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Original Article

KNOWLEDGE ATTITUDE & PRACTICE (KAP) ABOUT INFECTION PREVENTION CONTROL (IPC) AND WASTE MANAGEMENT DURING COVID-19 AMONG THE HEALTHCARE WORKERS IN PRIMARY LEVEL GOVERNMENT HOSPITALS IN BANGLADESH

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Abstract:

Infection prevention and control (IPC) is essential for reducing healthcare-associated infections by creating barriers between infectious agents and susceptible hosts. This study assessed the knowledge, attitudes, and practices (KAP) related to IPC and waste management among healthcare workers in primary-level government hospitals in Cumilla District, Bangladesh.

A cross-sectional descriptive study was conducted from August 2021 to September 2022 across 17 Upazilas, using a non-probability convenience sample of 261 healthcare workers. Data were collected via structured interviews and analyzed using Chi-square tests and logistic regression.

Results showed that 54.5% of participants had adequate IPC knowledge, 96.8% displayed positive attitudes, and 87.3% reported good IPC practices. Healthcare workers under 25 years were significantly less knowledgeable than older age groups (AOR=34.75; 95% CI: 4.532–266.554). Health assistants and nurses were 98% less knowledgeable compared to physicians. Diploma holders demonstrated lower knowledge than MBBS holders. Facilities with IPC teams were associated with higher knowledge levels (AOR=0.103; 95% CI: 0.035–0.307), while irregular hand hygiene training correlated with reduced knowledge (AOR=0.107; 95% CI: 0.029–0.388).

Although most healthcare workers reported good IPC practices and attitudes, gaps in knowledge persist—especially among non-physician staff and those with limited training opportunities. Strengthening regular training programs, establishing functional IPC committees, and improving supervision are crucial to enhance IPC compliance and reduce the risk of infection transmission in healthcare settings.

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Introduction:

Healthcare-associated infections (HCAIs) pose a significant public health challenge contributing to increased morbidity and mortality and rising health-care costs in developed and developing countries. They remain a major cause of preventable illness and death specially in low and middle income countries.[1] Healthcare-associated infection can be defined as "Infection occurring in a patient during the process of care in any healthcare facility which was not present or incubating at the time of admission". It also covers infections acquired in the hospital but appearing after discharge and occupational infections among the facility staff.[2] In developed countries, the prevalence of healthcare-associated infection ranges from 3.5% to 12%. With an average of incidence of 7.1% in European countries. According to the European Centre for Disease Prevention and Control, approximately 4.5 million HCAI cases affect around 431,000 patients annually in Europe. In the United States, the 2002 incidence rate was 4.5%, equating to 9.3 infections per 1,000 patient-days and affecting 1.7 million patients. On the other hand, low and middle-income nations have limited data, which is sometimes of poor quality. According to a recent WHO study, healthcare-associated illnesses are more common in resource-

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constrained settings than in developed ones. In low and middle-income nations, the prevalence of healthcare-associated infection fluctuates between 5.7 % and 19.1% at any one moment (3). High-quality studies report an average prevalence of 15.5%, nearly double that of high-income countries (8.5%). In these settings, the infection rate can reach 42.7 per 1,000 patient-days—nearly three times higher than in high-income countries.[3]

In Bangladesh, inadequate record-keeping and follow-up limit accurate data collection on HCAIs. Some urban hospitals report HCAI rates as high as 30%. Key infrastructural deficiencies—such as insufficient wash stations, lack of bedside hand sanitizers, and absence of isolation facilities—worsen the situation. Medical waste mismanagement and limited awareness of infection control practices among healthcare workers also contribute to increased risk. Yet, HCAIs can often be prevented using cost-effective strategies, such as implementing national and facility-level infection control measures.[4] et, HCAIs can often be prevented using cost-effective strategies, such as implementing national and facility-level infection control measures.[5] Infection prevention control programs are economical. An infection control program must include education for health care workers, HAI surveillance, proper regulations, and core infection control procedures.[6]

Infection prevention and control (IPC) is a scientifically driven, practical approach to minimizing infection risks for both patients and healthcare workers. According to the WHO, IPC draws on epidemiological data, health system strengthening, and infectious disease management. As IPC is relevant to every healthcare interaction, it is a cornerstone of patient safety and high-quality healthcare delivery.[7] Infection Prevention and Control is a systematic process or any procedures, policies, and activities which can establish a barrier between a microorganism and a vulnerable host and microorganisms which is targeted at reducing or preventing the risk of infectious disease transmission in a health care facility. It is found that standard precautions are most effective in preventing both occupational exposure incidents and associated infections.[8] Every healthcare facility should follow the IPC, and the physicians play a critical role in its implementation.

