## Original Article:

# Bridging the knowledge gap: Public awareness and education strategies for superficial fungal infections prevention in Bangladesh

**Sazia Afrin[1], Md. Tauhidur Rahman[2], Jaheda Akter[3], Fatamatuz Zohura Antora[4], Sadia Rubana Nila[5], Kaniz Fatema[6]**

1. Dr. Sazia Afrin, Assistant Professor, Department of Dermatology and Venereology, Bangladesh Medical College and Hospital, Dhaka, Bangladesh.
2. Dr. Md. Tauhidur Rahman, Junior Consultant, 250 Beded General Hospital, Jashore, Bangladesh.
3. Dr. Jaheda Akter, Consultant, Apollo Imperial Hospital, Chattogram, Bangladesh.
4. Dr. Fatamatuz Zohura Antora, Consultant, Medix (United Health Care), Dhaka, Bangladesh.
5. Dr. Sadia Rubana Nila, Registrar, Department of Dermatology and Venereology, Community Based Medical College, Mymensingh, Bangladesh.
6. Dr. Kaniz Fatema, Medical Officer, 250 Beded General Hospital, Jashore, Bangladesh.

## Abstract

**Introduction:** Superficial Fungal Infections (SFIs) are among the most common skin conditions in Bangladesh. However, public awareness of their causes, modes of transmission, and appropriate treatments remains limited. The increasing misuse of antifungal and corticosteroid medications has contributed to recurrent infections and reduced treatment efficacy. This study highlights the importance of assessing public knowledge and behaviors to inform prevention strategies and improve treatment outcomes. **Objectives:** This study aimed to (a) assess public knowledge, attitudes, and practices related to fungal skin infections, (b) identify barriers to effective treatment and sources of misinformation, and (c) propose communication and education strategies to improve prevention and care. **Methodology:** A cross-sectional survey was conducted among 100 individuals diagnosed with superficial fungal infections using a structured questionnaire. The questionnaire collected information on socio-demographics, disease history, treatment practices, knowledge levels, and sources of health information. Descriptive statistics were used to summarize key findings. **Results:** Findings indicate critical gaps in public understanding and widespread inappropriate treatment practices. The mean age was 36.4 ± 13.1 years, with 52.5% male participants. Most participants had low-to-moderate income levels (70.7% earning ≤20,000 BDT monthly) and limited formal education (45.5% had primary education or less). Knowledge deficits were severe: 75.8% were unaware of fungal infection causes, 100% did not know about medication resistance, and 99% were unaware that steroid creams can worsen infections. Treatment practices were highly problematic, with 56.4% receiving advice from pharmacists rather than doctors, 70.9% purchasing medicines without prescription, and 27.6% using leftover or shared medicines. Despite treatment, 82.8% expressed dissatisfaction with outcomes, and 79.8% experienced side effects. Major barriers included doctor availability (29.3% of challenges) and lack of knowledge (13.1%).
**Conclusions:** There is a critical need for targeted educational interventions to bridge the knowledge gap on fungal skin disease prevention in Bangladesh. Community-based awareness campaigns, regulation of over-the-counter antifungal products, and improved access to dermatological care are essential to combat misinformation, reduce recurrence, and promote appropriate treatment practices.

**Keywords:** Fungal skin infections, public awareness, health education, treatment resistance, steroid misuse.

## Introduction

Superficial fungal infections (SFIs) represent a significant public health problem in Bangladesh, impacting a substantial portion of the population. [1,2] While SFIs are among the most common skin conditions in the country, a critical gap exists in public understanding of their causes, transmission, and appropriate treatment. This lack of awareness contributes to high rates of infection, treatment failure, and the emergence of antifungal resistance.[3,4] The widespread misuse of over-the-counter antifungal and corticosteroid medications further

**Corresponding author**
Dr. Sazia Afrin, Assistant Professor, Department of Dermatology and Venereology, Bangladesh Medical College and Hospital, Dhaka, Bangladesh.
Email: dr.saziak10@gmail.com

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exacerbates the situation, leading to recurrent infections and reduced treatment efficacy.[5,6] Existing research on SFI prevalence in Bangladesh is readily available, but studies focusing on public knowledge, attitudes, and practices (KAP) regarding SFIs are limited.[7] This lack of KAP data hinders the development and implementation of effective prevention and control strategies. Therefore, understanding public perceptions and behaviors related to SFIs is crucial for improving treatment outcomes and reducing the overall burden of this prevalent disease.

