

A cross-sectional study on knowledge, attitude, and practices towards nosocomial infection prevention among healthcare workers at Kayunga regional referral, Kayunga district.

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Abstract

Background

This study assessed the Knowledge, attitudes, and practices of health care workers on the prevention of nosocomial infections at Kayunga regional referral hospital in Kayunga district.

Methodology

A hospital-based cross-sectional design was employed for this study to assess Knowledge, attitudes, and practices of health care workers on the prevention of Nosocomial infections at Kayunga Regional Referral Hospital, involving 66 respondents, including nurses, midwives, clinicians, laboratory, and dental officers. A simple random sampling procedure was used to select participants from each unit at Kayunga RRH, and a semi-structured questionnaire was used to obtain all of the required information.

Results

Majority of respondents were female 40(56%), most being nurses 20(30%), most of respondents had a working experience of less than 5 years 21(32%), Majority of the respondents 62 (94%) were knowledgeable of the WHO moments of Hand washing, while only 4(6%) were not aware of the moments of hand-washing, 100% knew the definition and 58(88%) of the respondents had familiarity with hospital-acquired infection prevention guidelines. 36(55%) reported to always using the IP guidelines/manuals at workplace, 15(23%) used the manual sometimes or never, 51(77%) of the respondents said they recap a needle after use.

Conclusion

Most of the respondents at Kayunga regional referral hospital have adequate knowledge of nosocomial infection prevention, a good attitude, and good practice, as evidenced by the high score in the positive findings of the study.

Recommendation

There is a need to continue improving the health workers' engagement in the prevention of nosocomial infections in all spheres, especially in those that were poorly scored by increasing the continuous medical education on hand washing moments, to increase outcomes in the infection prevention and control, hence nosocomial infections

Keywords: Nosocomial infection prevention, knowledge and attitude, Health care workers, Kayunga Regional Referral, Kayunga district.

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Background

Hospital-acquired infections (HAIs) are sometimes termed as nosocomial infections (NCIs), which the patient acquires during his stay or healthcare workers (HCWs) get during their day-to-day hospital activities. (Meena and Gaurav, 2016). Infections are considered nosocomial if they appear 48 to 72 hours after hospital admission or within 10 days after discharge treatment, but are absent upon admission. (Bayleyegn et al, 2021). Healthcare professionals (HCPs) can be exposed to infectious body fluids, blood, and body parts. It is also common for them to be exposed to microorganisms that can cause serious and even fatal illness. (Nimer, 2022). Healthcare workers acquire these infections during specimen collection, processing, and discarding, handling and discarding of medical equipment, as well as during patient-to-HCW direct interaction at the time of examination, creating risks

to HCPs that are always present, as well as the patients with whom they interact. (Allegranzi et al, 2016).

NCIs remain a public health burden affecting many people, with these NCIs estimated at 12.9% for urinary tract infection (UTI), 21.8% for surgical site infections, 4.0% for lower respiratory tract infections, 21.8% for pneumonia, 9.9% for bloodstream infections, and 5.6% for ENT and mouth infections. Other infections include skin and soft tissue infections, accounting for 3.2%, cardiovascular infections 1.2%, bone and joint infections 1.0%, central nervous system (CNS) 0.8%, reproductive tract infections 0.6%, and systemic infections 0.2%. (Hailemariam et al 2019). Globally, according to the World Health Organization, HAIs are reported to be the eleventh leading cause of death in the world and the fifth leading cause of death in hospitals (Saleem et al 2019) and that up to 2.5 million patients each year with an estimated 10% of

inpatients suffering the consequences of HAIs with the risk of acquiring an HAI in low-income countries being 2–20 times higher than that in high-income countries contributing to about 90% of these infections occurring in a resource limited setting. (Cassini et al, 2016). In developed countries, high-income countries, the rate of HAIs is reported to be 7.5% where some countries in Europe and the United States have nosocomial infection rates less than 1%. The burden of HAIs also varies widely from country to country, with prevalence of HAIs varying between 1.73% and 5.45% in Chinese municipalities and provinces, which culminates in the direct economic burden of hospital infections in China ranging from \$1.5 billion to \$2.3 billion annually. (Wang et al, 2018).

