

## DEMOGRAPHIC INSIGHTS INTO COVID-19 PREVENTATIVE PRACTICES: A STUDY AMONG NURSING PERSONNELS IN BANGLADESH

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### ABSTRACT

**Introduction:** Amidst the global health emergency precipitated by the COVID-19 pandemic, the implementation of robust Infection Prevention and Control (IPC) strategies has been vital in mitigating the spread of the virus, particularly within the confines of healthcare facilities. As integral members of the healthcare workforce, nurses are tasked with the critical responsibility of adhering to and promoting these IPC measures. This study conducts a rigorous assessment of IPC adherence among nursing personnel in Bangladesh, a nation where the confluence of high population density and limited healthcare resources presents a unique set of challenges. By examining the compliance with and efficacy of IPC protocols, this research yields insightful revelations into the frontline application of IPC initiatives by nurses during a period of global medical crisis. **Methodology:** A cross-

sectional study was conducted across three tertiary public hospitals in Dhaka, Bangladesh, from October to December 2021. A sample size of 384 nurses was determined using

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systematic random sampling. Data collection involved a semi-structured questionnaire and direct interviews. The practice evaluation used a scoring system with a 60% threshold distinguishing 'good' from 'poor' levels of practice. Data analysis was conducted using SPSS and Stata. **Results:** Most nurses (91.35%) practiced eating well-cooked food, with 80.17% maintaining hand hygiene, and 100% adhering to social distancing. A significant majority (86.78%) were classified as having 'Good' practice levels. Younger nurses (20-30 years) showed stronger adherence ( $p=0.019$ ), while educational attainment and gender did not significantly affect practice levels. **Conclusions:** The high compliance with IPC measures among nursing staff in Dhaka's tertiary hospitals indicates a strong commitment to patient and personal safety during the pandemic. The correlation between age and IPC adherence highlights the importance of targeted training and policy development to enhance IPC practices across all age groups in the nursing workforce. These findings provide a comparative perspective on regional IPC implementation, contributing valuable insights into occupational health practices during global health crises.

**KEYWORDS:** COVID-19, Infection Prevention and Control, Nursing Staff, Bangladesh, Occupational Health.

## INTRODUCTION

In the face of the global upheaval brought about by the COVID-19 pandemic, healthcare systems worldwide have been subjected to unprecedented challenges. The virus's rapid spread has necessitated the adoption of stringent prophylactic practices, particularly among healthcare professionals who constitute the frontline defense against this insidious threat. Nurses, as frontline healthcare workers, are integral to the COVID-19 response, playing a critical role in patient care, community education, and implementing infection control measures (Adams & Walls, 2020; Lee et al., 2021). Due to their vital role in patient care and engagement, nurses are more likely to be exposed (Giménez-Espert et al., 2020). In addition to being important for personal safety, understanding and strengthening adherence to COVID-19 preventive measures is also essential for the public health response to the pandemic. As of the last update in April 2023, the pandemic continues to challenge healthcare systems worldwide, demanding rigorous infection control practices, especially in high-risk environments such as hospitals (WHO, 2023). In Bangladesh, the healthcare system faces unique challenges due to the dense population, limited resources, and the need for comprehensive training in infection prevention and control (IPC) measures (Nath et al.,

2021). Nurses in Bangladesh, who form the backbone of healthcare service delivery, confront these challenges daily, often with inadequate personal protective equipment (PPE) and insufficient IPC training (Patwary et al., 2022). This study is situated within this complex backdrop. It aims to examine the adherence to COVID-19 prophylactic measures among nurses working in tertiary public hospitals in Dhaka, Bangladesh, where the burden of the pandemic has been particularly high. The focus on nurses is pertinent given that they have sustained extended patient contact times and are, therefore, at heightened risk of both contracting and transmitting the virus (Cinar et al., 2020). The timing of this study is critical as it captures a stage in the pandemic where the healthcare workforce in Bangladesh is likely to have been subjected to extended periods of stress, resource constraints, and potential virus exposure (Saha & Gulshan, 2021). A comprehensive review of prophylactic practices, including the use of PPE, hand hygiene, and social distancing within healthcare settings, can provide invaluable insights into the effectiveness of IPC measures adopted by nurses (Alhumaid et al., 2021). Building on previous research that delineates the positive impact of stringent IPC measures on reducing the incidence of hospital-acquired infections among healthcare workers (Kong et al., 2021). This study explores the extent to which these measures have been internalized and practiced by nursing staff in the context of Bangladesh. The findings aim to contribute to the literature on occupational health and safety practices amid a global health emergency, offering a comparative lens to understand regional differences in the implementation of IPC strategies.