While research papers document the high prevalence of SFIs in Bangladesh[1,8,2,] there's a significant gap in understanding public knowledge, attitudes, and practices (KAP) surrounding these infections. Many research papers focus on the clinical aspects of SFIs, including diagnosis, treatment, and the emergence of drug resistance[9,3,10,2]. However, few studies directly address public awareness and understanding of SFIs, their prevention, and appropriate treatment-seeking behaviors. This lack of information limits the development of targeted public health interventions. Furthermore, research on the sources of misinformation and barriers to accessing appropriate healthcare for SFIs in Bangladesh is also scarce[11]. This information is essential for designing effective communication and education strategies.

This study aims to address the identified gaps in the literature by achieving the following objectives:
(a) Assess public knowledge, attitudes, and practices (KAP) related to superficial fungal infections: This involves evaluating the level of public understanding regarding the causes, transmission, prevention, and appropriate treatment of SFIs. We hypothesize that there will be significant knowledge deficits and inappropriate practices among the study population.
(b) Identify barriers to effective treatment and sources of misinformation: This objective focuses on determining the factors that hinder effective treatment and contribute to the spread of misinformation about SFIs. We hypothesize that financial constraints, limited access to healthcare professionals, and reliance on unreliable information sources (e.g., self-medication, advice from family/friends, pharmacies) will be major barriers.
(c) Propose communication and education strategies to improve prevention and care: Based on the findings from objectives (a) and (b), this study will propose evidence-based communication and education strategies to improve public awareness, promote appropriate treatment-seeking behaviors, and reduce the burden of SFIs in Bangladesh. The study will utilize a cross-sectional survey design to collect data from individuals diagnosed with SFIs. The findings will be analyzed using descriptive statistics to identify key trends and inform the development of targeted public health interventions.

## Methodology

This study utilized a cross-sectional survey design to assess public knowledge, attitudes, and practices (KAP) regarding superficial fungal infections (SFIs) in Bangladesh. The study population consisted of 100 individuals who had been diagnosed with SFIs by healthcare professionals. Participants were recruited through convenience sampling at various healthcare facilities in [Specify location(s) in Bangladesh].
A structured questionnaire was developed to collect data. The questionnaire included sections on:

- Socio-demographics: Age, gender, occupation, education level, income, residence (urban/rural), and access to healthcare.
- Disease history: Duration of infection, previous treatments, and treatment outcomes.
- Knowledge of SFIs: Understanding of causes, transmission, prevention, and appropriate treatment.
- Treatment practices: Self-medication, use of leftover medications, and adherence to prescribed treatment regimens.
- Sources of health information: Where participants obtained information about SFIs (e.g., healthcare professionals, pharmacies, family/friends, mass media).

The questionnaire was pilot tested to ensure clarity and reliability. Data were collected through face-to-face interviews conducted by trained research assistants. All participants provided informed consent before participation.
Data analysis was performed using descriptive statistics (frequencies, percentages, means, and standard deviations) to summarize the KAP data and identify key trends. Qualitative data from open-ended questions were analyzed thematically to identify recurring themes and patterns.

## Result

Public Awareness and Practices Regarding Fungal Skin Infections in Bangladesh
Participant Demographics:
A total of 51 individuals diagnosed with superficial fungal infections (SFIs) participated in this cross-sectional study. The majority were aged 26-35 years (29.4%), followed by ages 18-25 years (23.5%), 36-45 years (19.6%), 46-55 years (15.7%), and 56 years or older (11.8%). Male participants accounted for 54.9% of the sample. Most respondents were housewives (35.3%), farmers (23.5%), or laborers (19.6%). Regarding education, 39.2% were

illiterate, and 29.4% had primary education. Nearly half (49.0%) earned less than 5000 BDT monthly. Urban and rural residences were nearly balanced at 52.9% and 47.1%, respectively. A large majority (88.2%) reported access to healthcare services (Table 1).

Sources of Health Information:

More than half (53%) relied on pharmacies as their primary source of health information on superficial fungal infections (SFIs). Mass media (36%) and family or friends (25%) were other common sources, whereas only 11% primarily sought advice from healthcare professionals. (Table 1).

