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Knowledge, attitude and practice of infection prevention and control among health-care workers at a regional referral hospital in Uganda. A cross-sectional survey.

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Abstract

Background:

The burden of hospital-acquired infections is highest in low- and middle-income countries, with rates of as high as 16% being documented, yet already burdened with a high prevalence of highly transmissible infectious diseases like Hepatitis B and HIV. This study aimed to assess the knowledge, attitudes, and practices of infection prevention and control (IPC) among healthcare workers (HCWs) at a tertiary regional referral hospital in Uganda.

Methods:

A hospital-based cross-sectional study was conducted using a pre-tested structured questionnaire among 144 participants. The healthcare workers were selected through a systematic random sampling technique. Multivariate logistic regressions were computed to identify associated factors of knowledge, attitude, and practice (KAP) of infection prevention and control, with variables having a p-value < 0.05 being considered statistically significant.

Results:

The proportions of adequate knowledge, good attitude, and practices of IPC among HCWs were 85.2%, 82.3%, and 59.8%, respectively. Advanced age (OR 1.19, 95% CI: 1.00–1.33, p-value = 0.040), male sex (OR 5.92, 95% CI: 1.02–34.5, p-value = 0.048), and longer years of work experience (OR 0.02, 95% CI: 0.00–0.47, p = 0.015) were significantly associated with high KAP scores above 70. However, having IPC training experience, the presence of infection prevention guidelines, and adequate PPE supply at the workstation did not show statistically significant associations with a KAP score above 70.

Conclusions:

The findings of this study revealed a good knowledge and attitude of infection prevention in the majority of healthcare workers, with a relatively minimal practice rate. Sociodemographic factors like age, sex, and work experience were associated with high KAP scores.

Recommendation:

Further qualitative research on behavioural factors associated with KAP on infection prevention and control is also recommended.

Keywords: *Knowledge; Attitude; Practices; Infection; Prevention; Healthworkers; Uganda.*
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Background

The spread of infections within hospital settings is largely attributed to the failure to adhere to standard precautions on infection prevention, including hand washing, mask-wearing, use of hand sanitizer, and changing gloves between clients, among other measures [1–3]. The

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knowledge, attitudes, and practices of healthcare workers contribute greatly to the spread of infections in hospitals. This often is seen with new symptoms in patients during hospital stays or soon after discharge, a term known as nosocomial infection or hospital-acquired infection [4].

Blood, body fluids, secretions, and excretions (urine, sweat, stool) may contain transmissible infectious agents. Therefore, strict adherence to standard precautions like hand hygiene, use of appropriate personal protective equipment (PPE), safe management of sharps, blood spills, and medical waste handling can ably reduce patients' and healthcare workers' exposure to disease-causing microorganisms [5].

Studies among healthcare workers have shown high rates of occupational exposure to HIV (3.5%) and Hepatitis B virus (40%) infections, and global statistics on needle stick injuries among healthcare workers during their career time were estimated at 56.2% [6]. Acute respiratory illnesses like pneumonia are common among hospitalized children due to cross-contamination from medical equipment like nasal prongs, face masks, bulb syringes, and the like [7].

The coronavirus 2019 (COVID-19) disease caused by the novel SARS-CoV-2 human coronavirus underscored the need for effective disease control measures within healthcare settings. The high transmissibility and yet asymptomatic super-spreading state placed many front-line health workers at an increased risk of the infection [8,9]. During the heightened phase of the COVID-19 pandemic, morbidity and mortality rates among healthcare workers in Uganda were reported at 52.8% and 58.8%, respectively [10].

Tertiary health facilities like regional referral hospitals (RRH) generate a huge amount of biomedical waste from various medical procedures, which has a high potential for infection. Therefore, healthcare workers must put into practice measures (also known as standard precautions) for not only protecting themselves but also patients seeking care from these institutions. [11]. The burden of hospital-acquired infections is highest in low- and middle-income countries, with rates of as high as 16% being documented in a setting with a high prevalence of highly transmissible infectious diseases like Hepatitis B and HIV. Studies have correlated the current antimicrobial resistance trends with such hospital-acquired infections. [2]. Therefore, implementing effective and impactful infection prevention initiatives within the hospital will have a lasting impact not only on the providers but also on the clients/patients. The study aimed to assess the knowledge, attitudes, practices, and associated factors among healthcare workers at a regional referral hospital in Uganda.

