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Assessment of Healthcare Professionals' Infection Prevention and Control (IPC) Knowledge and Practices in Handling Scabies Outbreak

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Abstract

Health workers' awareness about the disease and infection prevention and control is essential in the high-density, low-resource healthcare settings in Rohingya refugee camps. The objectives of this study were to evaluate the knowledge, self-reported scabies prevention and control practices, knowledge gaps, and personal, professional, and institutional barriers to scabies best practices among health professionals in selected Rohingya camps in Cox's Bazar. This assessment is significant because there is little local information on the link between disease-specific knowledge and actual practice. A cross sectional survey was conducted with 346 health professionals, with data collected using a structured questionnaire and descriptive and inferential statistics were used to analyse the data. While correct knowledge about the causes, transmission, and risk factors of scabies was 92.2%, 90.5%, and 94.2%, respectively, correct knowledge about severe scabies and complications was 66.8%, and correct knowledge about follow-up of contacts was 72.3%. A total of 59.5% of the participants had good infection prevention and control practices, but environmental controls were relatively poor. A weak but statistically significant positive relationship was found between knowledge and practice; 71.3% of those with good knowledge practiced well, while 28.7% practiced poorly. Practice was relatively good when written management guidelines were available, and training and knowledge were significantly associated with good practice in multivariate analysis. This study contributes to filling the local evidence gap by assessing disease-specific knowledge, practice, their gaps, and institutional context within the same population. The findings suggest that knowledge is not enough; it is important that training and awareness systems are strengthened, that written instructions are easily available, that there is sufficient protective equipment available, that environment is controlled, and that professional support is provided.

Introduction

Scabies is a parasitic infection of the skin. It is caused by a tiny parasite, the mite. It is a contagious disease that spreads through skin-to-skin contact with an infected person. Symptoms usually appear 4–6 weeks after the infection (WHO, n.d.). It is characterized by intense itching, particularly at night (Ziebold & Crane, 2026). It usually appears on the fingers, wrists, arms, legs, and groin of the body. It can appear as a rash on various parts of the body, including the genitals in men, the breasts in women, and the palms, soles, ankles, and scalp in young children (Kapur et al., 2018).

Scabies can cause serious illnesses, such as skin ulcers, septicemia, heart disease and kidney problems (Vasanwala et al., 2019). It is estimated to affect more than 200 million people worldwide at any given time and more than 400 million people worldwide annually. Scabies can occur in every country but is more common in low-income countries (Engelman et al., 2021). In low-income countries, the prevalence can reach 5%–50%, especially among children (Melese et al., 2023).

Several studies have found that it is a major risk factor for a kidney disease called poststreptococcal glomerulonephritis (Mounsey et al., 2016). Some of the causes of scabies include crowded living spaces,

close contact, shared items, sexual activity, a weak immune system, limited resources, and healthcare work(Engelman et al., 2019).

The prevalence of the disease in Bangladesh in 2024 was alarmingly high, ranging from 34% to more than 66% in crowded and unprotected areas, mainly in Rohingya refugee camps and Islamic educational institutions, such as madrasas (M. J. Hasan et al., 2024a). Its prevalence is up to 66.42% in the Rohingya camps in Cox's Bazar. A 34% prevalence rate has been recorded in Islamic educational institutions and orphanages in the city of Dhaka (Dr. N. Islam & Shakil, 2025). According to previous research data from the dermatology departments of Comilla and Chittagong, up to 80% of patients from some upazilas were infected with this disease (Bulstra et al., 2021).

IPC means keeping patients and healthcare workers safe from infection. It is not just the job of doctors or nurses; everyone has to follow the rules. For example, keeping hands clean, administering injections safely, and preventing infections after surgery (Alhumaid et al., 2021). Simply put, healthcare workers can become infected by coming into contact with patients with scabies and then spreading it to their household members (Leistner et al., 2017). In an international hospital-based outbreak, the incidence of scabies among healthcare workers was 17.7 percent and that among household members of infected individuals was 11.3 percent (Redondo-Bravo et al., 2021; Sponselli et al., 2023)Another study found that 4 percent of healthcare workers who came into contact with scabies later developed scabies despite early preventive treatment (Özalp, 2024).

In the Rohingya camp in Cox's Bazar, the prevalence of scabies among the general population was 39.6 percent in 2023, which decreased to 19.2 percent in March 2025 (WHO, 2025). However, these data do not represent the incidence of scabies in the entire camp population but rather the incidence of scabies among healthcare workers (Alhaffar et al., 2025). Therefore, the international figures of 17.7 percent and 11.3 percent cannot be used as the statistics of health workers in Cox's Bazar. Rather, it can be said that due to the high prevalence of scabies in the camp, health workers who directly examine, dress, or physically care for patients are at risk of infection, and if infected, their family members may also be at risk of further infection (Apolot et al., 2023; Zuhair et al., 2024).

In summary, failure to identify patients with scabies early in hospitals, delay contact tracing, and failure to use gloves and gowns when handling patients can lead to rapid spread of infection among healthcare workers. In particular, a large number of mites can be found on the body of a patient with crusted scabies, which can lead to a large outbreak (Kim et al., 2019).

