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Barriers and Enablers to Implementing Respiratory Hygiene Practices in Clinical Settings

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Abstract **Original Research Article**

Background: Respiratory hygiene functions as an essential method to stop infectious disease transmission in healthcare facilities where healthcare professionals (HCPs) encounter respiratory pathogens frequently. ***Objectives:*** The research studied the main factors impacting respiratory hygiene practice adoption among physicians operating at Rajshahi Medical College and Hospital and M Abdur Rahim Medical College and Hospital in Bangladesh. ***Methodology:*** A structured questionnaire was used for a descriptive cross-sectional study that included 285 physicians to evaluate their knowledge of infection prevention and control guidelines, as well as their compliance behaviors, and identify key factors that can improve adoption. A chi-square analysis technique evaluated the connections between compliance levels and different predictive elements. ***Results:*** The study found lack of PPE at 74.2% and inadequate training at 65.0%, and high patient workload at 57.5% were the three biggest obstacles preventing compliance among healthcare workers. Improved hygiene practices received their main enablers through PPE availability (80.0%), regular training (70.8%), and clear institutional policies (60.8%). Statistical analysis using $p<0.001$ showed a strong correlation between compliance and factors, including awareness of guidelines and institutional support problems, and supervision and training ($p<0.001$). Healthcare providers with more work experience demonstrated higher levels of hygiene compliance according to statistical results ($p=0.031$). ***Conclusion:*** The data emphasizes the strong necessity for comprehensive institutional approaches that build workforce capabilities and allocate necessary resources to spread respiratory hygiene practices in Bangladeshi healthcare facilities.

Keywords: Respiratory Hygiene, Infection Prevention, Personal Protective Equipment (PPE), Bangladeshi Clinical Settings, Medical Training, Patient Safety.

INTRODUCTION

Respiratory diseases, often known as lung diseases, are certain medical conditions that interfere with the air exchange of the pulmonary system and other pulmonary tissues [1]. Respiratory diseases are very infectious and can spread through viruses, germs and bacteria, and other parasites. Globally, around 545 million people, representing 7.4% of the world population, are suffering from chronic respiratory diseases [2]. In the clinical setting, healthcare professionals are at a high risk of respiratory diseases. According to the National Center for Health Statistics, the percentage of physicians aged >85 years who are suffering from respiratory disease is 57%, and the rate of mortality is 15% [3]. An Iran-based comparison study showed that the prevalence of respiratory diseases is 7% in nurses, 5% in laboratory workers, 9% in hospital cleaners, and 2% in other healthcare workers [4]. Any person who operates within health care facilities and encounters risks of infectious materials exposure through bodily fluids, contaminated medical equipment, contaminated environmental surfaces, and contaminated air qualifies as a healthcare worker (HCW) [5]. In the clinical setting, practicing respiratory hygiene can reduce the infection rate of HCWs to respiratory diseases [6]. The prime barriers included the lack of knowledge of maintaining hygiene in the workplace among healthcare workers. T. Sharmin *et al.*, 2023 reported that only 20.35% of Bangladeshi physicians have proper training on infectious prevention, and 94.4% are not at all aware of the component of standard precautions [7]. Standard Precautions are applied for all patients at all times to prevent healthcare-associated transmission of infectious

agents among patients and healthcare personnel [8]. Healthcare-associated infections among the physician workforce result in higher medical illness rates and physician absence, as well as increased mortality rates within the medical professional group. The health care system faces significant expenses, together with the financial consequences of this situation [9]. The risk level rises whenever medical professionals disregard SPs without understanding their requirements [10]. The majority of doctors acknowledge respiratory hygiene as fundamental, yet multiple elements restrict their ability to maintain continuous application [11]. Physicians usually face three key obstacles preventing proper protection and training regarding PPE while facing a heavy patient workload [12]. This study aims to find out the basic barriers and enablers to implementing respiratory hygiene practices in the clinical settings of developing countries like Bangladesh.

METHODOLOGY

A descriptive cross-sectional study took place with physicians in the outdoor and indoor patient care from two tertiary medical institutions of Bangladesh; Rajshahi Medical College and Hospital, Rajshahi, Bangladesh, and M Abdur Rahim Medical College and Hospital, Dinajpur. The study timeline runs from 1st January 2020 to 31st December 2020. The participants were selected based on some study-specific inclusion and exclusion criteria.

Inclusion criteria

- Doctors, involved with treating patients in indoor hospital wards and outpatient care settings.
- On-duty physicians during the data collection phase.
- Physicians, willing to provide informed consent.

Exclusion criteria

- Non-physician healthcare workers.
- Doctors, with no patient-handling experience in the indoor and outdoor (intern, regulatory bodies)
- Unwillingness to study.

