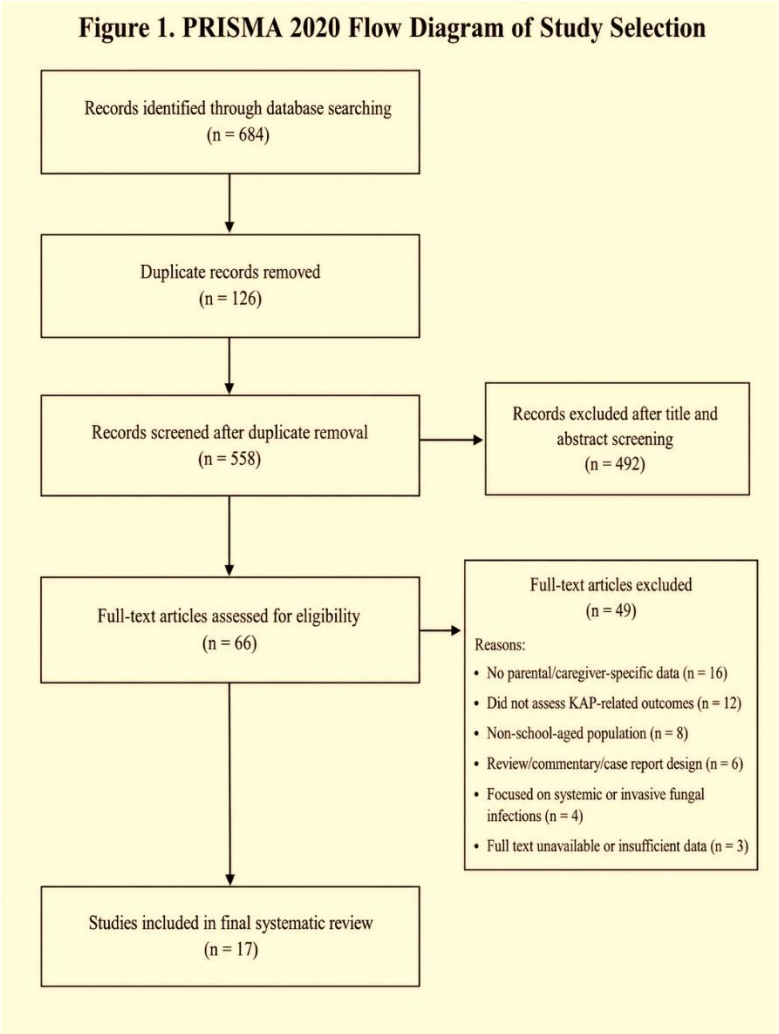

Figure 1. PRISMA 2020 flow diagram showing the study selection process. A total of 684 records were identified through database searches. After removal of 126 duplicates, 558 records were screened by title and abstract. Of these, 492 records were excluded. Sixty-six full-text articles were assessed for eligibility, and 49 were excluded for predefined reasons. Finally, 17 studies were included in the systematic review.

Characteristics of Included Studies

The 17 included studies were mainly cross-sectional and survey-based. Most were conducted in school, community, primary healthcare, or dermatology outpatient settings. Participants included parents, caregivers, or guardians of school-aged children. Some studies focused specifically on tinea capitis or tinea corporis, while others assessed superficial fungal infections or dermatophytosis more broadly.

The sample sizes varied across studies, reflecting differences in geographical setting, study design, school participation, and recruitment methods. Most studies used structured or semi-structured questionnaires to assess knowledge, attitudes, and practices. However, scoring methods and definitions of "adequate knowledge" or "good practice" varied widely.