A novel coronavirus (SARS- COV-2), also known as COVID-19) was discovered in Wuhan, China, in December 2019.[9] From its first detection till date, around 200 million people are affected worldwide, with the death of more than 4 million.[10] In the last 20 years two more coronavirus outbreaks, SARS-CoV and MERS-CoV, have resulted in many cases across various countries. Due to a lack of understanding of the emerging threats and HCW face enormous problems and dangers because to the reliance on infection prevention and control (IPC) strategies that might not take into account all developing pathogen transmission patterns.[11]

The COVID-19 pandemic has exposed critical weaknesses in IPC practices across healthcare systems. HCWs face increased risk of infection and transmission due to frequent exposure to SARS-CoV-2.[12] Because of their frequent exposure to COVID-19, HCWs are at a higher risk of acquiring the disease and transmitting it to their families, colleagues, and to other patients.[13]

Human-to-human transmission often occurs through respiratory droplets or contaminated surfaces (fomites), with evidence also suggesting the virus's presence in blood, sputum, urine, feces, and tears. SARS-CoV can survive up to nine days on surfaces and up to 96 hours in various body fluids.[14] Therefore, implementing strict IPC measures can protect healthcare workers from such pathogens.

A comprehensive approach is necessary to improve the prevention and control of such infections in countries with limited resources. This will be built on enhanced healthcare structures, increased knowledge, practical instructions, behavioral and attitude changes, as well as the effective and efficient use of previously available resources and internal cooperation. The only methods of reducing and protecting HCWs and patients from episodes of HCAIs and unnecessary injuries is to comply with IPC measures.

Standard and additional precautions have been suggested by both the WHO and the CDC. Standard Precautions are the most basic IPC procedures that should be followed in all patient-care settings, regardless of whether the patient is infected or not. It must be followed at all times when health care is provided. These procedures are intended to keep Health Care Personals safe while also preventing them from transmitting diseases to their patients. These procedures are aimed at keeping HCPs safe while also preventing them from transmitting diseases to their patients. However, standard precautions include

things like hand washing, respiratory hygiene, coughing etiquette, the use of personal protective equipment, safe injection techniques, sharps management, injury prevention, safe handling, cleaning, and disinfection of patient care equipment, sterile instruments and devices, clean and disinfected environmental surfaces, and waste management.[15]

Additional IPC practices, in addition to standard precautions, are advised as a part of health care delivery to all patients during COVID-19 pandemic. These guidelines are designed for all patients, not only those who have been diagnosed with SARS-CoV-2.[16] For efficient IPC implementation in this COVID-19 circumstance, the following methods should be implemented in all health care settings. These include ensuring triage, early detection, source control, standard precaution application for all patients, contact and droplet precautionary measures along with airborne precautions for aerosol generating procedures, effective administrative control and using environmental control.

The knowledge and compliance of healthcare workers are critical for effective IPC. However, poor understanding of IPC standards and limited awareness of preventive practices significantly hinder compliance. Often, IPC only garners attention during outbreaks, despite being a longstanding issue in healthcare settings. Proper training, behavior change, and continuous education are key to overcoming these barriers and reducing HCAIs .[17] In order to overcome these obstacles, effective training and education are the pillars of improving IPC practices. To minimize HAIs in Bangladesh, we need enhanced healthcare systems, effective guidelines, behavioral changes, and attitude adjustment. An efficient infection control program ensures that both service providers and service recipients are protected. On the other hand, excellent knowledge does not always imply good IPC practice. Despite well-established standards for the prevention of HAIs, certain HCWs may have been found to be noncompliant with IPC .[18] To overcome these obstacles, effective training and education are the pillars of improving IPC practices.

Methods:

Study place, population and period

This cross-sectional study was carried out among 220 healthcare workers working in primary care hospitals of different upazilas of Cumilla district, Bangladesh. The study period was from July 2021 to January 2022. This study specifically targeted healthcare workers with experience of more then one year in experience. Health care workers exhibiting unwillingness to participate in the study or those who refused to give informed consent were excluded. Non-probability type of convenient sampling will be used as sampling technique.