The questionnaire consisted of structured sections that collected data about participant demographics as well as awareness of IPC guidelines as well as perceived barriers and enablers, and compliance assessments. Different statistical methods were used to evaluate data through descriptive analysis and chi-square tests for detecting relationships between compliance and various influence factors. MS Excel and SPSS 26.0 were the main data analysis tools for this study. A p-value<0.05 was considered significant at the 95% confidence interval.

RESULTS

This study included 285 physicians from Rajshahi Medical College Hospital, Rajshahi, and M Abdur Rahim Medical College and Hospital, Dinajpur.

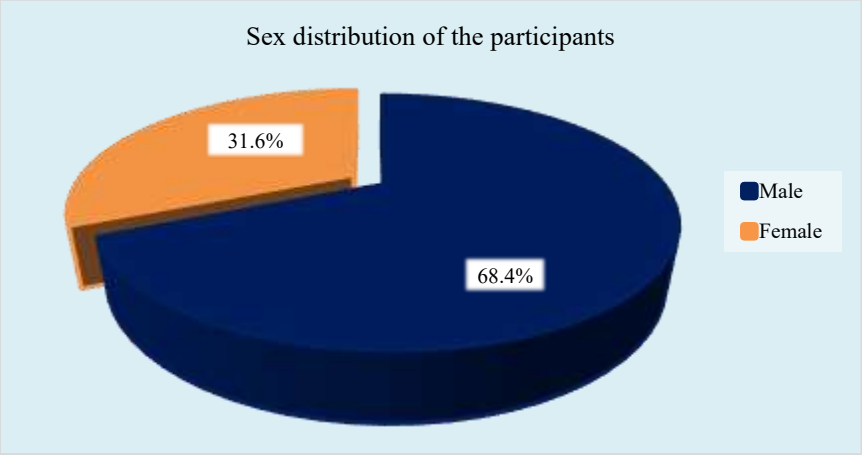

Figure I: Pie chart showed demographic characteristics of the respondents (sex) (N=285)

Figure 01 shows the demographic distribution of participants, which interprets a male-dominant study structure with more than twice as many study subjects as female participants.

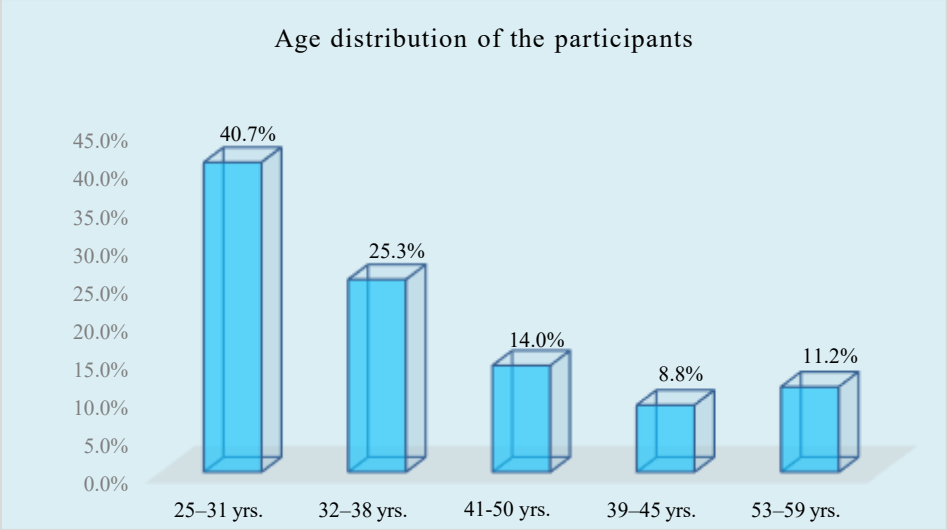

Figure II: Column chart showed demographic characteristics of the respondents (age) (N=285)

Figure 02 illustrates the age distribution of respondents, indicating that most participants fall within the 25-31 age group. The calculated mean age for the participants is 36.42±10.373 years, with a minimum age of 25 years and a maximum age of 59 years.