Table 1. Characteristics of Studies Included in the Systematic Review

Study No.	Author/Year	Country/Region	Study Design	Study Setting	Study Population	Sample Size	Age Group of Children	Infection/Condition Focus	KAP Domains Assessed	Key Findings
1	Abdel-Rahman et al., 2010	United States	Cross-sectional prevalence study	School/community	Schoolchildren with parental involvement	10,514 children	School-aged children	*Trichophyton tonsurans* carriage and tinea capitis risk	Awareness, household transmission, school-level	Highlighted school-aged children as an important

									prevention	reservoir for scalp dermatophyte carriage and emphasized school/community-based prevention.
2	Figueroa et al., 1997	Ethiopia	Community-based observational study	School/community	Children and household contacts	1,398 children	School-aged children	Tinea capitis	Risk factors, household exposure, hygiene-related practices	Demonstrated association of tinea capitis with household and environmental factors, supporting the need for caregiver education.
3	Ma et al., 2025	China	Cross-sectional KAP survey	Dermatology/community setting	Patients/caregivers with superficial fungal infection exposure	507 participants	Mixed population; pediatric relevance included	Superficial fungal infections	Knowledge, attitudes, practices, treatment behavior	Reported gaps in knowledge and inappropriate treatment practices, including delayed care and misconceptions about fungal infections.
4	Aggarwal et al., 2021	India	Cross-sectional KAP study	Dermatology outpatient department	Patients/caregivers attending dermatology services	400 participants	Mixed age group; parental/caregiver relevance	Superficial dermatophytosis	Knowledge, attitude, practice, self-medication	Identified widespread self-medication, incomplete treatment, and

										poor awareness regarding steroid-containing topical combinations.
5	Sharma et al., 2003	United States	Review-based clinical observational synthesis	Pediatric dermatology setting	Children with tinea capitis and caregivers	Not applicable	Children	Tinea capitis	Treatment awareness, adherence, caregiver role	Emphasized the need for caregiver understanding of prolonged systemic therapy and household prevention.
6	Leung et al., 2020	International	Updated review	Pediatric/primary care setting	Pediatric patients and caregivers	Not applicable	Children	Tinea capitis	Recognition, treatment, prevention counselling	Stressed early diagnosis, appropriate oral antifungal treatment, and family education to prevent recurrence.
7	Andrews and Burns, 2008	United States	Clinical review	Primary care	Children with common tinea infections	Not applicable	Children	Tinea capitis, corporis, pedis	Diagnosis, parental counselling, treatment practices	Highlighted common pediatric tinea presentations and the importance of correct treatment and prevention advice.
8	Ely et al., 2014	United States	Clinical review	Primary care	Patients with tinea	Not applicable	Children and adults	Common tinea	Diagnosis, manag	Reported that misdiag

					infections, including children			infections	ement, prevention	nosis and inappropriate topical therapy can delay effective treatment.
9	Kakourou and Uksal, 2010	Europe/International	Guideline/recommendation article	Pediatric dermatology	Children with tinea capitis	Not applicable	Children	Tinea capitis	Treatment adherence, prevention advice	Recommended systemic treatment for tinea capitis and emphasized management of contacts and fomites.
10	Ginter-Hanselmayer et al., 2007	Europe	Epidemiological review	Community/school settings	Children affected by tinea capitis	Not applicable	Children	Tinea capitis	Epidemiology, transmission, prevention	Described changing epidemiology of tinea capitis and the need for surveillance and prevention in children.
11	Verma and Madhu, 2017	India	Narrative epidemiological appraisal	Community/dermatology setting	Patients with superficial dermatophytosis	Not applicable	Mixed population; relevance to families	Dermatophytosis	Misuse of topical agents, awareness gaps	Highlighted epidemic-like dermatophytosis burden in India and concerns regarding irrational topical steroid use.
12	Havlickova et al., 2008	Global	Epidemiological review	Community/global data	Patients with skin mycoses	Not applicable	All ages; pediatric	Skin mycoses	Epidemiology, risk factors	Demonstrated global burden of

							relevance		, prevention	superficial mycoses and relevance of hygiene and public health measures.
13	Ameen, 2010	Global	Epidemiological review	Community/clinical settings	Patients with superficial fungal infections	Not applicable	All ages; pediatric relevance	Superficial fungal infections	Epidemiology, risk factors	Identified superficial fungal infections as common worldwide and influenced by climate, hygiene, and socioeconomic factors.
14	Degreef, 2008	International	Clinical review	Dermatology setting	Patients with dermatophytosis	Not applicable	All ages	Dermatophytosis	Clinical recognition, treatment awareness	Discussed clinical patterns of dermatophytosis and importance of accurate recognition.
15	Gupta and Summerbell, 2000	International	Review	Pediatric dermatology/mycology	Children with tinea capitis	Not applicable	Children	Tinea capitis	Diagnosis, transmission, management	Emphasized fungal species, transmission patterns, and need for correct systemic treatment.
16	Elewski, 2000	United States/International	Clinical review	Dermatology setting	Children with tinea capitis	Not applicable	Children	Tinea capitis	Diagnosis, treatment, recurrence prevention	Highlighted diagnostic approach, prolonged