Data collection instrument

Semi structured questionnaire was used for data collection. The questionnaire was divided into two sections. The first section gathered information on sociodemographic profiles and professional characteristics including facility type, age, sex, HCW type. Education level, work experience etc. The second section assessed the knowledge, attitude and practice related to infection prevention and control (IPC). The responses were collected through multiple-choice questions and Likert scale items with options varying based on the questions asked.

Data Management & Analysis Plan

A computer-based software SPSS was used for processing and analysis of the data. For data analysis, various statistical methods were used. When the P-value was less than 0.05 with a 95% confidence interval, it was considered statistically significant. T-test and chi-square test was done to assess the relationship between outcomes and independent variables.

Result

Sociodemographic Characteristics:

A total of 220 HCWs were participated and included in the study. Among 220 respondents 74 (33.6%) were males and 146 (66.4%) were females (N=220) (Figure 1). Of the study participants, 24 (10.9%) of HCWs were less than 25 years old and 113 (51.4%) were in the age group of 26-35 years, 57 (25.9%) were in the age group of 36-45 years and 26 (11.8%) were range in the age group of above >45 years. The mean age of the respondent was 34.92 (SD ± 8.6) and majorities 78.6% of them were Muslim. Concerning the professional categories of respondents 66 (30.0%) were Doctors, five were Health assistants, 98 (44.5%) were Nurses, 15 (6.8%) were midwives and 36 (16.4 %) were cleaners (Figure 2). Most of the respondents had work experience between 6-20 years 116 (52.7%), 75 (34.1%) of the respondents were with service years of less than five years. Regarding educational status

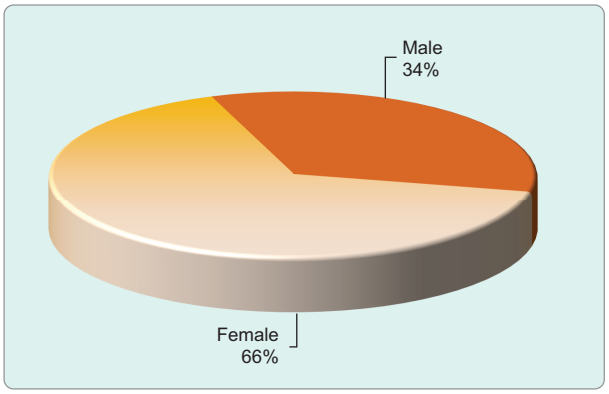

Figure 1: *Sex distribution of the respondents in percentage*

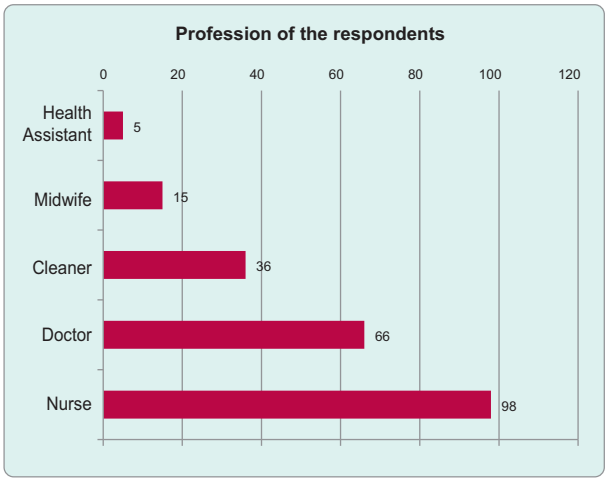

Figure 2: *Profession of the respondents*

66 (30.0%) of them were MBBS, 113 (51.4%) were Diploma and 36 (16.4%) were below HSC level (Figure 3). As the study place were primary healthcare centers