## METHODOLOGY

In a meticulously structured cross-sectional study conducted within the confines of three prominent tertiary public hospitals in the heart of Dhaka, Bangladesh, data was collated for three months from October to December 2021. The demographic focus of this study was the nursing staff employed at the healthcare facilities. The sample size was determined as 384, adhering to the established statistical formula " $n = z^2pq/d^2$ ". This calculation was grounded on a 95% confidence interval and a level of significance of 5%. The sampling method adopted for the selection process was systematic random sampling, ensuring a representative and unbiased distribution of the study population. The instruments for data collection comprised a thoroughly vetted semi-structured questionnaire supplemented by direct interviews, thereby facilitating a comprehensive understanding of the participants' perspectives. To maintain stringent quality control measures, data validation procedures were routinely implemented. After the collection phase, the data was meticulously entered and processed using the

sophisticated software tools SPSS (version 26.0, Chicago) and Stata (version 13.0), which are widely recognized for their analytical prowess in the social sciences domain. The evaluation of the participants' practice was operationalized through a scoring system—each accurate response earned the respondent a point. The aggregation of these points provided a quantitative measure of their practice, which was subsequently categorized. A threshold of 60% correct responses demarcated the line between 'good' and 'poor' levels of practice. In line with ethical research practices, the study protocol was reviewed and received approval from the Faculty of Allied Health Sciences at Daffodil International University, Dhaka, Bangladesh. Before the onset of the data collection, informed consent was diligently acquired from all the participants, ensuring that they were aware of and agreeable to the research procedures.

## RESULTS

The study delineated a clear demographic profile of the nursing staff sampled. In terms of age distribution, a majority of the nurses fell within the 20 to 30-year age group, comprising 58.60% (n=225) of the sample. This was followed by those aged 31 to 40 years, representing 32.87% (n=126), while those between 41 to 50 years accounted for a smaller fraction of 4.60% (n=18). Nurses above the age of 50 were the least represented in the sample, constituting just 3.93% (n=15). Gender distribution was highly skewed, with female nurses constituting the vast preponderance at 96.20% (n=369), overshadowing male nurses who formed a mere 3.80% (n=15). In examining the highest educational attainment, the majority of nurses held a BSc in Nursing, accounting for 72.23% (n=277) of the participants. Those with a Diploma in Nursing were 22.92% (n=88), and a minority of 4.85% (n=19) had achieved a Master's degree or higher. Marital status varied amongst participants, with 60.59% (n=233) being married, 35.79% (n=137) unmarried, and the remainder being widows (1.45%, n=6), divorcees (1.30%, n=5), or others (0.87%, n=3). When considering their positions within the nursing staff, the majority were Staff Nurses, at 74.23% (n=285), followed by Attending Nurses at 21.24% (n=82), and a smaller number held positions as Chief or Head Nurses, making up 4.53% (n=17). The specific roles within the nursing profession were predominantly clinical, with 76.77% (n=295) of the nurses engaged in clinical nursing. Nursing management was the focus for 13.39% (n=51) of the sample, while 9.84% (n=38) were categorized under 'other' roles. In terms of years of experience, the cohort with 5-10 years of experience was the largest group, representing 43.47% (n=167) of the sample. Those with less than 5 years of experience constituted 27.85% (n=107), those with 11-15 years

comprised 17.86% (n=69), and those with more than 15 years were 10.82% (n=42). Lastly, concerning the departmental distribution, nurses working in general wards formed the largest group at 26.45% (n=102), closely followed by those in isolation wards (21.23%, n=82) and intensive care units (ICUs) (23.38%, n=90). Emergency department staff made up 7.29% (n=28), those in laboratory/imaging were 2.93% (n=11), and nurses in other departments represented 18.72% (n=72) of the sample (Table 01).