										therapy, and importance of controlling spread.
17	Moriarty et al., 2012	United Kingdom	Clinical review	Primary care/dermatology	Patients with tinea infections	Not applicable	Children and adults	Tinea infections	Diagnosis, management, patient education	Emphasized recognition of tinea, appropriate antifungal therapy, and avoiding inappropriate treatment.

Abbreviations: KAP: Knowledge, Attitude and Practice; OPD: Outpatient Department.

Quality Assessment

The methodological quality of included studies was variable. Most studies clearly described their study population and used structured questionnaires. However, several limitations were identified, including non-random sampling, limited validation of questionnaires, reliance on self-reported practices, absence of multivariable analysis, and inadequate control for socioeconomic or educational confounders.

Table 2. Risk of Bias Summary

Risk of Bias Domain	General Finding
Clear inclusion criteria	Adequate in most studies
Description of study population	Adequate in most studies
Validity of questionnaire	Variable; many studies used non-validated tools
Sampling method	Frequently convenience-based
Measurement of KAP outcomes	Heterogeneous across studies
Control for confounders	Limited in many studies
Completeness of reporting	Moderate overall
Overall risk of bias	Low to moderate in most studies; high in a few studies

Parental Knowledge

Parental knowledge regarding superficial fungal infections varied widely. Many parents were able to identify visible abnormalities such as itching, scaling, circular lesions, redness, hair loss, or bald patches. However, deeper understanding of fungal causation, transmission routes, recurrence, and treatment requirements was often inadequate.

Knowledge of Symptoms

Parents commonly recognized itching, redness, scaling, rash, and circular skin lesions as signs of a skin problem. In the case of scalp infection, some parents recognized patchy hair loss, dandruff-like scaling, and broken hairs. However, early or mild lesions were often overlooked.

Some parents confused superficial fungal infections with eczema, allergy, insect bites, bacterial infections, nutritional deficiency, or poor cleanliness. This misinterpretation often contributed to delayed treatment.

Knowledge of Causation

A frequent misconception was that ringworm is caused by worms. Some parents attributed infection to heat, sweat, dust, poor diet, blood impurity, or seasonal change. Although sweating and humidity may favor fungal growth, poor understanding of fungal causation may reduce adherence to appropriate antifungal therapy.

Knowledge of Transmission
Knowledge of contagiousness was incomplete. Some parents understood that infection could spread from one child to another, but many were unaware of the importance of shared personal items. Limited awareness was observed regarding transmission through towels, combs, caps, bedding, clothing, hairbrushes, sports items, and close contact.

Awareness of animal-to-human transmission was also inconsistent. In households with pets or livestock, parents often did not consider animals as possible sources of recurrent infection.

Knowledge of Treatment
Parental knowledge of treatment was also variable. Many parents believed that any skin cream could treat fungal infection. Some were unaware that tinea capitis usually requires oral antifungal therapy. Several parents believed that treatment could be stopped once itching or redness improved. This misunderstanding may contribute to incomplete cure and recurrence.

Knowledge of Recurrence
Many parents did not understand why fungal infections recur. Recurrence was often attributed to poor immunity, weather, diet, or repeated exposure to dust rather than incomplete treatment, untreated contacts, contaminated clothing, or shared personal items.

Parental Attitudes
Parental attitudes toward superficial fungal infections ranged from concern and willingness to seek medical treatment to stigma, embarrassment, and minimization of disease severity.

Perceived Seriousness
Some parents considered superficial fungal infections to be minor and self-limiting. This perception led to delayed consultation and reliance on home remedies or pharmacy medications. Parents were more likely to seek medical advice when lesions were extensive, recurrent, painful, cosmetically visible, or associated with hair loss.

