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Abstract

Introduction:

Rural Tanzanian schoolchildren experience a high but underrecognized burden of skin disease. These conditions often go untreated despite their links to hygiene and water access. Skin conditions cause discomfort, stigma, and persistent infection, but remain absent from water, sanitation, and hygiene (WASH) priorities. Schoolchildren are especially vulnerable due to susceptibility and crowded, shared environments. In Karatu District, World Vision Tanzania, a nonprofit organization, built WASH infrastructure in schools, but only some received additional hygiene programs, creating a natural experiment.

Aims:

- To assess the impact of World Vision's WASH hygiene program on hygiene behaviors among Tanzanian schoolchildren.
- To identify unseen circumstances and practices that sustain skin disease despite improved infrastructure +/- hygiene education.
- To generate recommendations for improving skin health in school aged children

Methods:

We surveyed 122 students: 61 from WASH program schools and 61 from non-WASH schools with identical infrastructure. The survey assessed hygiene behaviors, self-perceived skin health, and potential exposures through both quantitative and open-ended questions.

Results:

- **WASH programming improved some hygiene behaviors:** WASH Students were 2.35x more likely to bathe with soap (88.5% vs 37.7%; $p < 0.000001$).
- 2.86x more likely to wash hands with soap after toilet use (32.8% vs 11.5%; $p = 0.005$).
- **Self-perceived skin health:** 62% of WASH vs 51% of non-WASH students reported "healthy" skin, though visible lesions were often denied, showing normalization.
- Item sharing was common ($\approx 80\%$); sharing clothes and hats linked to 5x higher odds of self-reported skin problems ($p = 0.08$).
- Open-ended responses revealed scarcity of water, nonfunctioning taps, and practices such as shared razors, scalp burning and ashes on wounds.
- **Key takeaway:** True skin health equity requires integrating dermatologic education into WASH programs to address norms, behavioral habits, and resource scarcity.

Introduction

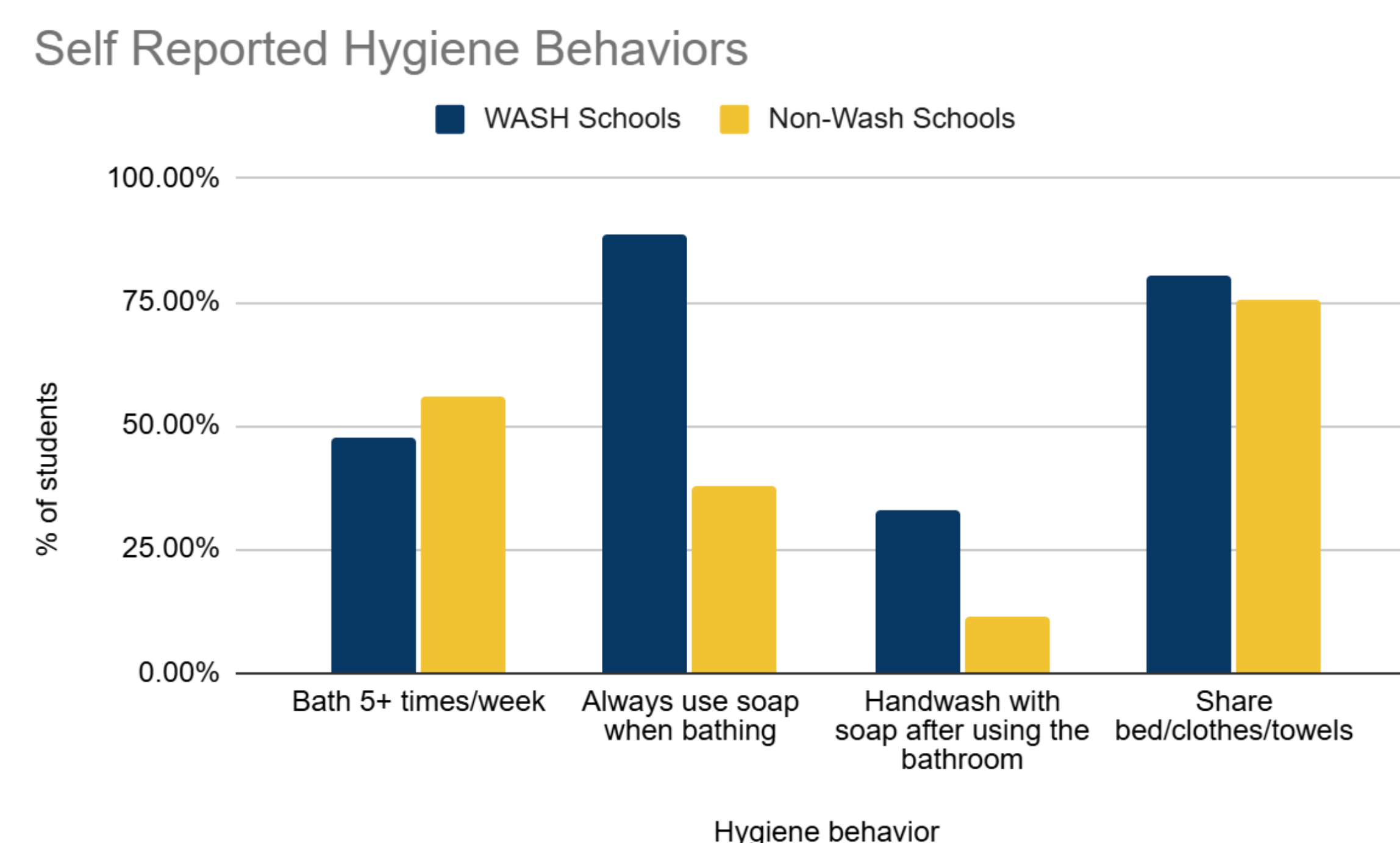
- Skin diseases are among the most visible yet overlooked childhood conditions in rural Tanzania.
- They cause itching, discomfort, stigma, and school absenteeism, yet are often accepted as normal within communities.
- Existing Water, Sanitation, and Hygiene (WASH) programs focus on preventing diarrheal disease but rarely consider skin infections.
- World Vision Tanzania, a nonprofit organization, introduced WASH infrastructure in Karatu District schools, with some schools also receiving hygiene programs.
- This project investigated how these hygiene programs impact behavior and sought to identify the behavioral and cultural factors that shape skin disease risk among Tanzanian schoolchildren in Karatu District