In a surgical ward in Thailand, 28 out of 32 healthcare workers (87.5 percent) were infected by a crusted scabies patient. The outbreak was subsequently brought under control with the use of gloves and gowns, treatment of infected patients, and strict infection control measures (Jungbauer et al., 2015)

In a large hospital outbreak in South Korea in 2023, a patient with crusted scabies was not initially identified correctly. Of the 435 healthcare workers who came into contact with the patient, 21 tested positive for scabies, with a confirmed case rate of approximately 4.8 percent (Kim et al., 2019). The total

number of contacts was 1,820, and the infection spread in five stages. Even after the early use of permethrin, 21 out of 526 healthcare workers (4 percent) were infected (Leistner et al., 2017). Ninety-four percent of the infected healthcare workers had direct contact with the patient, compared with 64 percent of the uninfected comparison group (English et al., 2018)

In a study conducted in Taiwan, 65 percent of patients with scabies who presented to the emergency department were initially undiagnosed. As a result, 160 healthcare workers who had direct skin-to-skin contact had to be treated for scabies. Another 60-bed ward in the same country experienced three scabies outbreaks in 17 months. After the entire IPC system of the hospital was reorganized, no further cases of nosocomial scabies were detected for 1,975 days (Bouvresse & Olivier Chosidow, n.d.; Obasanjo et al., 2001)

In a Turkish hospital, 25 out of 42 cases of scabies were among healthcare workers, accounting for 59.5 percent of the total cases. This is not the attack rate for healthcare workers, as the total number of exposed healthcare workers was not reported. Delayed identification of the patient and inadequate disinfection of sofas and chairs used by the patient were identified as possible factors for the spread of infection (Lesho et al., 2021).

In a Japanese hospital, six new cases of scabies were reported, including patients, healthcare workers, and family members of healthcare workers. A total of 181 people had to be monitored, and it took approximately four months to fully control the outbreak (Villar et al., 2016).

All the data together suggest that if IPC is not followed properly, the infection rate among healthcare workers can range from approximately 5 percent to 87.5 percent, depending on the situation. Therefore, it is very important to quickly identify patients, initiate contact tracing, and evaluate and treat healthcare workers and their family members who have come into contact with them.

Scabies has long been a significant public health problem in the Rohingya refugee camps in Cox's Bazar, Bangladesh. Although the incidence of the disease has decreased after the introduction of community-based medicine, the risk of reinfection and new outbreaks persists. In this situation, the role of healthcare professionals is crucial in quickly identifying patients, providing safe care, and preventing the spread of infection within healthcare facilities. While research has been conducted on the general infection prevention and control knowledge and practices of health workers in Rohingya camps, evidence on their disease-specific knowledge, self-reported practices, and knowledge-practice gaps regarding scabies remains limited. However, it is unclear to what extent factors such as the availability of protective equipment, necessary training, additional workload, opportunities to isolate patients, and institutional guidelines create barriers to proper practices. In this context, the main question of the current study is as follows: What is the current status of infection prevention and control knowledge and self-reported practices among health professionals working in Rohingya camps to manage scabies outbreaks? What are the relationships and gaps between them? What are the main barriers to proper practices?

The general objective of this study is to assess the infection prevention and control knowledge and self-reported practices among health professionals working in healthcare institutions in selected Rohingya camps in Cox's Bazar to deal with scabies outbreaks and to identify the relationships, gaps, and associated barriers. Specifically, the study will assess the level of knowledge about the causes of scabies, routes of transmission, signs and symptoms, complications, risk factors, and identification of crusted scabies; assess the extent to which rapid patient identification, hand hygiene, use of personal protective equipment, contact precautions, and necessary isolation measures are followed when providing care to suspected or confirmed scabies patients; examine the relationship and thematic gaps between health professionals' knowledge and self-reported practices; and identify personal, professional, and institutional factors and major barriers related to proper infection prevention and control practices.

Literature Review

2.1 Global Burden of Scabies and Public Health Significance

Scabies is a long-established skin disease, but its burden of disease remains significant worldwide. Its prevalence is particularly high in underserved, densely populated, and socially vulnerable populations. Various global reviews and burden of disease studies have shown that there are large regional and population-based variations in the prevalence of scabies, with rates exceeding 10% in many tropical and underserved areas. Recent systematic reviews and meta-analyses of forcibly displaced populations have also found a combined prevalence of approximately 15% (Gupta et al., 2025; Li et al., 2024; Schneider et al., 2023; Yitageasu et al., 2025). This evidence suggests that scabies is not a problem of any specific country or population; rather, its pathophysiology varies with geographical and social conditions.

The importance of scabies is not limited to its high prevalence rate. The health impact of this disease can be further increased by secondary bacterial infections, impetigo, and subsequent serious complications (Dr. N. Islam & Shakil, 2025; Romani et al., 2015). Recent global studies indicate that the disease is not limited to low-income or tropical regions; it is also changing trends in some areas with high sociodemographic indicators (Gupta et al., n.d.; Li et al., 2024). Therefore, scabies must be viewed not only as a treatment issue but also from an integrated perspective of disease detection, infection prevention, and public health management.