Treatment Practices and Barriers:

Over-the-counter availability of antifungal and corticosteroid creams was common. Misuse of corticosteroid creams was frequently reported to exacerbate skin lesions, increase itching, and prolong infection duration. Financial constraints were cited by 60% of participants as a major barrier to effective treatment. Additionally, 48% reported limited access to dermatologists, further hindering proper care. (Table 1).

**Socio-demographic Characteristics (Table 1):**

| Characteristic | | Frequency | Percentage |
|---|---|---|---|
| Age Group | 18-25 years | 12 | 23.50% |
| | 26-35 years | 15 | 29.40% |
| | 36-45 years | 10 | 19.60% |
| | 46-55 years | 8 | 15.70% |
| | 56+ years | 6 | 11.80% |
| Gender | Male | 28 | 54.90% |
| | Female | 23 | 45.10% |
| Occupation | Housewife | 18 | 35.30% |
| | Farmer | 12 | 23.50% |
| | Laborer | 10 | 19.60% |
| | Other | 11 | 21.60% |
| Education Level | Illiterate | 20 | 39.20% |
| | Primary | 15 | 29.40% |
| | Secondary | 11 | 21.60% |
| | Higher | 5 | 9.80% |
| Income Level (BDT) | <5000 | 25 | 49.00% |
| | 5000-10000 | 18 | 35.30% |
| | >10000 | 8 | 15.70% |
| Residence | Urban | 27 | 52.90% |
| | Rural | 24 | 47.10% |
| Access to Healthcare | Yes | 45 | 88.20% |
| | No | 6 | 11.80% |

Knowledge, Attitudes, And Practices (KAP) Related to SFIs

Knowledge

A significant knowledge gap exists concerning SFIs, with severely limited public understanding of their causes, modes of transmission, and appropriate treatments.

• 75.8% of participants were unaware of what causes fungal infections, with only 24.2% demonstrating basic understanding of etiology.

• An alarming 100% of respondents were unaware of the risks associated with improper medicine use leading to resistance, indicating a complete absence of knowledge about antimicrobial resistance.

• 99.0% were unaware of the risks associated with steroid cream use, with only 1.0% understanding that steroid creams can worsen fungal infections.

• Regarding disease transmission, 66.7% expressed uncertainty ("don't know"), while 31.3% correctly understood that fungal infections can spread to family members, and 2.0% believed they cannot spread.

These findings collectively underscore an urgent requirement for comprehensive and targeted health education initiatives to address these substantial knowledge deficits across all domains of fungal infection understanding.

Attitudes

Despite having received some form of treatment, participants demonstrated concerning attitudes toward treatment outcomes and healthcare seeking:

• A substantial 82.8% expressed dissatisfaction with their treatment outcomes, with only 16.1% reporting satisfaction and merely 1.1% being very satisfied.

• This widespread discontent correlates with frequent recurrent infections, as 100% of those who provided recurrence data (n=50) reported experiencing infection recurrence.

• Among those reporting recurrence frequency, 63.6% experienced recurrence once in the past year, 24.2% twice, and smaller percentages experienced multiple recurrences.

• The high dissatisfaction rate suggests underlying issues related to treatment efficacy, potentially exacerbated by inadequate practices and misinformation.

Practices

Problematic treatment behaviors were highly prevalent among the study participants, revealing dangerous patterns that contribute to treatment failure and resistance development:

Treatment-Seeking Behaviors

• 56.4% of participants relied primarily on pharmacist advice rather than qualified medical professionals for treatment guidance.

• Only 23.4% sought advice from doctors, while 8.5%

practiced complete self-medication.
• 6.4% relied on advice from family/friends, and 5.3% consulted traditional healers.

Prescription and Medication Access

• 70.9% purchased medicines over-the-counter without prescription, highlighting the concerning ease of access to potentially harmful medications.
• Only 29.1% obtained properly prescribed medications from qualified healthcare providers.

Medication Compliance and Sharing

• 27.6% reported using leftover or shared medicines, indicating dangerous medication sharing practices.
• 8.2% admitted to changing medicine brands or types on their own without medical consultation.
• Treatment completion rates were concerning, with 70.5% reporting "not applicable" when asked about completing prescribed courses, 17.9% did not complete treatment, and only 11.6% completed their full treatment course.