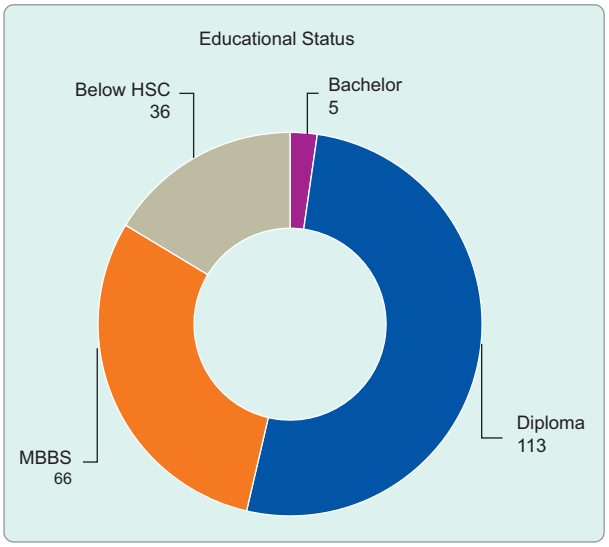

Figure 3: *Educational Status of the respondents*

that's why the maximum number of participants 159 (72.3%) were from Upazilla health complex. (Table I).

Knowledge about Infection Prevention and Control:

Among the study respondent's majority of 154 (70.0%) responded that they know about infection prevention and control. Among them, 53 (24.1%) of the respondents did not hear about infection prevention control before COVID-19. Ninety-One (41.4%) of the health care workers knew about the triage system. Among the respondent's majority, 90% and 91.8% knew about the recommended guideline for hand hygiene and the seven steps of handwashing. More than half of the respondents (54.1%) haven't known about the liquid spill management guideline. And half of the respondents didn't know concerning the preparation formula for preparing 0.5% chlorine solution (Table 5). In general, 120 (54.5%) of HCWs have good knowledge of infection prevention and control and 100 (45.5%) have poor knowledge (Figure 4).

Attitude on infection prevention and control measures

Out of 220 study participants 196 (89.1%) of HCWs had a positive attitude in asking every patient if they have any symptoms of infection and 24 (10.9%) had negative. Out of 220 respondents 188 (85.5) HCW advice very often to every patient to wear a mask. Of the total participants, 155 (70.5%) reported that they very often instructed coughing patients to follow cough hygiene procedures when coughing or sneezing, while 42 (19.1%) indicated that they did so only sometimes. Less than half of the respondents 84 (38.2%) ask very often the patients about hand washing before entering the hospital or ward, 35 (15.9%) never asked any patients. Most of the participants 213 (96.8%) had a positive attitude toward following any special advice by the hospital IPC committee.

Practice towards infection prevention measures

In this study Among the respondent, 191 (86.8%) very often wash their hands before and after contact with patients, and 11 (5%) of them wash sometimes. Of total respondents 98 (44.5%) often maintain proper hand wash technique while 39 (17.7%) sometimes followed. Maximum respondents 144 (65.5%) discard waste immediately into the container and 99 (45) empty the container while they are three-quarter full very often and 26 (11.8%) and 51 (23.2%) follow sometimes respectively. Most of the HCW 131 (59.5%) very often change chlorine solution within 24 hours, 23 (10.5%) sometimes and four (1.8%) responded never change chlorine solution within 24 hours (Table

Table-I

Descriptive characteristics of the participant and their relationship to IPC knowledge, attitude, practice, and knowledge of waste management (N=220)

Variable	N	%	IPC		Waste management procedures		
			SD	Knowledge	Attitude	Practice	Knowledge
			*P value**	*P value**	*P value**	*P value**	
Age (in years)							
<25	24	10.91	8.6	*<0.001*	0.842	*0.001*	*0.007*
26-35	113	51.36					
36-45	57	25.91					
>45	26	11.82					
Gender							
Male	74	33.64	,47	0.297	*<0.001*	0.050	0.296
Female	146	66.36					
Profession							
Physician	66	30.00	1.6	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Health Assistant	5	2.27					
Nurse	98	44.55					
Midwife	15	6.82					
Cleaner	36	16.36					
Educational status							
MBBS	66	30.00	1.08	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Undergraduate	118	53.64					
Below 12th standard	36	16.36					
Work experience							
< 5 years	75	34.09	7.92	0.133	0.115	0.145	*<0.001*
6-20 years	116	52.73					
> 20 years	29	13.18					
Level of facility							
Tertiary level	61	27.73	0.5	0.196	0.805	*<0.001*	*<0.001*
Primary and Secondary level	159	72.27					
Religion							
Islam	173	78.64	.45	*<0.001*	0.565	0.558	0.881
Hinduism	44	20.00					
Buddhism	3	1.36					

*Chi square test done; p value bold and italic=significant

N= Total participant, IPC=Infection control and prevention

5). In general, 192 (87.3%,) of HCWs have good practice towards infection prevention and control measures and the remaining 28 (12.7%) of health care workers have poor practice. (Table II).