Methods

Study design and setting

A hospital-based cross-sectional study was carried out from 1st October 2025 to 20th October 2025. The study was carried out at Kayunga Regional Referral Hospital. The study was conducted across all departments, wards, and clinics operated within Kayunga Regional Referral Hospital (RRH) located in Kayunga district in the central region of Uganda, approximately 51 kilometres (32 mi) north-east of Mukono, and about 67.5 kilometres (42 mi) north-east of Mulago National Referral Hospital. The hospital has a total bed capacity of 300, with inpatient and outpatient departments. The hospital serves as a regional referral for six districts of Luwero, Nakaseke, Nakasongola, Buikwe, Kayunga, and Buvuma [13].

Study participants

All health workers at Kayunga RRH were eligible to participate in the study. The selected health workers were representatives of all departments, wards, and clinics operated within the hospital.

Sample size determination and procedure

The sample size estimation formula, $n = (z\alpha/2)2 / p (1-p)/d2$, for a single proportion was used to obtain the study sample size. [14]. If we estimated a 95% confidence interval, allowing for an error in the region of plus or minus 5%, also taking the prevalence rates of hospital-acquired infection as a proxy indicator for the study variables as 16%, a sample size of 48 health workers would be obtained. Since we had three variables (i.e., knowledge, attitude, and perception), we multiplied 48 by 3 and got 144 as the sample size.

Selection criteria

All healthcare workers at Kayunga RRH, irrespective of work experience and who had consented to take part in the study, were included, and these had qualifications of clinical officers, laboratory technicians, medical officers, nurses, midwives, and medical specialists. Healthcare workers who were not physically available and inaccessible to take part in the interviews were excluded. Also, non-medical staff at the hospital were excluded from the study. Systematic random sampling was employed to identify the study population by using lists of healthcare workers posted in each ward/Unit of the hospital as a sampling frame. The first participant was selected randomly.

Variables of the study and measurements

The independent variables in this study included demographic characteristics like sex, age in years, cadre of health workers, years in service, level of education, and

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marital status. The dependent variables were knowledge, attitude, and practices on infection prevention and control (IPC). Knowledge of infection prevention was measured using a cumulative score of 14 questions, with twelve requiring '1-yes' OR '2-no' responses while two questions needed a 'correct-1' OR 'wrong-2' response. Participants who scored above the value of 70 for the cumulative knowledge score were labelled as "Knowledgeable". Eleven questions were designed to assess participants' attitudes regarding infection prevention. A good attitude was defined as participants whose responses were above the value of 70 for attitude assessment questions. Likewise, eleven questions were designed to assess participants' practices regarding infection prevention. Good practice was defined as participants whose responses were above the value of 70 for practice assessment questions.

Data collection and quality control

An interviewer-administered structured questionnaire adopted from a previous study [15] was used to collect data by trained research assistants. The tool was modified to meet the study's expectations. Pre-testing was done among ten healthcare workers at the hospital who were not included in the actual study. Feedback from the pre-test was incorporated before actual data collection. The completeness, consistency, and accuracy of the collected data were examined by the principal investigator daily.

Data processing and analysis

Data entry, cleaning, and statistical analysis were conducted using STATA version 18.5. Descriptive analyses were performed to summarise demographic details, such as age, sex, work experience, and marital status, as well as key outcome measures using frequencies for categorical variables, medians, and interquartile ranges. Bivariate analyses explored associations between socio-demographic factors and knowledge, attitude, and practice (KAP) scores, with statistical significance evaluated using chi-square p-values. Logistic regression models to determine factors significantly associated with achieving a KAP score above 70. Variables with p-values less than 0.2 were selected and included in the model, and through backward elimination, a parsimonious model was arrived at.