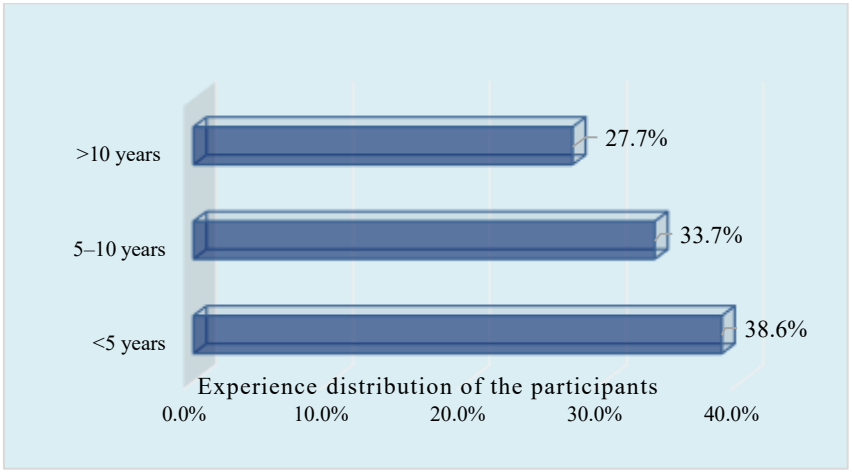

Figure III: Bar chart showed demographic characteristics of the respondents (years of experience) (N=285)

Figure 03 shows that the experience distribution for medical professionals is a majority who operated for less than 5 years (38.6%), as per early-career professionals. Statistics demonstrate that 27.7% of clinicians possess more than ten years of professional experience, in addition to the moderately experienced workforce distribution.

Table 1: Commonly Reported Barriers to Respiratory Hygiene Implementation (N=285)

Barrier	Frequency	Percentage (%)
Lack of PPE	89	74.2
Inadequate training	78	65.0
High patient workload	69	57.5
Absence of monitoring/supervision	55	45.8
Limited awareness of guidelines	42	35.0

Table 01 shows that a maximum of 74.2% of respondents identified inadequate personal protective equipment (PPE) as their main obstacle to compliance. Physicians face two primary barriers to standard precautions compliance, which are inadequate training and high patient workload (57.5%), according to 65.0% of respondents. A significant number of 45.8% of physicians stated that institutional oversight was absent during their work hours, as did 35.0% who pointed to a lack of awareness regarding guidelines.

Table 2: Reported Enablers for Better Compliance with Respiratory Hygiene (N=285)

Enabler	Frequency	Percentage (%)
Availability of PPE	96	80.0
Regular training programs	85	70.8
Clear institutional policies	73	60.8
Supportive supervision	68	56.7
Peer motivation	52	43.3

Table 02 demonstrates that 80.0% of respondents identified PPE access as the main enabler because it serves as a primary factor in protecting safe healthcare delivery. Most health care providers (70.8%) stated training regularly, while almost two-thirds (60.8%) mentioned having clear policies within their institutions, which shows the value of organized and sustained professional development.

Table 3: Chi-Square Analysis of Factors Associated with Compliance (N=285)

Factors	Chi-square (χ^2)	p-value
Awareness of Guidelines	48.47	< 0.0001
Institutional Support	40.58	< 0.0001
Supervision Available	32.99	< 0.0001
Training Provided	24.86	< 0.0001
Availability of PPE	15.63	0.0001

Table 03 reveals that every examined factor contributed significantly to compliance levels. Medical personnel possessing knowledge about protocols demonstrate the highest level of compliance according to a χ^2 analysis with a score of 48.47 (χ^2 = 48.47). Institutional support demonstrated significance at χ^2 = 40.58 along with supervision availability at χ^2 = 32.99, indicating that supportive environments with proper monitoring play key roles in compliance. Ongoing educational sessions (training) proved to be an especially effective factor for reaching compliance targets (χ^2 = 24.86). The chi-square value of PPE availability (χ^2 = 15.63) was minimal but still statistically significant, which confirms the need for maintaining proper PPE availability to ensure adherence consistency among medical staff. Knowledge of guidelines captured the highest association between variables (χ^2 = 48.47, p < 0.0001), which confirms the fundamental role of awareness.

Table 4: Compliance Level by Years of Experience (N=285)

Years of Experience	High Compliance	Low Compliance	Total	p-value
<5 years	8	102	110	0.031
5–10 years	41	55	96	
>10 years	30	49	79	

Table 4 displays a specific pattern that demonstrates that medical practitioners with longer experience demonstrate superior compliance levels. Professional physicians who had been practicing for more than 10 years exhibited the best implementation of respiratory hygiene measures, yet new graduates achieved the least effective adoption. Professional experience and increased exposure to healthcare settings result in better respiratory hygiene practice knowledge, according to the statistical analysis ($p<0.05$).