Methods and Materials

- **Study Design:** Cross-sectional, school-based survey conducted in the Karatu District, Tanzania.
- **Participants:** 122 students (53% F, 47% M): 61 from two WASH program schools (with World Vision sponsored hygiene programs) and 61 from two non-WASH schools with identical infrastructure. Age range: 10y - 17y
- **Data Collection:**
 - Questionnaires were administered using MWater surveyor
 - Structured questionnaires on bathing frequency, soap use, and handwashing behaviors.
 - Questions on self-perceived skin health.
 - Open-ended responses captured cultural, environmental and behavioral explanations for skin disease.
- **Analysis:**
 - Quantitative data were analyzed using R software for descriptive statistics and chi-square tests to compare groups.
 - Qualitative responses were coded thematically to identify recurring beliefs and practices

Results

Figure 1. Hygiene behaviors reported by students in WASH and non-WASH schools. WASH programming improved soap use for bathing and handwashing but not bathing frequency or item sharing.



2. Water Scarcity

"To ensure I bathe every day, I go to the surface water to fetch some. It is not a good source of water but because of scarcity, I have no choice."

Figure 3. In the absence of reliable water supply, students fetch surface water for daily use. Limited water access compromises hygiene and skin health.



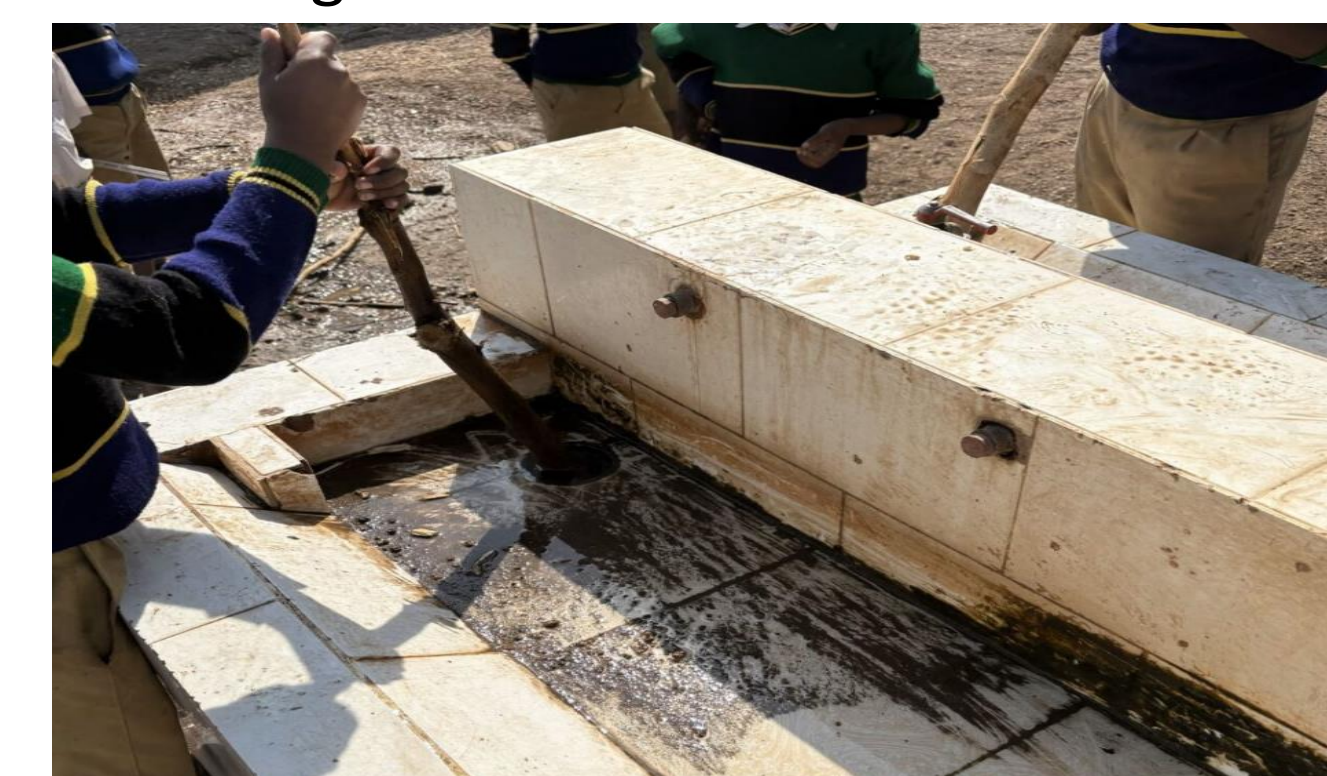
Student Voices

Students shared their beliefs about what causes skin diseases and the challenges they face in caring for their skin. The themes below reflect their most common experiences and perspectives.

1. Poor Functionality of Handwashing Facilities and lack of soap

"The handwashing facility only functions sometimes. There is no soap."

Figure 2: Students attempting to repair a nonfunctional handwashing station.



3. Cultural Practices and Beliefs

"My mother burned my scalp as part of the Mangati Tribe culture." "They would cut my skin and apply ashes whenever I fall sick"

Figure 4. Scalp burns from a traditional practice, illustrating how cultural beliefs intersect with skin health and hygiene.