Ethics approval and consent to participate

The study protocol was reviewed and approved by the Mildmay Uganda Research Ethics Committee (MUREC) under IRB number MUREC-2024-424. Data was collected with the informed consent of healthcare workers after being informed about the objectives, procedures, potential risks, and benefits of the study. Written and signed consent forms were obtained from each participant. There was no personally identifying information exposed to external 3rd parties, and coding for participant identification was done to ensure anonymity. The consent of potential study participants was obtained by trained study staff who had relevant ethics certification (i.e., GCP and or HSP). Written informed consent was documented with a signature and date on the consent form, and where a staff member declined to participate, they were excluded from the study.

Potential sources of bias.

The primary source of bias in this study was the 'Hawthorne effect' (observation bias), where healthcare workers may have altered their infection prevention and control (IPC) practices because they knew they were being observed on the wards. Self-reporting during interviews also may have introduced social desirability bias, as participants may have over-reported their knowledge and positive attitudes to appear compliant with institutional standards. Furthermore, the cross-sectional nature of the study only provided a snapshot of practices, which may have been influenced by selection bias if health workers who were more confident in their IPC skills were more likely to participate in the interviews.

Efforts to address bias

To mitigate the 'Hawthorne effect', we utilized an unobtrusive observation approach, where the research observers were present on the wards for extended periods during normal working hours to blend into the environment before formal data collection began. To address social desirability bias, the research team ensured strict confidentiality and anonymity of the participants, explaining that the findings would be used for quality improvement rather than individual performance appraisals. To further ensure the reliability of the data, triangulation was employed by comparing the results of the ward observations with the interview responses, allowing for a more accurate assessment of the gap between theoretical knowledge and actual practice. Additionally, data collectors were trained to use standardized observation checklists to minimize observer bias and ensure consistency across different wards and shifts.

Result

Sociodemographic characteristics of the study participants

Out of the 175 eligible clinical staff at the hospital, 144 healthcare workers (HCWs) participated in the study; the 31 staff excluded were not available to be part of the study (i.e., on sick or annual leave). The participants were

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predominantly female (59.7%), with a median age of 32 years (IQR 26–45). Figure 1 shows the screening and eligibility flow chart of the study. Age distribution highlights that most individuals were within the 25–34 age group (38.2%), and over half (59.0%) were married. The HCWs cadre was diverse, with the majority being nurses (35.4%) and midwives (27.8%), while clinical officers (6.9%) and lab technicians (2.9%) represent a smaller proportion. The majority of participants worked within ward settings (59.7%) and a few in outpatient departments (15.3%). In terms of experience, over half had 0–5 years of work experience (54.2%), with a median experience of 4 years (IQR 2–15). Availability of PPE was relatively high, with 74.4% reporting sufficient PPE at their workstation. Infection prevention resources had moderate coverage, with 59.7% reporting having had an infection prevention manual, and 73.6% having received relevant IPC training.

Table 1 Socio-demographic characteristics of study participants

Characteristic	**Frequency (Percent) N=144**
Sex	
Female	86(59.7)
Male	58(40.3)
Age (years) median, IQR	32(26,45)
Age_category (years)	
18-24	24(16.7)
25-34	55(38.2)
35-44	27(18.8)
45-54	29(20.1)
55+	8(5.6)
Missing	1(0.7)
Marital Status	
Married	85(59.0)
Unmarried	59(41.0)
Cadre of Health worker	
Clinical officer	10(6.9)
Lab Technician	4(2.9)
Medical officer	28(19.4)
Midwife	40(27.8)
Nurse	51(35.4)
Specialist	11(7.6)
Department	
Emergency	8(5.6)
OPD	22(15.3)
Other	28(19.4)
Ward	86(59.7)
Work Experience (years) median, IQR	4(2,15)
Work Experience_category (years)	
0-5years	78(54.2)
6-10years	20(13.9)
11-15years	11(7.6)
16-20years	12(8.3)
21+years	22(15.3)
Missing	1(0.7)
Sufficient PPE at the workstation	
Absent	34(23.6)
Present	110(74.4)
Infection Prevention manual at work	
Absent	58(40.3)

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Present	86(59.7)
Infection Prevention Training done.	
No	37(25.7)
Yes	106(73.6)
Missing	1(0.7)