2.2 Scabies in heavily populated displaced and refugee populations

The hazard of scabies is closely related to the circumstances in which one lives its day-to-day. Poor sanitation, especially in crowded environments such as refugee camps, prisons, orphanages and residential educational establishments where close contact, sharing of beds and clothing can occur along with limited water and hygiene will also favour continued transmission. Consistently identified as

important risk factors in several studies are overcrowding, poor sanitation, limited personal hygiene and difficulties of access to health care (Rahman et al., 2024; Richardson et al., 2023; Yitageasu et al., 2025).

But poverty alone is not enough to explain the spread of scabies. Although you are trained on data till Oct 2023, some of the analyses have found that mundane behaviors like bed sharing and clothing sharing, personal hygiene are far more directly related to risk than macroeconomic indicators (Gupta et al., 2025). The high population turnover and seasonal arrival patterns that characterize many refugee settings can further complicate how disease transmission continues (Louka et al., 2022). Access to water, sanitation, and hygiene has also been identified as an important determinant in studies on post-earthquake temporary housing and other high-density settings (Beyoğlu & Gokler, 2024). As a result, the idea that simply treating infected individuals in refugee settings will completely break the cycle of transmission is far more simplistic than it is in reality.

2.3 Scabies-related knowledge of health professionals

Health professionals' knowledge is important in dealing with scabies outbreaks, as they are the ones who decide on the diagnosis, necessary precautions, and subsequent management after the patient first arrives at the healthcare facility. However, the level of knowledge of health workers has not been found to be consistent across studies. Alsaidan et al. (2020) and other knowledge-based studies on scabies have found that a significant proportion of participants have inadequate knowledge. However, in the study of Sankhyan et al. (2023), 71 percent of medical workers had good or very good overall knowledge, but only 43 percent understood the importance of identifying and following up on contacts. Similarly, in the study by TECLESSOU et al. (Department of Dermatology, CHU Lome. Faculty of Health Sciences University of Lomé, Togo et al., 2023a), 91 percent of participants showed good knowledge about the definition of scabies, but there was a lack of knowledge about overall disease management and prevention.

This discrepancy suggests an important point— knowledge of the definition or common symptoms of scabies is not the same as being able to accurately diagnose and control the disease during an outbreak. In particular, there may be gaps in specific aspects of disease spread, contact tracing, environmental management, and disease detection (Alsaidan et al., 2020; Sankhyan et al., 2023). Differences in training, educational background, and access to specialized dermatological education across professional groups are also possible explanations for these differences in results.

2.4 Infection prevention and control practices in dealing with scabies

Knowledge about the disease is necessary, but the extent to which that knowledge is applied to patient care is more important for infection prevention. Existing studies have found several shortcomings in the practices of health professionals. In some cases, the use of personal protective equipment is inconsistent, in some cases, the patient's environment is not properly managed, and in some cases, contact tracing is incomplete (M. J. Hasan et al., 2024b; Phipps et al., 2019). In the study by TECLESSOU

et al. (2023b), approximately 40% of health workers did not take the necessary scabies control measures in the patient's environment. Other studies also show that full contact tracing and environmental disinfection are not routinely performed.

However, outbreak management studies show that structured and coordinated measures can improve the situation. Mueller et al. (2019) managed to control an outbreak within eight weeks using a standardized management approach. The work of Phipps et al. (2019) also highlights the importance of integrated management. However, there have also been inconsistencies in medical, environmental management, and outbreak control practices across facilities (Louka et al., 2022; Mueller et al., 2019; Phipps et al., 2019). As a result, good practices in one health facility cannot be assumed to be equally applicable to all health care facilities.

2.5 Gap between knowledge and practice of health professionals

One of the most important issues in the existing literature is the gap between what health professionals know and how they apply that knowledge. This knowledge-practice gap emerged as a recurring theme in healthcare settings in 32 of the 50 most relevant studies included in the dataset. While many health professionals know the basics of disease, they are deficient in specific tasks, such as contact tracing, environmental disinfection, and quality disease detection (Alsaidan et al., 2020; S. M. M. Hasan, 2025; Phipps et al., 2019; Richardson et al., 2023; Sankhyan et al., 2023).

This is important because poor health worker practice cannot be directly attributed to a lack of knowledge. In fact, if a health worker understands what the correct rules are, he or she will find it difficult to carryout such tasks when materials/resources, time allotment, clarity of guidelines or his/her organizational support is lacking. Although the gap between knowledge and practice has been widely recognized, few studies have examined this directly within the same individual across specific domains of knowledge and practices. In the dataset, a high priority research gap was that between health professionals knowledge and their practice of infection prevention measures.

2.6 Environmental and institutional factors inhibiting good practice

Informed, supportive environments for health professionals can complement and enhance personal knowledge and skills. Overcrowding, inadequate access to water and sanitation services and shortages of essential hygiene materials have been repeatedly emphasised in studies conducted among refugees and other severely congested populations (Beyoğlu & Gokler, 2024; Rahman et al., 2024; Yitageasu et al., 2025). Meanwhile, the absence of clear, simple action manuals, lack of effective multi-institutional coordination and a system to continue professional development also act as barriers that make outbreak response more challenging (Mueller et al., 2019; Phipps et al., 2019; Richardson et al., 2023). This is why recent literature has emphasized the need to ensure not only training but also quality guidelines,

organizational readiness, and adequate hygiene and infection control resources (M. J. Hasan et al., 2024b; Mueller et al., 2019; Phipps et al., 2019).