**Table 01: Socio-demographic characteristics of the respondents (n=384).**

Socio-demographic variables	Frequency	Percentage
<b>Age group</b>		
20 to 30 years	225	58.60
31 to 40 years	126	32.87
41 to 50 years	18	4.60
More than 50 years	15	3.93
<b>Gender</b>		
Male	15	3.80
Female	369	96.20
<b>Highest education attainment</b>		
BSc (Nursing)	277	72.23
Diploma (Nursing)	88	22.92
MS/Higher	19	4.85
<b>Marital status</b>		
Married	233	60.59
Unmarried	137	35.79
Widow	6	1.45
Divorcee	5	1.30
Others	3	0.87
<b>Position</b>		
Staff Nurse	285	74.23
Attending Nurse	82	21.24
Chief/Head Nurse	17	4.53
<b>Specific role</b>		
Clinical Nursing	295	76.77
Nursing management	51	13.39
Other	38	9.84
<b>Years of experience</b>		
<5 years	107	27.85
5-10 years	167	43.47
11-15 years	69	17.86
>15 years	42	10.82
<b>Working department</b>		
Isolation ward	82	21.23
General ward	102	26.45
ICU	90	23.38
Emergency	28	7.29

Laboratory/imaging	11	2.93
Others	72	18.72

This study rigorously assessed the adherence to COVID-19 preventative practices among 384 nursing professionals. It was found that a substantial majority, 91.35% (n=351), consistently consumed well-cooked food, particularly meat products, as a precautionary measure against COVID-19. Only a minuscule 0.76% (n=3) neglected this practice, while 7.89% (n=30) did so intermittently. Regarding personal care in the context of the pandemic, 72.90% (n=280) of the nurses reported regularly keeping themselves warm and hydrated. In contrast, 4.76% (n=18) never followed this practice, and a further 22.34% (n=86) did so occasionally. Hand hygiene, a critical preventive measure, was upheld by 80.17% (n=308) of the respondents who frequently used soap or sanitizer. A negligible 2.19% (n=8) of the sample never practiced this, while 17.64% (n=68) sometimes did. Avoiding close contact with individuals exhibiting cough and flu-like symptoms, a key to curbing transmission was adhered to often by 77.16% (n=296) of nurses, whereas a slight 1.65% (n=6) never did, and 21.19% (n=81) followed this guideline only sometimes. Personal Protective Equipment (PPE), vital for interactions with COVID-19 patients, was worn consistently by 89.46% (n=344) of the participants. Remarkably, none of the respondents reported never using PPE, and 10.54% (n=40) used it on a less consistent basis. In the context of hand hygiene specific to patient interactions and aseptic procedures, 84.76% (n=325) always performed hand hygiene. This was notably contrasted by the absence of any reports of never performing hand hygiene and a small percentage, 15.24% (n=59), doing so occasionally. When it came to hygiene after contact with patients' environments, a near-unanimous 98.47% (n=378) adhered to hand hygiene protocols. None of the surveyed nurses reported neglecting this practice, and only 1.53% (n=6) adhered to it sometimes. Most strikingly, adherence to social distancing practices was reported at an absolute rate, with 100% (n=384) of the respondents maintaining at least a 1-meter distance from both patients and healthcare colleagues, signifying complete compliance with this preventive guideline (Table 02).

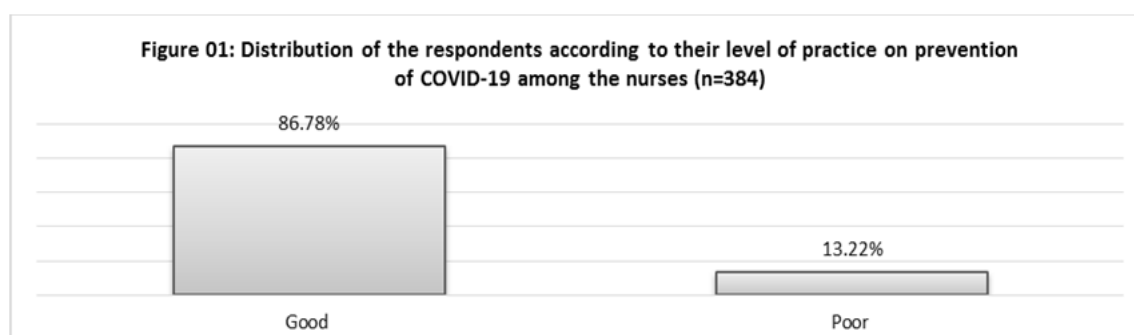
**Table 02: Distribution of the respondents according to their practice on prevention of COVID-19 among the nurses (n=384).**

Statement	Answer options					
	Often		Never		Sometimes	
	Freq.	%	Freq.	%	Freq.	%
I eat thoroughly cooked food, especially meat products	351	91.35	3	0.76	30	7.89