Profession, Educational status, and facility level of the respondents were found associated with the practice of IPC in the bivariate analysis.

Knowledge of waste management

Of the 220 respondents Majority of the HCW 178 (80.9%) know about the waste management protocol of the facility. Regarding the laundry and cleaning procedures of the facility 157 (71.4%) responded positively and 48 (21.8%) responded negatively and 15 (6.8) responded that they do not know. 144 (65.5%)

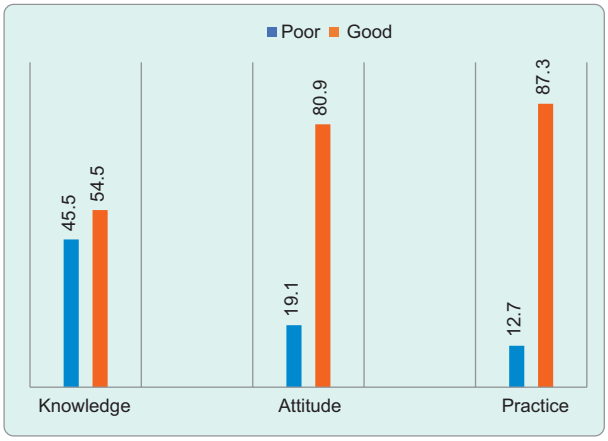

Figure 4: *Knowledge, Attitude and Practice regarding IPC of the respondents*

know about the waste segregation process of their facility. Out of 220 respondents 68 (30.9%) believes that there are no coordination between clinical staff and waste management staff whereas 35 (15.9%) responded that they don't know about the coordination.

Infection Control Training, Competency, and Implementation of Policies

Among the 220 respondents only 54(24.50%) has responded that they have IPC committee in their facility, majority 103 (46.8%) responded that they don't have any IPC team in their facility, 63 (28.6%) don't know about IPC team. The majority of the HCWs 138 (62.7%) responded that they sometimes received training on IPC and 57 (25.9%) responded that they never received any IPC training. Frequency of hand hygiene training takes place very often according to 32 (14.5%) respondents, often by 84 (38.2%) and never from 43 (19.5%) respondents. Among 220 respondents 155 (70.5%) responded that there is no system for reporting accidental exposure to blood and body fluids (Table III).

The facility which has IPC team are more knowledge than those who don't have (AOR=.103, 95% CI:.035-.307), Triage facility 76% less (AOR= .495; 95% CI:.236-1.037), The respondents who received Hand hygiene training sometimes are 89% less knowledgeable than who received often (AOR= .107; 95% CI: .029-.388)

Table-II

Practice towards infection prevention measures of HCWs

	Variables	Level of knowledge	Frequency (N)	Percentage
Practice on IPC				
Do you wash your hands before & after contact with patients?	Very often	191	86.8 %	.110
	Often	18	8.2 %	
	Sometimes	11	5.0 %	
	Never	0	0 %	
Do you maintain proper hand washing techniques each time?	Very often	83	37.7 %	*.009*
	Often	98	44.5 %	
	Sometimes	39	17.7 %	
	Never	0	0 %	
Do you discard wastes immediately into their container?	Very often	144	65.5 %	*.007*
	Often	50	22.7 %	
	Sometimes	26	11.8 %	
	Never	0	0 %	
Do you dispose containers when they are three-quarter full?	Very often	99	45.0 %	*<.001**
	Often	69	31.4 %	
	Sometimes	51	23.2 %	
	Never	1	.5 %	
Do you change chlorine solution after 24h?	Very often	131	59.5 %	*<.001**
	Often	62	28.2 %	
	Sometimes	23	10.5 %	
	Never	4	1.8 %	
Do you follow the safety precautions for the disposal of sharp waste?	Very often	152	69.1 %	*<.001**
	Often	44	20.0 %	
	Sometimes	22	10.0 %	
	Never	2	.9 %	

*Chi square test done; p value bold and italic=significant
N= Total participant, IPC=Infection control and prevention

Table-III

Infection Control Training, Competency, and Implementation of Policies at workplace and their relation to IPC knowledge, attitude, and practice (N=220)