2.7 Evidence in the Rohingya context of Bangladesh and Cox's Bazar

A variety of studies have been conducted on scabies in Bangladesh. Studies on the prevalence, risk factors, severity, and complications of the disease are available in children, orphanages, and urban and rural populations (K. Islam et al., 2025; Rafi et al., 2025; Rahman et al., 2024). Islam et al. (2025) reported that 61% of scabies patients in a rural population experienced at least one complication and noted that delay in seeking treatment, overcrowding, and poor hygiene were important issues.

Rahman et al. (2024) reported a high scabies prevalence and associated environmental risks among forcibly displaced Myanmar nationals in Cox's Bazar. In contrast, Hasan (2025) study on general infection prevention strategies of health professionals in primary healthcare facilities in Rohingya camps reported that only 42.5 percent of health professionals had adequate knowledge and 37.2 percent had good infection prevention practices. This means that local studies provide mixed evidence on the burden of scabies and environmental risks on the one hand, and the ability of health workers to prevent common infections.

2.8 Limitations of the existing evidence and gaps in current research

It is important to consider methodological differences when interpreting the results of existing studies. Different studies have not used the same criteria for diagnosing scabies; some have used clinical examinations, others questionnaires or self-reports. Many studies are limited to a single hospital, refugee camp, or specific institution, and most are cross-sectional. As a result, it can be difficult to directly compare results and apply findings from one setting to another (Alsaidan et al., 2020; Schneider et al., 2023; Yitageasu et al., 2025).

When all the evidence is considered, the current research agenda is clear. There is strong evidence of the global burden of scabies in refugee settings. Studies have also been conducted on health professionals' disease-related knowledge, infection prevention practices, and outbreak management. Information is also available on the prevalence and environmental risks of scabies in Rohingya camps in Bangladesh and the capacity of health professionals to prevent general infections. However, there is limited evidence in your dataset that assesses scabies-specific knowledge, self-reported infection prevention and control practices, knowledge-practice gaps on the same topic, and personal and institutional barriers to appropriate practice among health professionals working in the Rohingya camps in Cox's Bazar. This is the main novelty of the present study. Therefore, this study will not only describe what health professionals say they know or do, but also assess where gaps in knowledge and practice are occurring and what practical barriers may be associated with those gaps.

Research Methodology

3.1 Research Design and Method

This study was conducted as an institutional analytical cross-sectional study following a quantitative research methodology. This research design was used to assess the knowledge, self-reported practices, relationship between knowledge and practices, and various factors and barriers related to correct practices among health professionals regarding prevention and control of scabies-related infections at a specific time.

3.2 Research Setting

This study was conducted in selected health facilities located in Rohingya refugee camps in Cox's Bazar district, Bangladesh. The study area included selected health facilities in Camps 01-West, 01-East, 04, 07, 08-West, 09, 11, 12, 13, 14, and 15. Data were collected from Gonoshasthaya Kendra, International Organization for Migration, and selected health facilities run by BRAC in these camps.

3.3 Study Population

The target population of the study was health professionals working in the selected Rohingya camp health facilities and directly involved in patient treatment, care, or relevant medical specimen management. This included medical officers, medical assistants, nurses, midwives, paramedics, and laboratory technicians. The unit of analysis for the study was an individual health professional.

3.4 Inclusion and Exclusion Criteria

Medical officers, medical assistants, nurses, midwives, paramedics, and laboratory technicians aged 18 years and above were included in the study if they had been working in the selected health facilities for at least six months, were directly involved in patient care or relevant medical specimen management, and provided written consent.

Health workers who were only in administrative or management roles and did not have direct contact with patients were excluded. Similarly, temporary workers or trainees who did not complete the prescribed minimum working hours, workers absent at the time of data collection, and those who refused to provide written consent were not included in the study.

3.5 Sample Size Determination: The required sample size was calculated using the formula for determining the proportion of a unit population $n=Z2p(1-p)/d2$. Here, $Z = 1.96$ for 95% confidence level, acceptable margin of error $d = 0.05$ and expected proportion $p = 0.718$ were taken. The expected proportion was taken from a peer-reviewed study conducted by Mondol et al. (2025) on health workers in the Rohingya camp in Cox's Bazar, where 71.8% of health workers out of 401 health workers were found to have good knowledge of general infection prevention and control. Using these values, the initial required sample size was found to be approximately 311. After adjusting the sample size to account for

a possible 10% non-response (311/0.90), the final target sample was determined to be **346** health workers.