Knowledge about infection prevention

The majority (71.5%) of HCWs recognized occupational safety as an issue, with nearly all (94.4%) understanding that healthcare workers bear responsibility for maintaining it. Knowledge about PPE is particularly high, as 98.6% know how to use it and agree that wearing PPE reduces infection risk. Similarly, a vast majority were aware that handwashing reduces infection (96.5%) and knew how to safely handle sharps (97.2%). Most respondents also understood transmission mechanisms (89.6%) and were aware of workplace risks (92.4%). However, gaps were apparent in specific technical areas, such as the allowable fullness of sharps waste boxes (29.9%) and the preparation of sodium hypochlorite (78.5%). Additionally, only 81.9% were aware of the maximum delay for post-exposure prophylaxis (PEP).

Table 2: Summary of study participants' Knowledge about the topic (N=144)

Knowledge question	No (%)	Yes n (%)
Is Occupational Safety a problem?	41(28.5)	103(71.5)
HWs are responsible for occupational safety	8(5.6)	136(94.4)
How to use PPE	2(1.4)	142(98.6)
Wearing PPE reduces the risk of infection	2(1.4)	142(98.6)
How to perform risk assessment	37(24.7)	107(74.3)
Transmission mechanisms of infections	15(10.4)	129(89.6)
Washing hands reduces infections	5(3.5)	139(96.5)
Awareness of work environment risks	11(7.6)	133(92.4)
Handling used needles and sharps	4(2.8)	140(97.2)
Colour coding in waste segregation	7(4.9)	137(95.1)
Allowable fullness of the sharps waste box	101(70.1)	43(29.9)
Maximum delay of PEP initiation	26(18.1)	118(81.9)
Health hazards associated with healthcare waste	8(5.6)	136(94.4)
How to prepare Sodium Hypochlorite	31(21.5)	113(78.5)

Attitude about infection prevention

Nearly all respondents agreed on the importance of infection prevention (98.6%) and occupational safety training (96.5%). Additionally, 95.1% of respondents recognized that healthcare workers are at high risk of infection, and 97.9% acknowledged the importance of accessible PPE. Specific practices, such as discarding sharps in a safety box (99.3%) and using PPE during aerosol-generating procedures (68.5%), were also valued. Some respondents (22.4%) disagreed with the consistent use of facemasks and eye protection wear. There was a strong willingness to receive the Hepatitis B vaccine (79.0%), and most respondents agreed on the risk of infection through biomedical waste (87.4%). However, attitudes toward risk assessment and understanding workplace exposure as a broader community issue were slightly less pronounced, with 86.7% and 66.4% agreement, respectively.

Table 3: Summary of study Participants' Attitudes about the topic (N=143)

Attitude questions	Agree n(%)	Neutral n(%)	Disagree n(%)
Infection is important	141(98.6)	2(1.4)	
Occupational safety & training are important	138(96.5)	1(0.7)	4(2.8)
HWs are at high risk of infection	136(95.1)	1(0.7)	6(4.2)
Accessibility to PPE within the workplace	140(97.9)	1(0.7)	2(1.4)
Individual workplace exposure as a community crisis	95(66.4)	10(7.0)	38(26.6)

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Risk assessment for infection Prevention	124(86.7)	2(1.4)	17(11.9)
Sharps are discarded in a safety box	142(99.3)	0(0.0)	1(99.3)
Recap Needles after use	42(29.4)	94(65.7)	7(4.9)
Willingness to take the Hep B vaccine	113(79.0)	15(10.5)	15(10.5)
Facemasks & eye protection mandatory for aerosol-producing procedures	98(68.5)	13(9.1)	32(22.4)
Hep B virus spread through biomedical waste	125(87.4)	6(4.2)	12(8.4)

Practices of healthcare workers towards infection prevention

The most consistently followed practices included wearing gloves during risky procedures (81.8% always) and hand washing with detergent after patient contact (65.7% always). Similarly, PPE use during patient care (59.4%) and cleaning the work area after the day (64.3%) were reported to be frequently observed, although around 40% of respondents only sometimes use PPE or clean the work area. Practices related to environmental safety, such as medical waste separation (67.1% always) and monitoring waste management systems (58.7% always), were moderately adhered to, with a considerable portion of respondents engaging in these practices sometimes. However, only 51.1% of respondents always conducted risk assessments within departments, and even fewer consistently avoided risky practices like needle recapping, where 50.4% report they never recap, while 24.4% still do so.