In Uganda, the prevalence of nosocomial infections nationally is recorded at 28% with over 55% as a result of surgical site infections, 32% of all healthcare-acquired infections being urinary tract infections, 13% are bloodstream infections (Saito et al., 2017). Hospital-acquired infection prevention is a process of placing a barrier between susceptible hosts and the microorganisms that are an essential component of delivering safe and high-quality service at the facility level. (Loftus et al, 2019). According to the WHO, NCI can primarily be prevented either by reducing person-to-person transmission or by preventing transmission from the environment. Reducing person-to-person transmission involves implementing various measures to minimize the spread of infections between patients, healthcare workers, and visitors (Mbon et al, 2023). This includes promoting proper hand hygiene practices like handwashing or using hand sanitizers, and practicing safe injection practice (Desta et al, 2018). On the other hand, preventing transmission from the environment involves maintaining a clean and hygienic healthcare setting, encapsulating practices such as sterilization, disinfection of patient equipment, proper waste management, and cleaning of the hospital environment. (Yazie et al, 2019) With adequate and internationally accepted standards, health workers with adequate knowledge, positive attitudes, and good practices towards nosocomial infections have shown that more than 50% of hospital-related infections are avoided, reducing the illicit stay in hospitals and economic burdens associated with them (WHO, 2016). Therefore, this study assessed the knowledge, attitudes, and practices of health workers toward nosocomial infection prevention at Kayunga regional referral hospital, Kayunga District.

Methodology

Study Design

A descriptive cross-sectional design was employed for this study. This design was employed because data on the Knowledge, attitude, and practices were collected over a specified period of time. The design chosen was affordable since data was collected at a fixed point in time and results were immediately obtained.

Study site

The study was conducted at Kayunga regional referral hospital. Kayunga regional referral hospital is a government hospital located in Kayunga Municipality, Kayunga district, which is about 42 km from Kampala. The health facility had a bed capacity of 300. It has the emergency department, medical, paediatric, and maternity wards. In addition, it had an outpatient department and an operating theatre.

Study population

The study targeted all health care providers at Kayunga regional referral hospital. This was chosen because Kayunga regional referral hospital was the main government hospital for Kayunga district, as well as servicing many surrounding districts, and has a large enrollment of patients and staff numbers.

Eligibility criteria

Inclusion criteria

All health care providers Kayunga regional referral hospital who were ready to give informed consent were included in the study.

Exclusion criteria

Health care workers who declined informed consent to participate in the study. The study also excluded health care workers who were absent and on leave.

Determination of sample size

The sample size was calculated using Burton's formula (1905)

$$S=2(QR)O$$

S=required sample size

Q=number of days that will be used while collecting data (n=10)

R=Maximum number of respondents per day (n=3)

O=Maximum time spent on each respondent (n=1 hr.)

$$S=2 \times 11 \times 3 \times 1 = 66 \text{ respondents}$$

Therefore, a sample of 66 respondents will be used to conduct research

Sampling techniques and procedure

A convenient sampling technique was used for data collection to select participants from Kayunga regional referral hospital. This sampling procedure and method were preferred because the participants selected had no bias. Also, the sampling procedure and method were preferred because the study population was small and not scattered.

Study variables

Independent variables

These included knowledge, attitude and practices of health care workers at Kayunga regional referral hospital towards Nosocomial infection prevention.

Dependent Variable

This was Nosocomial infection prevention

Data collection tools

Data collection was conducted using a semi-structured questionnaire to obtain all of the required information. These questionnaires were closed-ended questions developed in English. The questionnaire consisted of four main sections, namely section A for individual characteristics of the respondents, section B for Knowledge of the H/W on NCIs, section C for Attitude, and section D for practices of H/W towards NCI prevention.

Data collection methods and procedure

Questions were read to the respondent, and the responses were filled in the corresponding questionnaire. The researcher will read the questions exactly as they appear on the survey questionnaires for the respondents to answer. The questionnaire was translated into the local language, which could be understood by participants who do not know English.

Data management

The questionnaires were pre-tested among 12 patients (10% of the sample size) from the outpatient department at Kayunga regional referral hospital for consistency, and where any uncertainties arose, clarifications were sought. All questionnaires were filled out. After confirmation of completeness, they were packed in the waterproof parcels to prevent soiling, and they were transported to the area of storage, where they were stored in a safe drawer and were locked with a padlock, and the key was kept by the researcher. Data was then picked for analysis and stored in the computer, and the soft copy was Z-protected using a password to avoid access by unauthorized people.

Data analysis and presentation

Data was coded and analyzed quantitatively based on the specific objectives. An analytical and inferential statistics was computed using Microsoft Excel, and the results of the analysis will be presented in tabular form, pie-charts, and bar-graphs.