I am keeping myself warm and hydrated	280	72.90	18	4.76	86	22.34
I am using soap or sanitizer to wash their hands and face	308	80.17	8	2.19	68	17.64
I am avoiding close contact with people having cough and flu-like symptoms	296	77.16	6	1.65	81	21.19
During interaction with the COVID-19 patient, I wear the necessary personal protective equipment such as masks, gloves, gowns, etc.	344	89.46	0	0	40	10.54
I perform hand hygiene before and after touching COVID-19 patients or before and after performing an aseptic procedure	325	84.76	0	0	59	15.24
I perform hand hygiene after touching the patient's surroundings like beds, tables, doors, etc.	378	98.47	0	0	6	1.53
I avoid unnecessary close contact practice social distancing and keep at least 1-m distance from patients and other healthcare workers	384	100.00	0	0	0	0

In the exploration of the nursing staff's engagement with COVID-19 preventive practices, a significant majority of the nurses exhibited commendable compliance, with 86.78% (n=334) categorized as having a 'Good' level of practice in terms of COVID-19 prevention. This suggests a high level of vigilance and commitment to the implementation of safety measures among nursing professionals. On the other hand, a smaller segment, constituting 13.22% (n=50) of the respondents, fell into the 'Poor' practice category, indicating a relatively lower adherence to established preventive guidelines. These findings highlight a critical area for potential improvement in public health practice within the nursing community (Figure 01).



The study sought to establish a correlation between socio-demographic factors and the level of COVID-19 preventive practices among 384 nursing staff, divided into 'Good' (n=334) and 'Poor' (n=50) practice categories. The age group of 20 to 30 years showed a strong adherence to good practices with 87.56% (n=197), whereas 12.44% (n=28) were categorized as poor,

with statistical significance ( $p=0.019$ ), indicating a potential correlation between age and practice levels. In terms of gender, 88.08% ( $n=325$ ) of female respondents demonstrated good practices, compared to a lower percentage in males, with only 60.00% ( $n=9$ ) exhibiting good practices, but the  $p$ -value of 0.191 suggests this was not statistically significant. Educational attainment appeared to have a marginal association with practice levels; 87.00% ( $n=241$ ) with a bachelor's degree in nursing had good practices. In contrast, those with a master's or higher qualification showed a slightly better adherence rate of 89.47% ( $n=17$ ), though these differences did not reach statistical significance ( $p=0.087$ ). Marital status showed variation, with unmarried individuals demonstrating a higher percentage of good practices (91.97%,  $n=126$ ) compared to married respondents (84.12%,  $n=196$ ), but this was not statistically significant ( $p=0.102$ ). Different professional positions within the nursing staff also showed variations in practice levels. Staff Nurses had an 87.37% ( $n=249$ ) good practice rate, which was statistically significant ( $p=0.041$ ) when compared to other positions, suggesting that the role within the hospital may influence adherence to preventive practices. The years of experience revealed a significant correlation ( $p=0.034$ ); those with less than five years of experience had lower adherence to good practices (83.18%,  $n=89$ ), while those with over 15 years of experience had the highest adherence (95.24%,  $n=40$ ). Lastly, when analyzed by working department, the differences were not statistically significant ( $p=0.087$ ), yet those in 'Other' departments showed the highest adherence to good practices (93.06%,  $n=67$ ), and those in the General ward exhibited the lowest (81.37%,  $n=83$ ) (Table 03).

**Table 03: Association of the level of practice of the respondents with their socio-demographic characteristics.**

Socio-demographic characteristics	No. of respondents	Level of practice				P-value
		Good (334, 86.78%)		Poor (50, 13.22%)		
		Freq.	%	Freq.	%	
Age group						
20 to 30	225	197	87.56	28	12.44	0.019
31 to 40	126	110	87.30	16	12.70	
41 to 50	18	14	77.78	4	22.22	
More than 50	15	13	86.67	2	13.33	
Gender						
Male	15	9	60.00	6	40.00	0.191
Female	369	325	88.08	44	11.92	
Highest education attainment						
BSc (Nursing)	277	241	87.00	36	13.00	0.087
Diploma (Nursing)	88	76	86.36	12	13.64	



MS/Higher	19	17	89.47	2	10.53	
Marital status						
Married	233	196	84.12	37	15.88	0.102
Unmarried	137	126	91.97	11	8.03	
Widow	6	5	83.33	1	16.67	
Divorcee	5	4	80.00	1	20.00	
Others	3	3	100.00	0	0.00	
Position						
Staff Nurse	285	249	87.37	36	12.63	0.041
Attending Nurse	82	69	84.15	13	15.85	
Chief/Head Nurse	17	16	94.12	1	5.88	
Specific role						
Clinical Nursing	295	253	85.76	42	14.24	0.064
Nursing management	51	46	90.20	5	9.80	
Other	38	35	92.11	3	7.89	
Years of experience						
<5 years	107	89	83.18	18	16.82	0.034
5-10 years	167	142	85.03	25	14.97	
11-15 years	69	64	92.75	5	7.25	
>15 years	42	40	95.24	2	4.76	
Working department						
Isolation ward	82	69	84.15	13	15.85	0.087
General ward	102	83	81.37	19	18.63	
ICU	90	82	91.11	8	8.89	
Emergency	28	24	85.71	4	14.29	
Laboratory/imaging	11	10	90.91	1	9.09	
Others	72	67	93.06	5	6.94	