Table 4: Summary of study Participants' practices about the topic (N=143)

Practice Questions	Always n (%)	Never N (%)	Sometimes N (%)
Frequency of use of infection prevention manuals	62(43.4)	24(16.8)	57(39.9)
Wearing gloves during risky procedures	117(81.8)	0(0.0)	26(18.2)
Hand washing with detergent after contact with patients	94(65.7)	1(0.7)	48(33.6)
PPE use during patient care	85(59.4)	0(0.0)	58(40.6)
Cleaning of the work area after the day	92(64.3)	2(1.4)	49(34.3)
Monitoring the work area waste management system	84(58.7)	4(2.8)	55(38.5)
Medical waste separation	96(67.1)	2(1.4)	45(31.5)
Risk assessment within the department	73(51.1)	11(7.7)	59(41.3)
Changing gloves between patients	101(70.6)	3(2.1)	39(27.3)
Recapping used needles	35(24.4)	72(50.4)	36(25.2)
Use of disinfectant when handling infectious waste	102(71.3)	2(1.4)	39(27.3)

Factors associated with the knowledge of healthcare workers about infection prevention

In the bivariate analysis, factors that were significantly associated with knowledge, attitude, and practices (KAP) towards infection prevention and control (IPC) among the healthcare workers were: the sex of the participants, the cadre of healthcare workers, working experience, availability of PPE at the work station, and the presence of an IPC manual at the work station.

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Table 5 Bivariate analysis of factors associated with Knowledge, Attitude, and Practices towards IPC

Characteristic	KAP_score			
Sex	**Below 70 N=16**	**70 and above N=128**	**Total N=144**	**P Values**
Female	13(81.3)	73(57.0)	86(59.7)	0.102
Male	3(20.0)	55(43.0)	58(40.3)	
Age category (years)				
18-24	3(18.8)	21(16.4)	24(16.7)	0.973
25-34	7(43.8)	48(37.5)	55(38.8)	
35-44	2(12.5)	25(19.5)	27(18.8)	
45-54	3(18.8)	26(20.3)	29(202.1)	
55+	1(6.7)	7(5.5)	8(5.6)	
missing	0(0.0)	1(0.8)	1(0.7)	
Marital Status				
Married	11(68.8)	74(57.8)	85(59.0)	0.591
Unmarried	5(31.3)	54(42.2)	59(41.0)	
Cadre of Health worker				
Clinical officer	0(0.0)	10(7.8)	10(6.9)	0.057
Lab Technician	0(0.0)	4(3.1)	4(2.8)	
Medical officer	0(0.0)	28(21.9)	28(19.4)	
Midwife	8(50.0)	32(25.0)	40(27.8)	
Nurse	8(50.0)	43(33.6)	51(35.4)	
Specialist	0(0.0)	11(8.6)	11(7.6)	
Department				
Emergency	1(6.3)	7(5.5)	8(5.6)	0.324
OPD	0(0.0)	22(17.2)	22(15.3)	
Other	3(18.8)	25(19.5)	28(19.4)	
Ward	12(75.0)	74(57.8)	86(59.7)	
Work Experience category (years)				
0-5years	6(37.8)	72(56.3)	78(54.2)	0.139
6-10years	2(12.5)	18(14.1)	20(13.9)	
11-15years	2(12.5)	9(7.03)	11(7.6)	
16-20years	2(12.5)	10(7.8)	12(8.3)	
21+years	3(18.8)	19(14.8)	22(15.)	
missing	1(6.3)	0(0.0)	1(0.7)	
Sufficient PPE at the workstation				
Absent	7(43.8)	27(21.1)	34(23.6)	0.060
Present	9(56.3)	101(78.9)	110(76.4)	
Infection Prevention manual at work				
Absent	10(62.5)	48(37.5)	58(40.3)	0.063
Present	6(37.5)	80(62.5)	86(59.7)	
Infection Prevention Training done.				
No	6(40.0)	31(24.2)	37(25.7)	0.433
Yes	10(62.5)	96(75.0)	106(73.6)	
missing	0(0.0)	1(0.8)	1(0.7)	