Stigma and Social Concerns
Visible fungal infections, especially scalp lesions and ring-shaped rashes on exposed body parts, were associated with embarrassment. Some parents feared that their child would be teased or excluded at school. In some settings, fungal infections were perceived as a sign of poor hygiene or neglect, leading to social stigma.

Attitude Toward Medical Treatment
Most parents expressed willingness to seek medical treatment when symptoms became severe or persistent. However, some preferred home remedies, advice from relatives, or direct purchase of creams from pharmacies before consulting a physician.

Attitude Toward School Attendance
Parental views on school attendance varied. Some parents believed affected children should remain absent from school until lesions resolved completely, while others continued school attendance without informing teachers or taking preventive measures. Lack of communication between parents and schools may increase transmission risk.

Attitude Toward Prevention
Parents generally agreed that hygiene is important. However, attitudes toward practical prevention were inconsistent. Some parents considered sharing towels, combs, or bedding unavoidable, especially in large families or low-resource households.

Parental Practices
Parental practices were inconsistent and frequently did not match knowledge. Even when parents were aware that hygiene mattered, household-level preventive practices were often incomplete.

Hygiene Practices
Common hygiene practices included bathing children regularly, washing clothes, and keeping the skin clean. However, practices such as drying skin properly, washing bedding frequently, cleaning combs, avoiding damp clothing, and changing socks or undergarments regularly were less consistently followed.

Sharing of Personal Items
Sharing of combs, towels, caps, hair accessories, bedding, and clothing was common, particularly among siblings. Many parents did not recognize these items as potential sources of transmission. In households with limited resources, complete avoidance of sharing was difficult.

Laundry and Environmental Measures
Regular washing of clothes was commonly reported, but washing bedding, towels, and caps separately or in hot water was less frequent. Hairbrushes and combs were often reused without cleaning or replacement. Few parents reported disinfecting or replacing contaminated personal items after diagnosis.

Household Contact Management
Many parents did not examine siblings or other household members when one child developed fungal infection. Recurrent infection was often managed as a new episode rather than as possible household transmission. Treatment of asymptomatic carriers was rarely considered.

Pet-Related Practices
In households with pets, few parents reported checking animals for skin lesions or seeking veterinary advice. Lack of awareness regarding animal reservoirs may contribute to recurrent infection in some families.

Treatment-Seeking Behavior
Treatment-seeking behavior varied across studies and was influenced by education, socioeconomic status, access to healthcare, severity of symptoms, distance from health facilities, previous experience, and cost of treatment.

Early Medical Consultation
Parents with better knowledge and previous exposure to fungal infections were more likely to seek early medical advice. Early consultation was also more common when lesions involved the scalp, face, or multiple body sites.

Delayed Consultation
Delayed consultation was common when lesions were mild, hidden by clothing, or perceived as simple allergy or rash. Some parents sought care only after treatment failure, spread of lesions, secondary infection, or visible hair loss.

Pharmacy-Based Treatment
In several settings, pharmacies were the first point of care. Parents often purchased topical creams without medical evaluation. While some antifungal creams may be appropriate for limited skin disease, unsupervised use increases the risk of incorrect diagnosis, incomplete treatment, and inappropriate steroid exposure.

Self-Medication and Home Remedies
Self-medication was common. Parents used previously prescribed creams, medications shared by relatives, herbal preparations, oils, antiseptic solutions, or home remedies. These practices sometimes delayed appropriate treatment.

Adherence to Treatment
Incomplete adherence was a major concern. Parents often stopped treatment once symptoms improved. Some discontinued therapy due to cost, inconvenience, side effects, lack of visible improvement, or poor understanding of treatment duration. Inadequate adherence was especially problematic for tinea capitis, which requires longer therapy than superficial skin lesions.

Inappropriate Use of Topical Steroid Combinations
A recurring concern was the inappropriate use of topical steroid-containing creams. Such creams may temporarily reduce redness and itching, creating a false impression of improvement. However, they can mask fungal infection, alter lesion morphology, delay diagnosis, and contribute to chronic or recurrent dermatophytosis.

Parents often did not know the difference between antifungal creams, steroid creams, antibiotic creams, and combination products. Easy availability of over-the-counter preparations contributed to misuse. Health education should therefore clearly advise parents to avoid using steroid-containing creams unless prescribed by a qualified clinician.