Results (continued)



Figure 5: "After shaving, I get bumps on my head." Student-reported scalp irritation after shaving, consistent with razor-related infection risk.



Figure 6: Student with visible fungal infection observed during fieldwork. Shared grooming tools may facilitate disease transmission.

Discussion

- With identical infrastructure, behavioral and cultural differences strongly influenced hygiene outcomes.
- WASH programming improved soap use, yet skin disease signs persisted.
- Cultural normalization of skin problems reduced concern and delayed care-seeking.
- Shared razors, beds, and clothing remained major routes of transmission.
- Cultural practices (e.g., scalp burning, scarification) and misconceptions about hereditary causes contributed to recurring skin conditions.
- To reduce transmission, hygiene education must expand to include cleansing of shared personal items and safe grooming practices, ensuring skin health is part of everyday hygiene, not just handwashing.

Conclusions

- Infrastructure access alone is insufficient to prevent skin disease in schoolchildren.
- Broken or poorly maintained WASH facilities push children to use contaminated surface water for bathing, increasing the risk of infection. Functionality is just as critical as infrastructure presence.
- Sustainable skin health requires combining infrastructure, education, and behavior change strategies.
- Integrating skin hygiene into WASH programs (razor hygiene, shared item use, soap use consistency) can reduce transmission.
- Teacher- and parent-led hygiene education can reshape norms and empower children to recognize and manage skin problems early.
- Targeted interventions should promote consistent water and soap availability, safe grooming, and culturally sensitive education to improve skin health outcomes
- **Future Directions:** Future research will clinically assess students' skin conditions, correlate hygiene practices with dermatologic outcomes, and test targeted school-based interventions to reduce infection rates.

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