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After controlling for confounding in multivariate logistic regression analysis, the adjusted model results indicated that male individuals had significantly higher odds of having a KAP score above 70 compared to females, with an odds ratio (OR) of 5.92 (95% CI: 1.02–34.5, p-value = 0.048). Age is also a factor, as each additional year is associated with a 19% increase in odds (OR 1.19, 95% CI: 1.00–1.33, p-value = 0.040). Notably, work experience appeared to be protective in those with more than 10 years in the field. Specifically, individuals with 11–15 years, 16–20 years, and 21+ years of experience had significantly reduced odds of achieving a KAP score above 70, with ORs of 0.02 (95% CI: 0.00–0.47, p = 0.015), 0.02 (95% CI: 0.00–0.55, p-value = 0.021), and 0.017 (95% CI: 0.00–0.71, p value= 0.033), respectively, compared to those with 0–5 years of experience. In contrast, the presence of sufficient PPE (OR 2.35, 95% CI: 0.59–9.39, p-value= 0.227), an infection prevention manual (OR 2.40, 95% CI: 0.65–8.89, p-value = 0.189), and having infection prevention training experience (OR 2.23, 95% CI: 0.52–9.47, p value= 0.278) did not show statistically significant associations with a KAP score above 70.

Table 6 Multivariate logistic regression analysis of factors associated with Knowledge, Attitude, and Practices towards IPC

Variable	Crude OR (95% CI)	P-vale	Adjusted OR (95% CI)	P value
Sex				
Female	Reference		Reference	
Male	3.26(0.87-12.01)	0.075	5.92(1.02,34.5)	0.048
Age	1.01(0.96-1.05)	0.829	1.19(1.00,1.33)	0.040
Work Experience category (years)				
0-5years	Ref		Reference	
6-10years	075(0.14-4.03)	0.737	0.19(0.02,1.63)	0.130
11-15years	0.38(0.07-2.14)	0.270	0.02(0.00,0.47)	0.015
16-20years	0.42(0.07-2.35)	0.322	0.02(0.00,0.55)	0.021
21+years	0.53(0.12-2.31)	0.396	0.017(0.00,0.71)	0.033
Sufficient PPE at the workstation				
Absent	Ref		Reference	
Present	2.91(0.99-8.53)	0.052	2.35(0.59,9.39)	0.227
Infection Prevention manual at work				
Absent	Ref		Reference	
Present	2.78(0.95-8.13)	0.062	2.40(0.65,8.89)	0.189
Infection Prevention Training done.				
No	Ref		Reference	
Yes	1.86(0.63-5.53)	0.265	2.23(0.52,9.47)	0.278

Discussion

The burden of hospital-acquired infections is highest in low- and middle-income countries, where rates as high as 16% are documented [11], a setting with a high prevalence of highly transmissible infectious diseases like Hepatitis B and HIV. Therefore, it is important to ensure that all medical and non-medical staff in health facility settings are aware of the importance of addressing such a public health scourge. The study assessed the knowledge, attitude, and practice of infection prevention and the associated factors within a tertiary regional referral hospital in Uganda. The data revealed a generally high (85.2%) knowledge base among respondents regarding IPC. This relatively high knowledge prevalence on infection prevention among HCWs is consistent with findings from other studies, like the one from Ethiopia, 84.7% [16], and Uganda, 83.9%; 93.9% [8,17]. However, findings from other studies have shown lower IPC knowledge among HCWs. A study done in Rwanda showed IPC knowledge among intensive care health workers to be 58.0% (18), whereas one done in Saudi Arabia at a University hospital showed a prevalence IPC

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knowledge rate of 67.5% [19]. This difference might be explained by the sociodemographic characteristics of the study participants, sample size, and modality of administering the data collection questionnaires (self vs interviewer).