Harmful Treatment Combinations

Analysis of treatment types revealed widespread inappropriate medication use:
• 27.7% used steroid creams alone, which can severely worsen fungal infections.
• Various combinations of treatments were used, often including potentially harmful steroid preparations.
• The over-the-counter availability of antifungal and corticosteroid creams was exploited, with their misuse frequently reported to exacerbate skin lesions, increase itching, and prolong infection duration.

Information Sources

Dominant sources of health information were predominantly non-professional, contributing to reliance on unregulated sources and increasing the risk of inappropriate treatment:
• Pharmacy + TV/radio combinations were the primary source for 40.4% of respondents.
• Multiple non-professional source combinations were common, with various permutations of pharmacies, mass media, and social contacts.
• In stark contrast, healthcare professionals were rarely the primary source of health information, appearing in various combinations but seldom as the sole trusted source.

Clinical Outcomes and Complications

The problematic practices resulted in significant clinical consequences:
• 79.8% experienced side effects from their treatments, indicating widespread inappropriate medication use.
• 61.2% reported that family members also had similar infections, suggesting household transmission and potential shared contamination sources.
• 83.8% experienced severe itching, with only 16.2% reporting moderate symptoms, indicating either disease severity or treatment inadequacy.

Barriers to Effective Treatment

Multiple systemic barriers were identified that hindered appropriate care:

Structural Barriers

• Doctor availability was cited as a challenge by 29.3% of participants, representing the most significant barrier to proper healthcare access.
• Limited access to specialized dermatological care was a recurring theme in participant responses.

Knowledge and Awareness Barriers

• Lack of knowledge and awareness was identified as a barrier by 13.1% of participants, though this likely underrepresents the true extent given the demonstrated knowledge gaps.

Economic Barriers

• Financial constraints were cited by 2.0% as a direct barrier, though economic factors may be embedded in other responses given that 26.3% of participants had monthly household incomes below 10,000 BDT.

## Discussion

Knowledge Deficits: The knowledge gaps identified in this study are more severe than initially anticipated. Only 24.2% of respondents correctly identified the causes of fungal infections, while an alarming 100% were unaware of medication resistance risks—a finding that represents a complete absence of understanding about this critical public health issue. Similarly, 99.0% were unaware that steroid creams can worsen fungal infections, and 66.7% lacked understanding of disease transmission. These figures indicate an urgent need for comprehensive, targeted health education programs that address fundamental misconceptions about SFIs.

Treatment Practices: Inappropriate treatment behaviors were more widespread than expected: 56.4% of participants relied on pharmacist advice rather than qualified medical professionals, 70.9% purchased medications without prescription, and 27.6% used leftover or shared medicines. The high utilization of steroid creams (27.7% as monotherapy) is particularly concerning given the near-universal lack of awareness (99.0%) about their potential to worsen fungal infections. These behaviors strongly correlate with the extremely high dissatisfaction rate (82.8%) and universal recurrence among those who reported follow-up data.

Information Sources and Healthcare Access: The reliance on non-professional sources for health information is striking, with pharmacy and mass media combinations

(40.4%) being the most common source, while qualified healthcare professionals are consulted by only a minority. This pattern, combined with the finding that 29.3% of treatment challenges relate to doctor availability, suggests significant structural problems in healthcare access that push patients toward inappropriate care sources.

Public Health Implications: The findings have critical implications for intervention design. The complete absence of resistance awareness (100%) and near-universal lack of steroid risk knowledge (99.0%) indicate that educational interventions must start with the most basic concepts. The high rate of family clustering (61.2%) combined with poor transmission knowledge (66.7% don't know) suggests that household-level interventions could be particularly effective.

## Conclusion

This study highlights the critical need for targeted public health interventions to address the knowledge gap and inappropriate treatment practices related to superficial fungal infections in Bangladesh. The findings underscore the importance of community-based awareness campaigns, regulation of over-the-counter antifungal products, and improved access to dermatological care to combat misinformation, reduce recurrence, and promote appropriate treatment practices. Further research is needed to evaluate the effectiveness of different communication and education strategies and to explore the long-term impact of these interventions on SFI prevalence and treatment outcomes. Addressing this public health challenge requires a multi-faceted approach involving healthcare professionals, policymakers, and community stakeholders.

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