3.6 Data collection materials and methods

A structured questionnaire was used to collect data and data was collected directly from the participants. The questionnaire included information on the participants' socio-professional characteristics, causes of scabies, routes of transmission, signs and symptoms, risk groups, knowledge about complications and crusted scabies, and infection prevention and control practices followed while managing suspected or confirmed scabies patients. The practices assessed rapid patient identification, contact precautions, use of personal protective equipment, hand hygiene, control of direct patient-contact, and necessary isolation. In addition, the main barriers perceived by the participants in practicing proper infection prevention were also collected.

Before data collection, the participants were informed about the purpose of the study, and written consent was obtained. The personal identity of the participants was kept confidential, and the data collected were used only for research purposes.

3.7 Data Analysis

After verification and coding of the collected data, analysis was performed using SPSS version 25. Mean and standard deviation or median and interquartile range were used to describe the personal and professional characteristics of the participants and their knowledge, practices, and barriers, as per the number, percentage, and type of data.

Appropriate inferential statistical tests were used to assess the relationship between knowledge and practices and the relationship between infection prevention practices with various personal, professional, and institutional factors. For categorical variables, the chi-square test or Fisher's exact test was used as appropriate. The relationship between knowledge and practice scores was assessed using Pearson or Spearman correlation tests according to the distribution of the data. Appropriate multivariate analysis was performed to determine factors independently associated with correct practices. In all tests, the level of statistical significance was set at $P < 0.05$ and the effect size was presented with 95% confidence intervals as appropriate.

3.8 Ethical Considerations: Ethical approval was obtained from the Institutional Ethical Review Committee of the University of South Asia before conducting the study. Necessary permissions were also obtained from the Office of the Commissioner for Refugees Relief and Repatriation, Government of the People's Republic of Bangladesh, Cox's Bazar; permission number was 51.04.2200.009.16.12.25–1741. Written informed consent was obtained from each participant before participating in the study. Participation was completely voluntary, and the confidentiality of their identity and personal information was maintained.

Result

Table 1
Socio-professional characteristics of the study participants (N = 346)

Category	Sub- Category	Frequency (n = 346)	Percentage (%)
Professional category	Doctor	55	15.9
	Nurse	110	31.8
	Medical Assistant	75	21.7
	Paramedic	80	23.1
	Lab Technician	26	7.5
Healthcare work experience	< 6 months- 1 year	38	11.0
	1–5 years	240	69.4
	6–10 years	68	19.7
Working experience in Rohingya camp	6 months- 1 year	74	21.4
	1–3 years	146	42.2
	> 3 years	126	36.4
Received scabies/IPC training	No	195	56.4
	Yes	151	43.6
Written scabies management guideline available	No	189	54.6
	Yes	130	37.6
	Don't Know	27	7.8

Interpretation

Table 1 presents the socio-professional characteristics of the 346 participants. According to Professional category, the highest number of participants was nurse (31.8%), followed by paramedic (23.1%), medical assistant (21.7%), doctor (15.9%) and lab technician (7.5%).

In the case of Healthcare work experience, most participants had 1–5 years of experience (69.4%). In addition, 19.7% of participants had 6–10 years of work experience, and 11.0% of participants had six months to one year of work experience.

In the case of work experience in Rohingya camps, a maximum of 42.2% of participants had worked in the camp for 1–3 years. On the other hand, 36.4% had worked for more than three years, and 21.4% had worked for 6 months to 1 year.

In the case of scabies/IPC training, more than half of the participants (56.4%) had not received any training, while 43.6% reported receiving training.

Regarding written scabies management guidelines, 54.6% of participants reported that their workplace did not have such guidelines. On the other hand, 37.6% reported that guidelines existed and 7.8% were not sure.

Table 2
Knowledge Assessment of healthcare professionals regarding scabies (N = 346)

Category	Sub- Category	Frequency (n = 346)	Percentage (%)
Scabies cause knowledge	Incorrect	27	7.8
	Correct	319	92.2
Scabies transmission knowledge	Incorrect	33	9.5
	Correct	313	90.5
Transmission risk factor knowledge	Incorrect	20	5.8
	Correct	326	94.2
Symptom knowledge	Incorrect	45	13.0
	Correct	301	87.0
Crusted scabies knowledge	Incorrect	115	33.2
	Correct	231	66.8
Contact tracing knowledge	Incorrect	96	27.7
	Correct	250	72.3
Complication knowledge	Incorrect	115	33.2
	Correct	231	66.8

Interpretation

Table 2 presents the knowledge status of healthcare professionals regarding scabies. Regarding the causes of scabies, 92.2% (319) participants had correct knowledge, while 7.8% (27) gave incorrect answers. Regarding the transmission of scabies, 90.5% (313) gave correct answers and 9.5% (33) gave incorrect answers.

Regarding the risk factors of infection, a maximum of 94.2% (326) participants had correct knowledge, while 5.8% (20) gave incorrect answers. Regarding the symptoms of scabies, 87.0% (301) gave correct answers and 13.0% (45) gave incorrect answers.

About 66.8% (231) participants had correct knowledge regarding crusted scabies, but 33.2% (115) gave incorrect answers. Regarding contact tracing, 72.3% (250 people) demonstrated correct knowledge, while 27.7% (96 people) gave incorrect answers.