Barriers to Effective Prevention and Management
The review identified several recurring barriers.

Table 3. Major Barriers Identified

Barrier	Effect on Prevention or Management
Poor knowledge of fungal cause	Misinterpretation of disease and inappropriate treatment
Misconception that ringworm is due to worms	Confusion and reliance on non-antifungal remedies
Limited awareness of contagiousness	Continued close contact and spread
Sharing towels, combs, caps, bedding, and clothing	Household and school transmission
Delayed consultation	Increased severity and recurrence
Self-medication	Incorrect treatment and delayed diagnosis
Use of steroid-containing creams	Masked infection and chronic disease

Incomplete treatment	Persistence and relapse
Poor household contact management	Reinfection among siblings
Stigma and embarrassment	Concealment and delayed care
Cost and poor access to care	Interrupted treatment and reliance on pharmacies
Low school-parent communication	Missed opportunity for outbreak prevention

Facilitators of Good Practice

Several factors were associated with better prevention and management practices.

Table 4. Facilitators of Appropriate Prevention and Management

Facilitator	Positive Impact
Higher parental education	Better symptom recognition and treatment-seeking
Previous experience with fungal infection	Improved awareness and earlier care
Counselling by healthcare providers	Better adherence and hygiene practices
School health education	Improved prevention among children and parents
Written instructions	Better understanding of treatment duration
Affordable treatment	Improved adherence
Teacher involvement	Early identification and referral
Avoidance of shared personal items	Reduced transmission
Follow-up visits	Confirmation of cure and prevention of recurrence
Community awareness programs	Reduced stigma and misconceptions

DISCUSSION

This systematic review demonstrates that parental knowledge, attitudes, and practices are central determinants of prevention and management of superficial fungal infections among school-aged children. Although many parents can identify visible skin changes, important gaps persist in understanding causation, contagiousness, recurrence, and treatment requirements.

One important finding is the gap between symptom recognition and correct action. Parents may recognize itching or circular lesions but may not understand that the condition is fungal, contagious, and requires appropriate antifungal treatment. Misconceptions such as ringworm being caused by worms, heat, diet, or poor blood remain common in many communities. Such misconceptions delay appropriate care and encourage non-specific remedies.

Transmission-related knowledge was particularly inadequate. Superficial fungal infections can spread through direct contact and contaminated personal items. However, many parents were unaware that towels, combs, caps, bedding, clothing, and hairbrushes may contribute to spread. This gap is highly relevant in school-aged children because children frequently share items at home and school. Siblings may sleep together, use the same towel, or share hair accessories, creating opportunities for recurrent infection.

Attitudes also influenced outcomes. When parents perceived fungal infections as minor, they delayed consultation. When they perceived infection as shameful, they concealed the condition. Both responses may worsen transmission and delay care. Health education should therefore avoid fear-based messaging. Parents should be informed that fungal infections are common and treatable but require timely and proper management.

Treatment practices were a major concern. Self-medication, pharmacy-based treatment, and incomplete adherence were frequently reported. The use of topical steroid-containing combinations is especially problematic. These products may reduce inflammation temporarily but can worsen fungal infections and make diagnosis more difficult. Parents should be taught to avoid using unknown creams and to consult a healthcare provider for persistent, spreading, recurrent, or scalp lesions.

Tinea capitis requires special attention because it commonly affects children and often needs systemic antifungal treatment. Parents may mistakenly apply only topical creams to scalp lesions, resulting in treatment failure and continued transmission. Counselling should clearly explain that scalp involvement, patchy hair loss, broken hairs, or persistent scaling require medical evaluation.

The role of schools is also important. School-based transmission may occur through close contact, shared items, and delayed identification. Teachers and school health workers can help identify suspicious lesions, encourage medical referral, and reduce stigma. Schools can also reinforce simple messages: do not share combs, towels, caps, or hair accessories; keep skin clean and dry; report itchy or scaly lesions early; and complete prescribed treatment.

Household-level interventions are essential. Treating one child without addressing contaminated items or infected contacts may result in recurrence. Parents should be advised to wash towels, clothes, and bedding; avoid sharing personal items; clean or replace combs and hairbrushes; check siblings; and seek veterinary advice if pets have suspicious lesions.