N	%	Infection prevention and control measures Knowledge *P value**	 Attitude *P value**	 Practice *P value**	
Availability of infection control team					
Yes	54	24.55	*<0.001*	*<0.001*	*0.023*
No	103	46.82			
Don't Know	63	28.64			
Availability of triage system					
Yes	91	41.36	*<0.001*	*<0.001*	*<0.001*
No	53	24.09			
Don't Know	76	34.55			
Frequency of IPC training					
Very often	2	0.91	*<0.001*	*<0.001*	*<0.001*
Often	23	10.45			
Sometimes	138	62.73			
Never	57	25.91			
Frequency of Hand hygiene training					
Very Often	32	14.55	*<0.001*	*<0.001*	*<0.001*
Often	84	38.18			
Sometimes	61	27.73			
Never	43	19.55			
System for reporting accidental exposure					
No	155	70.45	0.106	0.365	*<0.001*
Don't Know	65	29.55			

*Chi square test done; p value bold and italic=significant
N= Total participant, IPC=Infection control and prevention

Table-IV

IPC knowledge, attitude and practice and knowledge of waste management and associated factors (N=220)

	N (%)	IPC Knowledge *P value**	IPC attitude *P value**	IPC practice *P value**
IPC Knowledge				
Poor	100(45.45)			*<0.001*
Good	120(54.55)			
IPC attitude				
Negative	42(19.09)	*0.036*		
Positive	178(80.91)			
IPC practice				
Poor	28(12.73)		*0.025*	
Good	192(87.27)			
Waste management knowledge				
Poor	73(33.18)	*0.039*	*<0.001*	0.761
Good	147(66.82)			

*Chi square test done; p value bold and italic=significant
N= Total participant, IPC=Infection control and prevention

Table-V

Knowledge towards Infection prevention control practices and measures (N=220)

Variables	Level of knowledge	Frequency	Percentage
Do you have knowledge about infection prevention Control?	Yes	154	70.0%
	No	64	29.1%
	I don't know	02	0.9%
Have you heard about infection prevention Control	Yes	167	75.9%
before COVID-19?	No	53	24.1%
	I don't Know	00	00%
Do you know about Triage system?	Yes	91	41.4%
	No	64	29.1%
	I don't know	65	29.5%
Do you know about the guidelines on standard	Yes	106	48.2%
precautions for infection prevention?	No	109	49.5%
	I don't know	5	2.3%
Do you know about the recommended guidelines for	Yes	198	90%
hand hygiene	No	22	10.0%
	I don't Know	00	00%
Do you know about the effectiveness of hand washing	Yes	202	91.8%
in preventing disease?	No	18	8.2%
	I don't Know	00	00%
Do you know the 7 steps of hand washing	Yes	193	87.7%
	No	27	12.3%
	I don't Know	00	00%
Do you know about liquid spill management?	Yes	70	31.8%
	No	119	54.1%
	I don't Know	31	14.1%
Do you know about safe injection practice?	Yes	185	84.1%
	No	29	13.2%
	I don't Know	6	2.7%
Do you know how to prepare hypochlorite solution?	Yes	103	46.8%
	No	110	50.0%
	I don't Know	7	3.2%
Do you know about nosocomial infection?	Yes	132	60.0%
	No	86	39.1%
	I don't Know	02	0.9%

Discussion

This study assessed the knowledge, attitude, and practices (KAP) of healthcare workers (HCWs) on Infection Prevention and Control (IPC) within primary-level government health care facilities. The findings suggest that a considerable proportion of HCWs possess satisfactory knowledge and demonstrate adequate IPC practices. However, gaps remain in attitudes and in the consistent application of preventive measures.

Age was found to be significantly associated with both IPC knowledge and practice. This is consistent with findings from a study conducted in Ethiopia, where older HCWs were more likely to exhibit better IPC practices, likely due to increased work experience and exposure to training opportunities.[11] Similarly, this study found that attitude toward IPC was significantly associated with gender, aligning with previous research from Nepal which highlighted gender-related differences in risk perception and compliance with IPC guidelines.