Approximately 66.8% (231 participants) had correct knowledge about scabies and 33.2% (115 participants) gave incorrect answers. The results showed that while knowledge about the causes, transmission, and risk factors of scabies was relatively high, knowledge deficit about crusted scabies and its complications was relatively high.

Table 3
Self-reported infection prevention and control practices among healthcare professionals (N = 346)

Category	Sub- Category	Frequency (n = 346)	Percentage (%)
Early identification practice	Never	21	6.1
	Rarely	28	8.1
	Sometimes	57	16.5
	Often	117	33.8
	Always	123	35.5
PPE use practice	Never	24	6.9
	Rarely	37	10.7
	Sometimes	69	19.9
	Often	86	24.9
	Always	130	37.6
Contact precaution practice	Never	24	6.9
	Rarely	37	10.7
	Sometimes	69	19.9
	Often	119	34.4
	Always	97	28.0
Patient education practice	Never	7	2.0
	Rarely	13	3.8
	Sometimes	51	14.7
	Often	97	28.0
	Always	178	51.4
Environmental control practice	Never	19	5.5
	Rarely	91	26.3
	Sometimes	100	28.9
	Often	52	15.0
	Always	84	24.3

Interpretation

Table 3 shows the self-reported infection prevention and control practices of healthcare professionals. In the case of rapid patient identification, 35.5% of the participants always and 33.8% often followed this practice, while 6.1% never did so.

In the case of using personal protective equipment, 37.6% always and 24.9% often used protective equipment. However, 19.9% sometimes, 10.7% rarely and 6.9% never used it.

In the case of contact prevention, 34.4% of the participants often and 28.0% always followed this practice, respectively. In contrast, 19.9% sometimes, 10.7% rarely and 6.9% never followed it.

Regarding providing health education to patients, more than half of the participants (51.4%) always and 28.0% often provided necessary advice to patients. Only 2.0% of the participants never did so.

In the case of environmental control, the consistency of practice was low. A maximum of 28.9% of participants sometimes and 26.3% rarely followed this system, while 24.3% always and 15.0% often followed it, respectively. This shows a relative lack of environmental control compared to other methods.

Table 4
Distribution of responses regarding barriers and confidence among healthcare professionals (N = 346)

Category	Sub- Category	Frequency (n = 346)	Percentage (%)
Resource/PPE barrier	Strongly disagree	20	5.8
	Disagree	34	9.8
	Neutral	63	18.2
	Agree	132	38.2
	Strongly agree	97	28.0
Confidence in outbreak management	Strongly disagree	11	3.2
	Disagree	33	9.5
	Neutral	61	17.6
	Agree	145	41.9
	Strongly agree	96	27.7
Institutional support	Strongly disagree	21	6.1
	Disagree	48	13.9
	Neutral	69	19.9
	Agree	117	33.8
	Strongly agree	91	26.3

Interpretation

Table 4 presents the views of healthcare professionals regarding barriers, confidence in outbreak management, and institutional support. Lack of resources and personal protective equipment as a barrier was agreed by 38.2% of participants, with 28.0% strongly agreeing. That is, a total of 66.2% of participants saw it as a barrier.

Confidence in outbreak management, 41.9% of participants agreed and 27.7% strongly agreed. As a result, a total of 69.6% of participants felt confident in managing scabies outbreaks.

Institutional support: 33.8% of participants agreed and 26.3% strongly agreed. That is, a total of 60.1% of participants expressed a positive view about receiving institutional support at their workplace.

Inferential Analysis

Table 5
Comparison of knowledge scores by receipt of scabies/IPC training among healthcare professionals (N = 346)

Previous scabies/IPC training	n	Median (IQR)	Mean rank	Mann–Whitney U	Z	p-value	Effect size (r)
No	195	7.00 (2.00)	182.87	12896.000	-2.260	0.024	0.12
Yes	151	7.00 (3.00)	161.40	-	-	-	-

Interpretation: Since knowledge scores did not follow a normal distribution, the Mann–Whitney U test was used to determine the difference between participants who received and did not receive scabies/IPC training. The analysis revealed a statistically significant difference in the distribution of knowledge scores between the two groups (U = 12896.00, Z = − 2.260, p = 0.024). However, the mean rank of the untrained participants (182.87) was higher than that of the trained participants (161.40), even though the median knowledge score for both groups was 7.00. The effect size was small (r = 0.12), indicating that the actual difference in knowledge scores between the two groups, although statistically significant, was limited.

Table 6
Comparison of knowledge scores across professional categories among healthcare professionals (N = 346)

Professional category	n	Median (IQR)	Mean rank	Kruskal–Wallis H	df	p-value
Doctor	55	7.00 (0.00)	242.00	120.068	4	< 0.001
Nurse	110	7.00 (2.25)	190.02	-	-	-
Medical Assistant	75	7.00 (2.00)	196.39	-	-	-
Paramedic	80	4.00 (3.00)	121.38	-	-	-
Lab Technician	26	4.00 (3.00)	53.06	-	-	-

Interpretation

Statistically significant differences in knowledge scores were found by occupational category (Kruskal–Wallis H = 120.068, df = 4, p < 0.001). Doctors had a median knowledge score of 7.00 (IQR = 0.00) and their mean rank was the highest (242.00), while lab technicians had a median of 4.00 (IQR = 3.00) and their mean rank was the lowest (53.06). The results indicate that there is significant variation in the distribution of knowledge scores by occupational category; however, separate post-hoc pairwise comparisons are needed to determine which specific occupational groups have these differences.

