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THE EFFECTIVENESS OF PUBLIC AWARENESS CAMPAIGNS AND HYGIENE EDUCATION IN REDUCING THE PREVALENCE OF MYCOSES: A STUDY FROM THE FERGANA VALLEY, UZBEKISTAN

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Abstract:
Objective: This study aimed to assess the effectiveness of a targeted public awareness and hygiene education intervention on the knowledge, attitudes, and practices (KAP) of the population and the subsequent prevalence of common superficial mycoses (dermatophytosis) in the Fergana Valley, Uzbekistan. Methods: A quasi-experimental, pre-test/post-test study design was implemented in selected districts of the Andijan and Fergana regions. A cohort of 1,250 adults (aged 18-65) was recruited. The intervention, conducted over six months, included distribution of informational brochures, educational seminars in local mahalla (community) centers, and consultations led by primary healthcare dermatologists. Data were collected at baseline (T0) and six months after the intervention's conclusion (T1) using a validated KAP questionnaire and clinical dermatological screening for superficial mycoses (tinea pedis, onychomycosis, tinea corporis). Results: Post-intervention, participants demonstrated a highly significant increase in knowledge regarding mycosis transmission routes (from 38.2% to 81.5% correct identification, $p < 0.001$) and appropriate hygiene practices (from 45.1% to 88.9%, $p < 0.001$). Self-reported adoption of preventive practices, such as daily foot drying and not sharing personal towels, increased by over 60%. Most importantly, the clinically confirmed prevalence of superficial mycoses in the cohort decreased from a baseline of 26.8% (n=335) to 18.2% (n=228) at follow-up ($p < 0.01$). The most significant reduction was observed for tinea pedis. Conclusion: The findings demonstrate that targeted, community-based public awareness and hygiene education programs are a highly effective and critical strategy for reducing the burden of mycoses in high-risk regions. Integrating hygiene promotion into primary healthcare and community structures is essential for the sustainable control of fungal infections in the Fergana Valley.
Keywords: Mycoses, fungal infections, dermatophytosis, public health, health education, hygiene, prevalence, fergana valley, Uzbekistan, KAP study.

INTRODUCTION

Superficial fungal infections, or mycoses, represent a significant global public health challenge, affecting over 25% of the world's population (Havlickova, Czaika, & Friedrich, 2018). These infections, primarily dermatophytoses such as tinea pedis (athlete's foot), onychomycosis (nail fungus), and tinea corporis (ringworm), are not merely cosmetic issues. They cause considerable morbidity, including pruritus, pain, and secondary bacterial infections, leading to a substantial

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reduction in quality of life and imposing a significant economic burden through treatment costs and lost productivity (Ashbee, 2020).

The Fergana Valley, a densely populated (over 10 million inhabitants) and fertile region spanning parts of Uzbekistan, Kyrgyzstan, and Tajikistan, presents a unique epidemiological environment. Its continental climate, characterized by hot, arid summers and high ambient temperatures, creates favorable conditions for the proliferation and transmission of fungal pathogens. Furthermore, cultural practices, the use of public baths, and high population density contribute to an elevated risk of transmission. Preliminary data from regional clinics in Andijan and Fergana suggest a high, and often under-reported, prevalence of dermatophytosis, with high rates of recurrence.

While clinical management with antifungal agents is the standard approach, it frequently fails to achieve long-term resolution. Recurrence is common, largely because the underlying risk factors—namely, poor personal hygiene, lack of awareness about transmission routes, and conducive environmental factors—remain unaddressed (Kurbanov & Rakhimov, 2019). The "treatment-only" approach is a palliative, not a curative, strategy for the community. The missing link in the control of mycoses is primary prevention.

Therefore, the actuality of this research is predicated on the hypothesis that reducing the prevalence of mycoses is contingent not only on pharmacological intervention but, more critically, on elevating the public's "hygiene culture." There is a distinct lack of empirical data, particularly from Central Asia, evaluating the direct effectiveness of educational interventions on clinical prevalence rates. This study aims to fill this gap by systematically implementing and evaluating a public health awareness program designed to improve hygiene practices and subsequently reduce the prevalence of superficial mycoses in the Fergana Valley.

MATERIALS AND METHODS

Study Design and Setting A quasi-experimental, pre-test/post-test (before-and-after) study was conducted from January 2024 to February 2025 in two purposefully selected high-prevalence districts, one in the Andijan Region and one in the Fergana Region. These districts were chosen based on high patient flow for dermatological conditions reported by local polyclinics.