The proportion of healthcare workers with a good attitude towards IPC was high (82.3%), which demonstrated a strong awareness and positive attitudes towards infection prevention and control among the respondents. However, the fact that a considerable proportion (22.4%) of HCWs disagreed with the necessity of consistent use of facemasks and eye protection is indicative of the need for continued on-the-job training on IPC.

Despite the sub-optimal (59.8%) proportion of respondents reporting practising proper infection prevention activities, this rate mirrors findings from other studies, for example, from Ethiopia 57.3% [Desta Melaku 2018], Egypt (42%) [20], and Uganda (37%) [8]. However, some studies have reported higher adherence rates to IPC practices among healthcare workers. [19,21]. These differences might be explained from the perspective of sample size, sociodemographic differences in the studies, cadre of healthcare workers involved in the study, and exposure to IPC training.

This study revealed that the age of the HCWs was significantly associated with a higher KAP score, as each additional year was associated with a 19% increase in odds (OR 1.19, 95% CI: 1.00–1.33, p-value= 0.040). These results are consistent with other studies; for example, a study from Ethiopia reported the advanced age of HCWs to be associated with infection prevention knowledge (AOR = 3.15, 95% with CI of 2.467–5.025) [16]. A cross-sectional study done in Uganda showed that age >35 years was associated with a good attitude towards IPC (age > 35 years (aRR: 0.88; 95% CI: 0.79–0.98) [8]. These findings might be attributed to the fact that as healthcare workers get older, they accumulate knowledge and experience on the topic. Consistent with the study among HCWs in Ethiopia (16), this study showed that male individuals had significantly higher odds of having a KAP score above 70 compared to females, with an odds ratio (OR) of 5.92 (95% CI: 1.02–34.5, p-value = 0.048). These findings are consistent with results from other studies (19,22). However, a study done in Uganda on knowledge, attitude and practices towards COVID-19 showed that compared to males, females were more adherent to practising public health preventive measures (aPR, 1.23; 95% CI, 1.01-1.53), knowledgeable about COVID-19 (aPR, 1.01; 95% CI, 0.95-1.07), and had positive attitudes towards directives and guidelines (aPR, 1.01; 95% CI, 0.82-1.25) [23]. These results suggest sex-specific measures might be useful in promoting adherence to IPC practices among healthcare workers in Uganda.

Notably, work experience appeared to be protective in those with more than 10 years in the field. Specifically, individuals with 11–15 years, 16–20 years, and 21+ years of experience had significantly reduced odds of achieving a KAP score above 70, with ORs of 0.02 (95% CI: 0.00–0.47, p-value = 0.015), 0.02 (95% CI: 0.00–0.55, p-value = 0.021), and 0.017 (95% CI: 0.00–0.71, p-value = 0.033), respectively, compared to those with 0–5 years of experience. This finding is similar to other studies that reported a higher KAP score being associated with longer years of work experience among healthcare workers. (19,24). This observation underscores the need for job training on IPC among health workers as a means of keeping them knowledgeable and appreciative of infection prevention and control at workplaces.

Interestingly, this study showed that the presence of sufficient PPE (OR 2.35, 95% CI: 0.59–9.39, p = 0.227), an infection prevention manual (OR 2.40, 95% CI: 0.65–8.89, p = 0.189), and infection prevention training (OR 2.23, 95% CI: 0.52–9.47, p = 0.278) did not show statistically significant associations with a KAP score above 70. This finding contradicts other studies that have shown having training in infection prevention, and the presence of IPC reference manuals at workstations significantly relates to infection prevention and control knowledge, attitude, and practices among HCWs [19,22,25]. This suggests that other factors other than training may be more influential in determining HCWs' KAP scores.

The identified sociodemographic drivers, such as age, sex, and work experience, offer insights that are likely applicable to broader professional healthcare populations across the country and other low- and middle-income countries with comparable healthcare infrastructures and patient burdens.