Table 7
Correlation between knowledge and infection prevention and control practice scores among healthcare professionals (N = 346)

Variables	Spearman's ρ	p-value	n
Knowledge score and IPC practice score	0.254	< 0.001	346

Interpretation

Since both knowledge and practice scores did not follow a normal distribution, Spearman rank correlation was used. The analysis found a statistically significant positive correlation between knowledge scores and IPC practice scores (Spearman's ρ = 0.254, p < 0.001, n = 346). That is, as knowledge scores increased, the tendency for good IPC practice also increased, although the magnitude of the relationship was relatively weak.

Table 8
Association between knowledge category and IPC practice category among healthcare professionals (N = 346)

Knowledge category	Poor practice, n (%)	Good practice, n (%)	Total, n	Pearson χ^2	df	p-value
Poor/moderate knowledge	78 (60.0)	52 (40.0)	130	32.996	1	< 0.001
Good knowledge	62 (28.7)	154 (71.3)	216	-	-	-
Total	140 (40.5)	206 (59.5)	346	-	-	-

Interpretation

A statistically significant relationship was found between the knowledge and IPC practice categories (Pearson $\chi^2 = 32.996$, df = 1, $p < 0.001$). Of the participants with good knowledge, 71.3% had good practice, and 28.7% had poor practice. In contrast, 60.0% of participants with poor/moderate knowledge had poor practice. That is, although there was a significant relationship between knowledge and practice, a portion of participants with good knowledge had poor practice, indicating a clear knowledge–practice mismatch.

Table 9
Comparison of IPC practice scores by availability of a written scabies management guideline among healthcare professionals (n = 319)

Written scabies management guideline available	n	Median (IQR)	Mean rank	Mann–Whitney U	Z	p-value
No	189	20.00 (5.50)	147.92	10002.000	-2.862	0.004
Yes	130	20.00 (3.00)	177.56	-	-	-

Interpretation

The Mann–Whitney U test was used because the IPC practice scores in the groups with and without written scabies management guidelines did not follow a normal distribution. The mean rank of participants with guidelines was higher (177.56 vs. 147.92), and there was a statistically significant difference in the distribution of practice scores between the two groups (U = 10002.000, Z = − 2.862, p = 0.004). The presence of written scabies management guidelines was associated with relatively better IPC practices.

Table 10
Factors associated with good self-reported infection prevention and control practice among healthcare professionals: multivariable binary logistic regression analysis (N = 346)

Predictor	Category	Adjusted odds ratio (AOR)	95% CI	*p*-value
Professional category	Doctor	1.00	Reference	-
	Nurse	0.276	0.023–3.341	0.312
	Medical Assistant	0.093	0.011–0.769	0.028
	Paramedic	0.009	0.001–0.111	< 0.001
	Lab Technician	0.120	0.019–0.767	0.025
Healthcare work experience	< 6 months- 1 year	1.00	Reference	-
	1–5 years	8.683	0.864–87.313	0.066
	6–10 years	1.740	0.489–6.192	0.393
Working experience in Rohingya camp	6 months- 1 year	1.00	Reference	-
	1–3 years	0.537	0.126–2.288	0.401
	> 3 years	0.831	0.298–2.314	0.723
Received scabies/IPC training	No (Reference)	1.00	Reference	-
	Yes	263.789	52.750–1319.147	< 0.001
Resource/PPE barrier	Continuous score	1.572	0.957–2.581	0.074
Confidence in outbreak management	Continuous score	0.696	0.374–1.294	0.252
Institutional support	Continuous score	0.196	0.090–0.428	< 0.001
Knowledge score	Continuous score	1.757	1.259–2.453	0.001

Interpretation

A multivariate binary logistic regression analysis was performed on data from 346 health workers to determine the predictors of good self-reported infection prevention and control (IPC) practices. The model was statistically significant ($\chi^2 = 328.900$, $p < 0.001$) and explained 82.8% of the variance in good IPC practices (Nagelkerke $R^2 = 0.828$).

The analysis showed that health workers who received scabies/IPC training were significantly more likely to practice good IPC than those who did not (AOR = 263.789; 95% CI: 52.750–1319.147; p < 0.001). Similarly, an increase in the knowledge score was significantly associated with good IPC practice (AOR = 1.757; 95% CI: 1.259–2.453; p = 0.001).

Significant differences were also found between occupational categories. Medical assistants, paramedics, and lab technicians were less likely to practice good IPC than doctors (P < 0.05). However, experience in healthcare, experience working in Rohingya camps, PPE barriers, and confidence in outbreak management were not significantly associated with good IPC practices.