## DISCUSSION

The demographic characteristics of this nursing cohort, with a preponderance of younger female nurses, are consistent with global nursing demographics, which suggest a predominantly female workforce, often younger due to high turnover rates (Çamveren et al., 2020). The skew towards a younger age bracket, with 58.60% of our sample aged between 20 to 30 years, might reflect broader employment trends in healthcare, which often attract and retain younger professionals due to the demanding nature of the profession (van der Cingel & Brouwer, 2021). The findings regarding educational attainment, where the majority hold a BSc in Nursing, are in line with the increasing push for a baccalaureate-educated nursing workforce, as this is correlated with better patient outcomes (Yakusheva & Weiss, 2017). This emphasis on higher education within nursing may also reflect the rising complexity of healthcare, which demands a workforce with a solid foundation in evidence-based practice (Atkinson et al., 2021). The adherence to COVID-19 preventive practices among the nurses in this study was commendably high, notably in maintaining social distancing and hygiene

post-patient contact. This mirrors the findings of Lai et al. (2020), who reported that healthcare workers, especially those in direct patient care, showed high compliance with infection control measures during the pandemic. The universal compliance with social distancing practices in this study underscores the seriousness with which healthcare workers have adhered to pandemic guidelines, possibly influenced by their direct exposure to the consequences of non-compliance. Interestingly, this study found a significant correlation between age and the level of COVID-19 preventive practices, with younger nurses adhering more stringently to guidelines. This is contrary to some studies that suggest that more experienced staff may be better at compliance due to their years of ingrained practice and experience with previous healthcare emergencies (Gilbert & Kerridge, 2019; Hills et al., 2021). One possible explanation for this study's findings could be that younger nurses, being more recently educated, are closer to their training and may be more attuned to the latest protocols and guidelines. The data did not show a significant gender difference in the practice of COVID-19 preventive measures, which contrasts with findings from Shah et al. (2021), who reported that female healthcare workers were more compliant with such measures. The disparity in findings could be attributed to cultural differences in the study populations or variances in workplace policies and enforcement. The notable high compliance rate with hand hygiene protocols, specifically after patient contact (98.47%), is encouraging and echoes the critical importance of this practice as a cornerstone of infection control, as emphasized by numerous studies (Kashyap et al., 2021; Coetzer., 2018; Livorsi et al., 2018). The role of hand hygiene in preventing the spread of infection is well-established, and our findings reinforce its continued priority in nursing practice. Despite the overall high adherence to preventive practices, 13.22% of nurses with poor practice habits represent a concern. Comparing this to a study by Phelps & Reed (2016), which found a non-compliance rate of around 10% among hospital staff regarding hand hygiene, suggests that even in crisis conditions, there's room for improvement. This study suggests that targeted interventions might be most needed among those with less experience and those working in general wards, where adherence was notably lower. The positive correlation between years of experience and adherence to good practices could reflect the greater familiarity with the repercussions of infectious diseases that seasoned nurses have. This supports the notion that experience in the field not only provides clinical skills but also ingrains the habits that underpin effective infection control (Haines et al., 2023).

## CONCLUSION

The study reveals a positive correlation between the level of adherence to COVID-19 preventive measures among nursing staff and variables such as age and years of experience, with younger and more seasoned nurses showcasing higher compliance. Key findings indicate that the introduction of tailored educational programs on infection control across all age demographics could bolster this adherence further. To further enhance compliance, it is recommended that hospitals implement continuous education programs focusing on infection control, targeting all age groups and experience levels. Regular training sessions can reinforce the importance of protective measures. Additionally, it is advisable to conduct follow-up studies to assess the long-term adherence to these practices and identify any emerging gaps or challenges that nurses may face. Institutions should also recognize and address potential barriers to compliance, such as PPE shortages or understaffing, ensuring that nurses are supported and able to maintain high standards of practice for the safety of themselves and their patients.

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## Conflict of interest

The authors declared no conflict of interest for this study.

## Consent for publication

All authors have given their consent to publish this article.

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