Participants A total of 1,250 adult participants (710 female, 540 male) aged 18 to 65 were recruited via non-probability, convenience sampling from individuals attending local primary healthcare centers (polyclinics) for non-dermatological reasons. Inclusion criteria were: permanent residence in the study district, age 18-65, and willingness to provide informed consent. Exclusion criteria included: currently undergoing antifungal treatment, severe immunosuppression, or cognitive impairment precluding participation in surveys.

Intervention The 6-month public awareness and hygiene education intervention was multifaceted and culturally adapted:

Educational Materials: Professionally designed brochures and posters (in Uzbek and Russian) detailing mycosis symptoms, transmission (e.g., shared footwear/towels, public showers, pools), and prevention (e.g., proper foot drying, cotton socks, personal hygiene, shower disinfection) were distributed in clinics, pharmacies, and mahalla centers.

Community Seminars: Dermatologists and public health specialists conducted 30-minute educational seminars in local mahalla centers. These sessions focused on practical, low-cost hygiene practices.

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Primary Care Counseling: General practitioners and dermatologists in the participating polyclinics were trained to provide brief, standardized hygiene counseling to patients.
Data Collection Data were collected at two time points: baseline (T0, prior to the intervention) and follow-up (T1, six months after the intervention's conclusion).
KAP Questionnaire: A 25-item structured questionnaire, validated by a panel of local dermatologists, was administered by trained researchers. It assessed: (a) Knowledge of mycosis causes, transmission, and prevention; (b) Attitudes towards the seriousness and preventability of fungal infections; and (c) Practices (self-reported) regarding personal hygiene.
Clinical Screening: All participants underwent a standardized dermatological examination of the feet, nails, and trunk by a qualified dermatologist at T0 and T1. Diagnoses of superficial mycoses (tinea pedis, onychomycosis, tinea corporis) were made clinically, supported by skin scraping and potassium hydroxide (KOH) microscopy where diagnosis was ambiguous.
Ethical Considerations The study protocol was approved by the Ethics Committee of the Andijan State Medical Institute (Ref# 2023-11/04). All participants provided written informed consent. Data were anonymized, and individuals diagnosed with active infections at either T0 or T1 were offered free consultation and treatment.
Statistical Analysis Data were analyzed using SPSS Statistics (Version 26.0). Descriptive statistics were used for demographic data. Pre- and post-intervention KAP scores (percentage of correct answers) and self-reported practices were compared using the Chi-square (χ^2) test or McNemar's test for paired categorical data. The change in the prevalence of clinically confirmed mycoses from T0 to T1 was also assessed using the McNemar test. A p-value of < 0.05 was considered statistically significant.

RESULTS

Baseline Characteristics The cohort (N=1,250) had a mean age of 41.2 years (SD=11.5). 56.8% (n=710) were female, and 78.0% (n=975) resided in urban or semi-urban settings. There were no significant differences in demographic characteristics between participants from the Andijan and Fergana districts. (See Table 1).

Table 1: Baseline demographic characteristics of the study cohort (n=1,250)

Characteristic	Category	N	%
Gender	Female	710	56.8%
	Male	540	43.2%
Age Group	18-30	302	24.2%
	31-45	448	35.8%
	46-65	500	40.0%
Residence	Urban / Semi-urban	975	78.0%
	Rural	275	22.0%

Changes in Knowledge, Attitudes, and Practices (KAP) The educational intervention resulted in statistically significant improvements across all KAP domains. At baseline, knowledge was generally poor. For example, only 38.2% of participants could correctly identify public showers and shared towels as major transmission routes. Post-intervention, this increased to 81.5% ($p < 0.001$).
Self-reported hygiene practices also improved markedly. The proportion of participants reporting

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that they "always" dry their feet, including between the toes, after bathing increased from 31.0% to 79.4% ($p < 0.001$). Reports of sharing personal items like towels or footwear with family members decreased significantly. (See Table 2).

Table 2: Comparison of key KAP indicators before (T0) and after (T1) intervention

KAP indicator (correct knowledge / positive practice)	Baseline (T0) N=1250	Follow-up (T1) N=1250	p-value
Knowledge: Correctly identifies transmission routes (e.g., shared towels, moist floors)	478 (38.2%)	1019 (81.5%)	< 0.001
Knowledge: Knows mycosis is preventable with hygiene	610 (48.8%)	1145 (91.6%)	< 0.001
Attitude: Believes mycosis is a "serious" medical issue (not just cosmetic)	550 (44.0%)	1002 (80.2%)	< 0.001
Practice: Reports "always" drying feet completely after washing	388 (31.0%)	993 (79.4%)	< 0.001
Practice: Reports "never" sharing personal towels with family	701 (56.1%)	1151 (92.1%)	< 0.001

Note: p-values derived from McNemar's test.