DISCUSSION

Physicians encounter various workplace perils in healthcare facilities, primarily due to their direct contact with patients and handling of body fluids. Hospital settings present a significant occupational risk through the potential transmission of infections. Healthcare professionals have long been at risk of exposure to body fluids, which carry infectious agents. Respiratory infections are among the most common hospital-acquired infections, as physicians must maintain close contact with patients during history taking and physical examinations. The research participants had an average age of 36.42±10.373 years, with ages ranging from 25 to 59 years. Those aged 25-31 years represented 40.7% of the total sample population, while 25.3% of respondents fell within the 32-38 year age range. The participant pool included 68.4% male respondents and 31.6% female respondents. Another important demographic detail highlights that the maximum patients is 38.6% of patients have <5 years of experience, 33.7% of participants have 5-10 years of experience, and 27.7% of participants have>10 years of experience. The year of experience also aligns with the practice styles of physicians, described in Table 04. The major barrier for not maintaining respiratory hygiene is the lack of PPE (74.2%), and mostly physicians reported 80% availability of PPE, which is a major enabler also. In 2020, the WHO estimated that the production of PPEs should be increased by 40% to meet global need [13]. C.R. MacIntyre *et al.* 2014 highlighted the shortage of

N95 masks in their research [14]. T. Rebmann *et al*., 2021, found the availability of hand gloves in hospitals to be 63.4%, N95 respirators 13.6%, and 18.2%, 66.9% of hospitals reported sufficient hand soap, but far fewer had sufficient hand sanitizer (29.5%) [15]. The prevalence of inadequate training is 65.0%; on the contrary, 70.8% of physicians see it as an important enabler. Work pressure (57.5%), absence of monitoring (56.7%), and limited awareness/guideline (35.0%) are some other barriers reported by the current study. Enablers included 80% of the availability of PPE, 70.8% of arrangements of regular training programs, 60.8% of strict institutional policies, 56.7% of supportive supervision, and 43.3% peer motivation. S. K. Chakma *et al.*, 2024 reported that the hygiene practice increased from 66.0% to 88.3% in medical practice after proper training [16]. Stressful professional life is very common in the Bangladeshi healthcare system. The World Bank in 2021 observed that the ratio of doctors to patients is 06:1000 [17]. Limited supervision and awareness of guidelines are some other noticeable issues in Bangladeshi settings. Bangladesh is a developing country and there is always been a scarcity of physicians. Respiratory infections among physicians might impact the country's health system. This study draws a clear line between the barriers and enablers to maintaining respiratory hygiene to prevent diseases among healthcare professionals. Awareness of guidelines, institutional support, regular supervision, and training ($p<0.001$) are factors for practicing respiratory hygiene in clinical settings. Although the lack of PPE is significant ($p=0.001$), but relatively lower Chi-square value ($\chi^2=15.63$) implies that PPE cannot prevent respiratory infections. The frequency of training also shows a low Chi-square value ($\chi^2=24.86$), indicating that the implementation of training learning is important than arranging training sessions. Table 04 data shows a significant relationship ($p<0.05$) between the years of experience and high compliance with the respiratory hygiene practice. Several studies claimed that senior physicians are more concerned about maintaining respiratory hygiene [11] [18]. Encouraging young doctors in a broad spectrum to ensure respiratory hygiene in their medical practice.

LIMITATION

The research findings might have limited generalizability due to various factors. The research included physician participants from just two tertiary medical institutions without considering doctors in other areas or different types of medical facilities in Bangladesh. Self-reporting research data makes it susceptible to both recall bias and social desirability bias, thus affecting the reliability of participant responses. A cross-sectional approach cannot properly establish cause-and-effect relationships between the identified variables and healthcare provider behaviors. The study lacked participation from essential healthcare staff who support physicians, including nurses or support workers who actively contribute to infection prevention efforts. The year 2020 represented the entire study duration and research data collection, which might not capture potential changes in personal protective equipment (PPE) availability and institutional policy adaptations over time.

CONCLUSION

The study explores essential obstacles along with facilitators that affect the execution of respiratory hygiene practices among medical personnel in clinical settings in Bangladesh. A lack of PPE, insufficient training, and excessive patient responsibilities undermine adherence to respiratory hygiene practices. However, support, training resources, and available institutional assistance enhance favorable outcomes. The relationships between physician compliance with respiratory hygiene practices and promotional awareness initiatives, supervisory support, and experience indicate that future success depends on enhancing education, strengthening policies, and providing professional mentorship. Improving these manageable risk factors within resource-constrained settings leads to significant progress in respiratory hygiene protocols, thus protecting medical staff and their patients. Future healthcare initiatives need to continue training healthcare workers, enforce policies, and develop inclusive methods to reach all medical staff.

Abbreviation

IPC: Infection Prevention and Control
HCW: Healthcare Workers
PPE: Personal Protective Equipment

Conflicts of Interest: The authors declare no conflicts of interest.

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