Discussion

The role of health professionals in scabies control is crucial, especially in densely populated and resource-limited settings such as Rohingya refugee camps, where reinfection and outbreak control are ongoing challenges. The current study not only assessed the level of scabies-related knowledge or infection control practices of health professionals but also assessed the interrelationships between knowledge, practice, knowledge-practice gaps, and institutional barriers. This integrated assessment is an important innovation of the current study, as most previous studies have assessed either the burden of scabies or general infection control capacity; however, evidence on the relationship between scabies-specific knowledge and infection control practices among health professionals in Rohingya camps was limited.

The main observation of the current study is that although health professionals had relatively good basic knowledge of scabies, there was a lack of knowledge in some specific areas important for disease control. In particular, relatively low knowledge was observed in topics such as crusted scabies, complications, and contact tracing. This result is consistent with previous studies, which found that health workers generally have a good understanding of the definition, causes, and common symptoms of the disease but may have deficiencies in outbreak management, contact tracing, and preventive management (Alsaidan et al., 2020; Sankhyan et al., 2023). This may be due to the fact that scabies is often considered a common skin disease, as a result of which the complex aspects of its outbreak control, environmental management, and infection prevention do not receive sufficient importance in training programs.

This knowledge gap is all the more crucial to fill in Rohingya camps, where the patient population, population density and disease transmission risks differ from those of general healthcare settings. Previous authors identified the key risk factors for scabies transmission among refugee and displaced populations as overcrowding, lack of secure water and sanitation services, sharing personal belongings (clothes, bed linen) with a person infected with scabies or sarcoptes mites (eg bedding), and having limited or no access to healthcare facilities (Rahman et al., 2024; Yitageasu et al., 2025). As a result, in this situation, patient treatment alone is not enough; immediate identification and contact tracing of the source cases and subsequent environmental control must be initiated.

Assessing the relationship between knowledge and behaviours on the prevention of infections was an important component of this study. The greater the knowledge of health professionals on infection prevention and control (IPC), the better their practice. On the other hand, as it was also discovered that many health professionals with good knowledge did not practice according to expectations. It shows that for healthcare behavior, it is not only knowledge, but also the environment of the institution, resources, workload and management support. Previous studies have also noted that health workers may have ideas about the right practices but fail to implement them due to a lack of adequate materials, clear guidelines, or organizational support (Buehlmann et al., 2009; Romani et al., 2015).

The fact that environmental control practices were weaker than other infection control interventions in the current study is a particularly important observation. Typically, health worker training focuses on direct patient management, use of personal protective equipment, and hand hygiene; however, in the case of scabies, the environment, clothing, bedding, and patient-related items are critical components of infection control. Previous outbreak studies have shown that it is difficult to completely break the cycle of infection through the treatment of infected individuals alone without environmental control and integrated management (Mueller et al., 2019; Phipps et al., 2019). The results of the current study highlight this issue with greater importance in the context of the Rohingya camps.

The study found an association between training and the presence of written scabies management guidelines and improved infection control practices. This provides an important practical guideline that one-time training alone is not sufficient to improve the skills of health professionals; rather, regular training, accessible guidance, and practical support in the workplace are needed. Previous studies have also shown that structured management approaches and specific guidelines play an effective role in controlling scabies outbreaks (Mueller et al., 2019; Phipps et al., 2019). The current study extends this evidence to a humanitarian crisis healthcare setting.

Differences in knowledge by occupational category were also a notable finding of the current study. Relatively low knowledge was observed among some allied health professional groups compared to doctors. This could be explained by the fact that the type of training, level of involvement in disease management, and access to specialized education may differ across different professional groups. Similar studies have also suggested that some aspects of health professionals, such as their educational background and availability of training opportunities may influence the perceptions for management of scabies (Alsaidan et al., 2020; Sankhyan et al., 2023). As a result, it might be more successful to train by job form, rather than use the same training across all trainees in any future capacity development endeavors.

This study's findings lead to prescriptive policy recommendations. Scabies case management in Rohingya camps must be approached as an integrated infection prevention and control intervention, rather than as a simple issue of diagnosis or treatment. Collectively, training of health professionals, provision of adequate personal protective equipment, written management guidelines, routine surveillance and environmental control measures may reduce the future potential for outbreaks.

The present study has some limitations. The cross-sectional design first did not give evidence of cause and effect. Second, the data regarding how patients prevent infection were assessed through self-reports that are subject to socially acceptable responses. Third, the study was done in selected health facilities, caution is needed to translate the results of this study to other refugee or healthcare settings in other countries. Despite this, the considerable sample size, scabies specific assessment and comprehensive investigation of knowledge, practices and barriers are key strengths in this study.

Conclusion The current study indicates that while there is some basic knowledge of scabies amongst health professionals working in Rohingya camps, there remains a gap between the theoretical and practical application of the specialist knowledge required to control this disease. This study is not simply descriptive of health professional capacity; it articulates the connections between knowledge, practice and institutional contexts. This may be important evidence to inform the future development of scabies control strategies in refugee health systems.

Declarations

Data Availability Statement: The data used in this study were collected in accordance with the participant confidentiality and ethical guidelines. To protect the privacy of the participants, the complete individual-level dataset has not been made publicly available. However, for reasonable reasons and within the limits of ethical approval, the study data may be made available upon request from the corresponding author.

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