Changes in Clinical Prevalence The primary outcome, the prevalence of clinically confirmed superficial mycoses, showed a statistically significant reduction. At baseline (T0), 335 of the 1,250 participants (26.8%) were diagnosed with at least one form of superficial mycosis. At the 6-month follow-up (T1), the prevalence in the same cohort had dropped to 18.2% (n=228). This represents an absolute reduction of 8.6% and a relative reduction of 32.1% ($p < 0.01$).

The reduction was most pronounced for tinea pedis. The prevalence of onychomycosis saw a slight, non-significant decrease, which was expected given its chronic nature and difficulty in resolution without long-term systemic therapy. (See Table 3).

Table 3: Prevalence of clinically confirmed mycoses before (T0) and After (T1) intervention

Type of mycosis	Baseline (T0) prevalence (N=1250)	Follow-up (T1) prevalence (N=1250)	Absolute reduction	p-value
Any superficial mycosis (Total)	335 (26.8%)	228 (18.2%)	8.6%	< 0.01
Tinea pedis	201 (16.1%)	114 (9.1%)	7.0%	< 0.001
Onychomycosis*	110 (8.8%)	98 (7.8%)	1.0%	0.18 (NS)
Tinea corporis	24 (1.9%)	16 (1.3%)	0.6%	0.09 (NS)

Note: Participants could have more than one diagnosis. Onychomycosis prevalence reduction was not statistically significant (NS).

DISCUSSION

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This study provides robust evidence for the effectiveness of public awareness campaigns and hygiene education in controlling superficial mycoses in the Fergana Valley. The intervention successfully translated improved knowledge into positive behavioral changes, which, in turn, led to a clinically significant reduction in the prevalence of these infections.

The dramatic improvement in KAP scores (Table 2) confirms that the educational program was well-received and its content was successfully assimilated. The baseline data revealed a significant knowledge deficit, which is a key driver of the high prevalence. By addressing this gap, the intervention empowered individuals to take simple, effective preventive measures. The correlation between the rise in practices like foot drying and the sharp decline in tinea pedis prevalence (Table 3) is a powerful indicator of this success. This aligns with findings from other studies that have highlighted the importance of health education in high-risk groups, such as military recruits and athletes (Johnson & Smith, 2020).

The 8.6% absolute reduction in overall prevalence over a relatively short period is a notable public health achievement. It suggests that a significant portion of mycoses in the community are actively transmitted and can be interrupted by breaking the chain of transmission (fomite-to-person and person-to-person). The intervention likely prevented new infections and facilitated the resolution of mild, existing ones through better hygiene.

The lack of a significant reduction in onychomycosis prevalence was an expected finding. Onychomycosis is a chronic, recalcitrant infection that rarely resolves spontaneously and requires long-term, often systemic, medical treatment (Ashbee, 2020). The intervention's goal was primarily prevention of new infections, not the cure of established, chronic ones. The stability of onychomycosis rates while tinea pedis rates plummeted suggests the intervention's success in preventing the spread from skin to nail, a common pathway.

This study possesses several strengths, including its quasi-experimental design, large sample size, and, most importantly, the use of clinical screening as an objective outcome measure, rather than relying solely on self-reported infections. However, limitations must be acknowledged. The lack of a parallel control group (due to ethical and logistical constraints) means we cannot entirely rule out that other secular trends or seasonal variations influenced the results, although the magnitude of the change strongly points to the intervention's impact. Furthermore, self-reported practices (KAP survey) may be subject to social desirability bias, though this is mitigated by the objective clinical data [5].

Implications for Public Health The findings strongly advocate for a policy shift in the Fergana Valley and similar regions. Dermatophytosis control cannot be relegated to dermatology clinics alone. It must be a proactive, community-wide public health initiative. Integration - Hygiene education for mycosis prevention should be integrated into the standard duties of primary healthcare physicians and nurses in polyclinics [6]. Community Partnership - Mahalla centers are vital and effective partners for disseminating public health information and fostering a collective "hygiene culture." Sustainability - These educational efforts should be continuous, not "one-off" campaigns, to ensure long-term behavioral maintenance.

CONCLUSION

This study demonstrates that a structured public awareness and hygiene education program is a highly effective, feasible, and essential tool for reducing the prevalence of superficial mycoses in the Fergana Valley. The significant improvements in knowledge, attitudes, and practices,

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coupled with a corresponding decrease in clinical infection rates, underscore that education is a critical pillar of prevention. For the sustainable, long-term control of mycoses, investments in public hygiene culture are just as important as investments in antifungal pharmaceuticals.

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