Educational status and profession were significantly associated with all three components of KAP. Higher educational attainment and professional roles such as nursing or medical officers were linked with stronger IPC knowledge and practice, echoing results from a study in Nigeria which showed that professional role and training level had a direct impact on IPC compliance.[33]

Knowledge about waste management was significantly associated with education level, professional background, and the facility level. This corresponds with findings from studies in India and Pakistan, which emphasized the importance of targeted training in biomedical waste management for improved IPC compliance at all facility levels.[34]

Availability of IPC-related resources—such as medical masks, alcohol-based hand rub, disposable gloves, and environmental disinfectants—was significantly associated with better IPC practices. This finding mirrors research conducted in Bangladesh and Kenya, which reported that resource availability is a key enabler of IPC adherence.[35]

Training also played a pivotal role. Frequency of IPC training, hand hygiene training, and the presence of triage systems were all significantly associated with knowledge, attitude, and practice. This is supported by global studies during the COVID-19 pandemic, which showed that continuous training and on-site simulation exercises significantly improve IPC performance and staff readiness.

Despite these insights, this study had several limitations. The sample size was small and restricted to a single district, limiting the generalizability of findings to the national level. Furthermore, the cross-sectional design precludes establishing causal relationships between variables. Also, due to the limited geographical and facility-level scope, the study could not fully capture the influence of broader socioeconomic and demographic determinants or their linkage to health outcomes.

Conclusion and Recommendation

The practice of Infection Prevention and Control (IPC) among healthcare workers is generally good; however, there are gaps in knowledge in certain areas. The key factors that influence are age, profession, educational background. Doctors and nurses tend to have better knowledge while other healthcare workers have less awareness and receive less training on IPC and hand hygiene. regular practice sessions and training programs should be organized, especially for cleaning staff, to refresh their knowledge and reduce errors in IPC practices. Additionally, ongoing supervision and monitoring are recommended. Establishing an IPC committee within the facility is essential for effective oversight. due to the small sample size of this study, we cannot draw definitive conclusions about the overall knowledge, attitudes, and practices of healthcare workers regarding IPC. Since there has not been a similar study conducted in the country, this research can serve as a valuable reference for future studies on a larger scale.

Appendix

Questionnaire

Title: Knowledge, attitude & practice (KAP) about Infection Prevention Control (IPC) and waste management during COVID-19 among the healthcare workers in primary level government hospitals in Bangladesh".

I will appreciate if you could complete the following table.

Any information obtained in connection with this study that can be identified with you will remain confidential. Please read the questions carefully. Once you have read the questions, please select one of the options below based on how you know with the statement provided,

Section-1

Socio-demographic information of respondents:

Sl no.	Questions	Options	Remarks
1.1	Name of the respondent		
1.2	Name of the facility		
1.3	Level of the facility	¨ Medical College Hospital	
		¨ District Hospital	
		¨ Upazilla Health Complex	
		¨ Union Sub-center	
		¨ Community Clinic	
1.4	Age (in years)		
1.5	Religion	¨ Islam	
		¨ Hinduism	
		¨ Buddhism	
		¨ Christianity	
		¨ Others	
1.6	Sex	¨ Male	
		¨ Female	
1.7	Profession	¨ Doctor	
		¨ Health assistant	
		¨ Nurse	
		¨ Midwife	
		¨ Lab technologist	
		¨ Cleaner	
		¨ Other	
1.8	Educational status	¨ MBBS	
		¨ Bachelor	
		¨ Diploma	
		¨ Below HSC	
1.9	Work experience (In years)		

Section-2

Knowledge on infection prevention measures:

Sl no.	Questions	Options	Remarks
2.1	Do you have knowledge about infection prevention Control?	¨ Yes ¨ No ¨ I don't know	
2.2	Have you heard about infection prevention Control before COVID-19?	¨ Yes ¨ No ¨ I don't know	
2.3	Do you know about Triage system?	¨ Yes ¨ No ¨ I don't know	
2.4	Do you know about the guidelines on standard precautions for infection prevention?	¨ Yes ¨ No ¨ I don't know	
2.5	Do you know about the recommended guidelines for hand hygiene	¨ Yes ¨ No ¨ I don't know	
2.6	Do you know about the effectiveness of hand washing in preventing disease?	¨ Yes ¨ No ¨ I don't know	
2.7	Do you know the 7 steps of hand washing	¨ Yes ¨ No ¨ I don't know	
2.8	Do you know about liquid spill management?	¨ Yes ¨ No ¨ I don't know	
2.9	Do you know about safe injection practice?	¨ Yes ¨ No ¨ I don't know	
2.10	Do you know how to prepare hypochlorite solution?	¨ Yes ¨ No ¨ I don't know	
2.11	Do you know about nosocomial infection?	¨ Yes ¨ No ¨ I don't know	