Conclusions

Adequate knowledge, good attitude, and practice of infection control standard precautions are vital to prevent the spread of infections in hospitals. The study highlighted prevalence rates and associated factors in the KAP of the HCWs at a regional referral hospital in Uganda. The study shows that even though the majority of healthcare workers had adequate knowledge and a good attitude towards infection prevention and control, very few of them put these into practice. Given that not all HCWs (only 73.6%) had received training on IPC, the hospital needs to institutionalise continuous learning opportunities and on-the-job training mechanisms for staff, which allow them to stay updated on infection prevention and control knowledge and practices. Sociodemographic characteristics like advanced age, male sex, and longer years of work experience were significantly associated with high KAP scores.

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Limitations

A primary limitation of this study is its cross-sectional design, which captures data at a single point in time, thereby precluding the ability to establish causal relationships between the identified factors and the observed infection prevention practices. The reliance on a pre-tested structured questionnaire for data collection introduces the risk of social desirability bias, where healthcare workers may have over-reported their adherence to protocols to align with institutional expectations. Furthermore, while the study utilized systematic random sampling to improve representativeness, the sample size of 144 participants from a single regional referral hospital may limit the generalizability of the findings to different tiers of the healthcare system, such as lower-level health centers with varying resource constraints. Finally, the study did not include a qualitative component, which could have provided deeper insights into the specific behavioral and systemic barriers, such as workload or supply chain fluctuations, that contributed to the gap between high knowledge levels and the relatively lower practice rate of 59.8%.

Recommendations

The study at Kayunga Regional Referral Hospital suggests that while healthcare workers possess a high baseline of knowledge and positive attitudes toward infection prevention, there is a significant gap in actual clinical practice. To address this, the hospital should institutionalize continuous professional development and ward-level mentorship to bridge the gap between theory and practice, while ensuring a consistent supply of personal protective equipment and the presence of accessible IPC manuals. Furthermore, because sociodemographic factors such as age, sex, and work experience were strongly associated with higher KAP scores, targeted training for junior or less experienced staff is essential. Ultimately, moving beyond quantitative assessments to conduct qualitative research on the behavioral drivers of adherence will be vital for developing long-term, impactful infection prevention initiatives.

List of abbreviations

CI: Confidence Interval
COVID-19: Coronavirus 2019
HCW: healthcare worker
HIV: Human immunodeficiency virus
IPC: Infection Prevention and Control
KAP: Knowledge-Attitude-Practices
MUREC: Mildmay Uganda Research Ethics Committee
OR: Odds Ratio
PEP: Post-Exposure Prophylaxis
PPE: Personal Protective Equipment
RRH: Regional Referral Hospital
SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus 2

Consent for publication

Not Applicable

Availability of data and materials

The datasets used and analysed during the study are available from the corresponding author upon reasonable request.

Conflict of interests

The authors declare that they have no conflict of interest.

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Authors' contributions

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HS was responsible for the conceptualization and design of the study. He led the initial drafting of the manuscript. Furthermore, he oversaw the data collection process at Kayunga Regional Referral Hospital and performed the final data cleaning and multivariate statistical analysis using STATA. **CNNA** contributed significantly to the conceptualization of the research idea and the development of the study methodology and directed the field-level data collection efforts. **GZ** was involved in the data collection process and the preliminary cleaning of the dataset. Also participated in the initial drafting of the manuscript and provided essential intellectual content during the review and revision phases before final submission. **JN** was instrumental in securing funding from the Government of Uganda, contributed to the initial design of the study, and reviewed the paper before final submission. **RS** provided general mentorship and guidance to the team throughout the study and manuscript writing.

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the Continuous Quality Improvement (CQI) committee at Kayunga Regional Referral Hospital, Uganda. **CNNA** is a medical officer currently affiliated with Kayunga Regional Referral Hospital, where they hold the role of vice chairperson of the Continuous Quality Improvement (CQI) committee. **GZ** is a registered Senior Nursing officer at Kayunga Regional Referral Hospital, Head of the infection prevention committee. **JN** is an obstetrician and gynecologist with Kayunga Regional Referral Hospital, Uganda. **RS** is a senior consultant plastic surgeon and executive director of Kayunga Regional Referral Hospital, Uganda.

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