The findings support a multi-level intervention approach. Healthcare providers should provide clear counselling at diagnosis. Pharmacists should avoid dispensing irrational steroid-antifungal combinations without appropriate evaluation. Schools should implement awareness activities. Public health programs should develop culturally appropriate educational materials for parents.

Public Health Implications

Superficial fungal infections among school-aged children are not only individual clinical problems but also household and school health concerns. Parent-centered education may reduce spread, recurrence, inappropriate treatment, and stigma.

Effective public health strategies may include:

1. School-based health education programs.
2. Parent-teacher awareness sessions.
3. Distribution of simple visual leaflets in local languages.
4. Screening camps in high-burden schools.
5. Training of teachers to identify suspicious lesions without stigmatizing children.
6. Counselling parents on avoiding shared personal items.
7. Clear guidance on completing antifungal treatment.
8. Education against unsupervised topical steroid use.
9. Household contact evaluation in recurrent cases.
10. Linkage with primary healthcare and dermatology services.

Recommendations

Based on the review findings, the following recommendations are proposed:

1. Parents should be educated that superficial fungal infections are caused by fungi and not worms.
2. Children should be encouraged to avoid sharing towels, combs, caps, clothes, bedding, and hair accessories.
3. Parents should seek medical advice for scalp lesions, hair loss, extensive lesions, recurrent infection, or treatment failure.
4. Topical steroid-containing creams should not be used unless prescribed by a qualified clinician.
5. Antifungal treatment should be completed for the full prescribed duration.
6. Siblings and close household contacts should be checked when infection is recurrent.
7. Clothes, towels, bedding, combs, and hairbrushes should be cleaned appropriately.
8. Pets with skin lesions should be examined by a veterinarian.
9. Schools should promote early reporting and non-stigmatizing management.
10. Healthcare providers should give written and verbal instructions to parents.

Limitations

This review has several limitations. First, included studies used different definitions, questionnaires, and scoring systems for knowledge, attitude, and practice. Second, most studies were cross-sectional and therefore could not establish causality between parental KAP and infection outcomes. Third, many studies relied on self-reported practices, which may be affected by recall bias and social desirability bias. Fourth, parental KAP studies specifically focused on school-aged children are limited compared with general dermatophytosis studies. Fifth, some studies had small sample sizes or convenience sampling, limiting generalizability. Finally, publication bias and language restrictions may have influenced the available evidence.

CONCLUSION

This systematic review highlights that parental knowledge, attitudes, and practices play an important role in preventing and managing superficial fungal infections among school-aged children. Although many parents recognize visible symptoms such as itching, scaling, circular rashes, and hair loss, misconceptions regarding fungal causation, contagiousness, recurrence, and treatment duration remain common. Preventive practices are often inadequate, particularly regarding sharing of towels, combs, caps, bedding, clothing, and hair accessories. Delayed consultation, self-medication, inappropriate use of topical steroid combinations, incomplete treatment, and poor household contact management contribute to persistence and recurrence.

Improving parental KAP through school-based health education, community awareness, clear medical counselling, rational antifungal use, and household hygiene interventions may reduce transmission, recurrence, stigma, and complications among school-aged children.

Tables

Table 5. Summary of Knowledge, Attitude, and Practice Findings

Domain	Positive Findings	Common Deficiencies
Knowledge of symptoms	Parents recognized itching, scaling, rash, and hair loss	Early lesions often missed; confusion with allergy or eczema
Knowledge of causation	Some parents knew infection was communicable	Misconceptions about worms, heat, diet, or poor blood
Knowledge of transmission	Some awareness of person-to-person spread	Poor awareness of spread through combs, towels, caps, bedding, and clothing
Knowledge of treatment	Some parents sought medical care	Poor understanding of treatment duration and need for oral therapy in scalp disease
Attitude	Willingness to treat severe disease	Stigma, embarrassment, and underestimation of seriousness
Prevention practice	Bathing and washing clothes commonly reported	Continued sharing of personal items
Treatment practice	Some parents used prescribed antifungals	Self-medication, steroid misuse, incomplete treatment
Household control	Some families cleaned clothes	Poor contact screening and inadequate cleaning of combs/bedding