Section-3

Attitude on infection prevention and control measures

Sl no.	Questions	Options	Remarks
3.1	Do you feel comfortable asking every patient if they have any symptoms of infection?	¨ Yes ¨ No ¨ I don't know	
3.2	Do you advice every patient to wear a mask?	¨ Very often ¨ Often ¨ Sometimes ¨ Never	
3.3	Do you tell coughing patients to follow cough hygiene and etiquette?	¨ Very often ¨ Often ¨ Sometimes ¨ Never	
3.4	Do you ask the patient about hand washing before entering the hospital?	¨ Very often ¨ Often ¨ Sometimes ¨ Never	
3.5	If you receive any special advice by the hospital infectious committee for COVID-19 would you follow them?	¨ Yes ¨ No ¨ I don't know	
3.6	Do you believe Personal Protective Equipment's (PPE) protect HCWs from infection?	¨ Yes ¨ No ¨ I don't know	

Section-4

Practice towards infection prevention measures

Sl no.	Questions	Options	Remarks
4.1	Do you wash your hands before & after contact with patients?	¨ Very often ¨ Often ¨ Sometimes ¨ Never	
4.2	Do you maintain proper hand washing techniques each time?	¨ Very often ¨ Often ¨ Sometimes ¨ Never	
4.3	Do you discard wastes immediately into their container?	¨ Very often ¨ Often ¨ Sometimes ¨ Never	
4.4	Do you dispose containers when they are three quarter full?	¨ Very often¨ ¨ Often ¨ Sometimes ¨ Never	
4.5	Do you change chlorine solution after 24h?	¨ Very often ¨ Often ¨ Sometimes ¨ Never	
4.6	Do you follow the safety precautions for disposal of sharp waste?	¨ Very often ¨ Often ¨ Sometimes ¨ Never	

Section-5

Availability of infection control resources/supplies at their facilities.

Sl no.	Questions	Options	Remarks
5.1	Clean running water	¨ Always available ¨ Sometimes available ¨ Very rarely available ¨ Not available	
5.2	Medical (surgical or procedural) masks	¨ Always available ¨ Sometimes available ¨ Very rarely available ¨ Not available	
5.3	Hand-washing soap/liquid soap	¨ Always available ¨ Sometimes available ¨ Very rarely available ¨ Not available	
5.4	Alcohol based hand rub	¨ Always available ¨ Sometimes available ¨ Very rarely available ¨ Not available	
5.5	Disposable latex gloves	¨ Always available ¨ Sometimes available ¨ Very rarely available ¨ Not available	
5.6	Environmental disinfectant(e.g., chlorine, alcohol)	¨ Always available ¨ Sometimes available ¨ Very rarely available ¨ Not available	
5.7	Color coded bins	¨ Always available ¨ Sometimes available ¨ Very rarely available ¨ Not available	

Section-6

Healthcare workers' awareness and knowledge of waste management procedures in their facilities.

Sl no.	Questions	Options	Remarks
6.1	Do you know the waste management protocols in your facility?	¨ Yes ¨ No ¨ I don't know	
6.2	Do you know that laundry and cleaning procedures in your facility?	¨ Yes ¨ No ¨ I don't know	
6.3	Do you know how to dispose medical waste other than sharps boxes in your facility?	¨ Yes ¨ No ¨ I don't know	
6.4	Do you know about the waste segregation process of the facility?	¨ Yes ¨ No ¨ I don't know	
6.5	Do you know if there is coordination between clinical staff and waste management and cleaning staff?	¨ Yes ¨ No ¨ I don't know	

Section-7

Infection Control Training, Competency, and Implementation of Policies

Sl no.	Questions	Options	Remarks
7.1	Is there an infection control team in your facility?	¨ Yes ¨ No ¨ I don't know	
7.2	Triage system in the facility?	¨ Yes ¨ No ¨ I don't know	
7.3	How frequently do healthcare workers receive training regarding IPC in your facility?	¨ Very often ¨ Often ¨ Sometimes ¨ Never	
7.4	Did you receive any training in hand hygiene and standard precautions?	¨ Very often ¨ Often ¨ Sometimes ¨ Never	
7.5	Is there any procedure in place for reporting accidental blood and body fluid exposure?	¨ Yes ¨ No ¨ I don't know	

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