Table 6. Suggested Parent Education Messages

Topic	Message for Parents
Cause	Ringworm is caused by fungi, not worms
Spread	It can spread by skin contact and shared personal items
Personal items	Do not share towels, combs, caps, clothes, bedding, or hair accessories
Hygiene	Keep skin clean and dry; change clothes regularly
Scalp disease	Hair loss or scalp scaling should be checked by a doctor
Treatment	Complete the full course of antifungal medicine
Steroid creams	Do not use unknown creams or steroid combinations without prescription
Recurrence	Check siblings and clean personal items if infection comes back
School	Inform teachers if needed and avoid stigma
Pets	Pets with skin lesions should be checked by a veterinarian

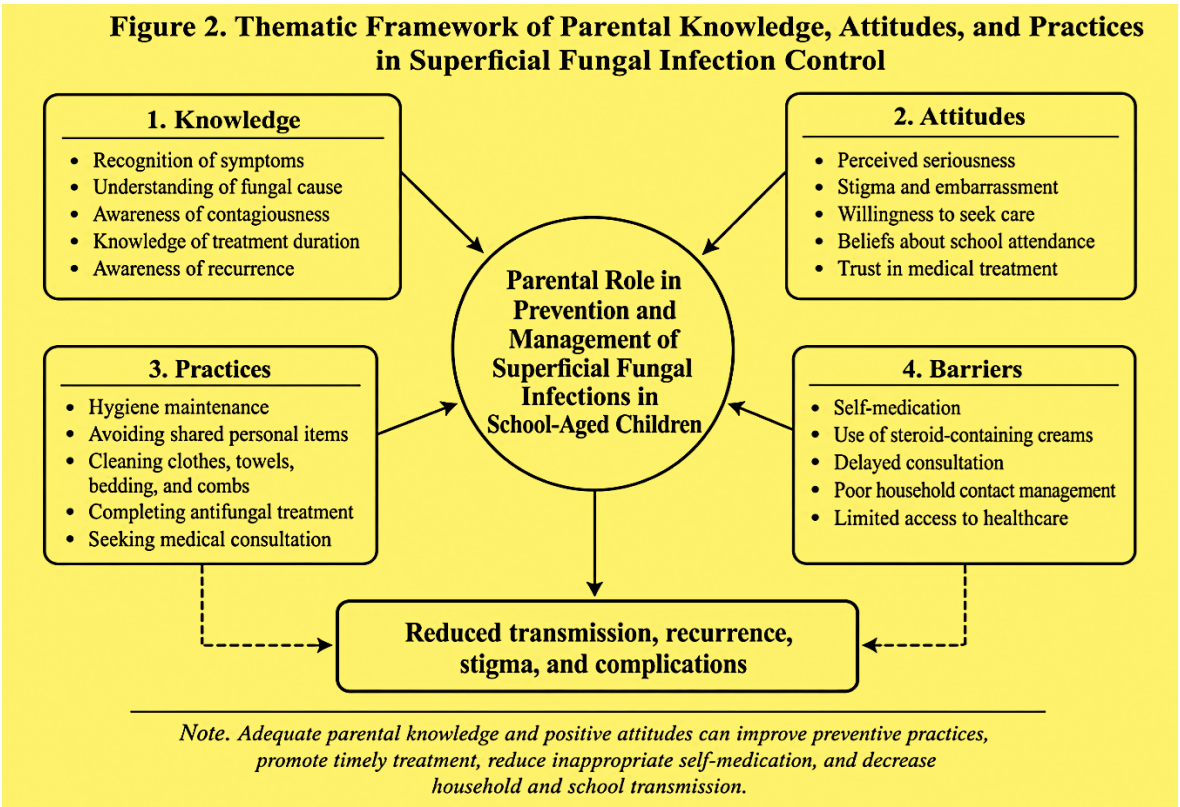

Figure 2. Conceptual framework showing the role of parental knowledge, attitudes, and practices in preventing and managing superficial fungal infections among school-aged children. Adequate parental knowledge and positive attitudes

can improve preventive practices, promote timely treatment, reduce inappropriate self-medication, and decrease household and school transmission.

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