RESULTS

Socio-demographic characteristics of respondents

Table 1: Socio-demographic distribution of the respondents N=66

Parameter	Category	Frequency (n)	Percentage (%)
Gender	Male	29	44
	Female	40	56
Age Range	<20 years	00	00
	20-30 years	28	42
	31-40 years	17	26
	>40 years	21	32
Highest Education level	Certificate	27	41
	Diploma	14	21
	Degree	17	26
	Masters	08	12
Marital status	Single	17	26

	Married	47	71
	Divorced	02	03
	Widowed	00	00
Religion	Christians	39	59
	Islam	27	41
	SDA	00	00

	Herbalist	00	00
	Others	03	06
Professional cadre	Nurse	20	30
	Midwife	10	15
	Clinician	08	12
	Medical officer	18	28
	Dentist	02	03
	Laboratory personnel	08	12
Years of experience	Less than 5 years	21	32
	6-10 years	19	29
	11- 15years	18	27
	more than 15 years	08	12

Table 1 shows that the majority of respondents were female, 40(56%) of whom 28(42.0%) of the participants were 20 to 30 years, while none of the respondents were those less than 20years of age. Most 27(41%) of the participants had had at least a certificate education compared to 8(12%) who had a master's education. More than half of the participants, 47(71%), were married, and only 2(03%) were divorced. More than half of the respondents, 39(59%), were

Christians, while Muslims were 27(41%). The majority of the respondents were nurses, 20(30%), while the least were dentists, 02(03%). Only 18(28%) doctors also participated in the study. Lastly, the largest number of respondents has a working experience of less than 5 years, 21(32%), compared to those with more than 15 years' experience, 08(12%).

Knowledge of h/w towards NCI prevention AT KRRH

Figure 1: showing the knowledge of WHO's 5 moments of hand hygiene

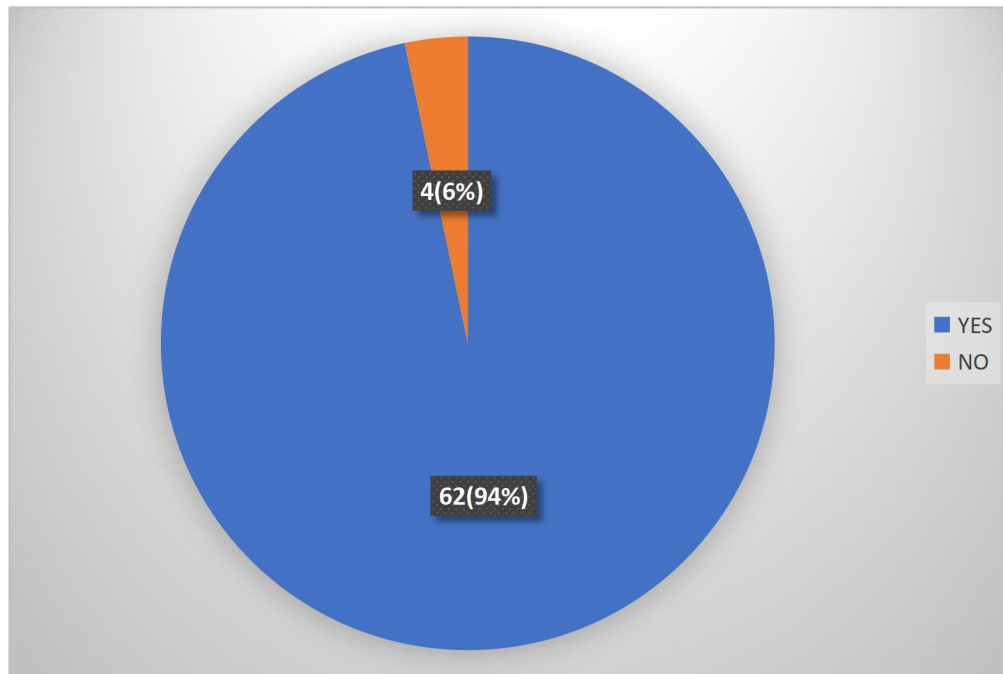


Figure 1 indicates that the majority of the respondents, 62 (94%), were knowledgeable of the WHO moments of Hand washing, while only 4(6%) were not aware of the moments of hand washing.

Figure 2: showing Options reported by the respondents on moments of hand- washing

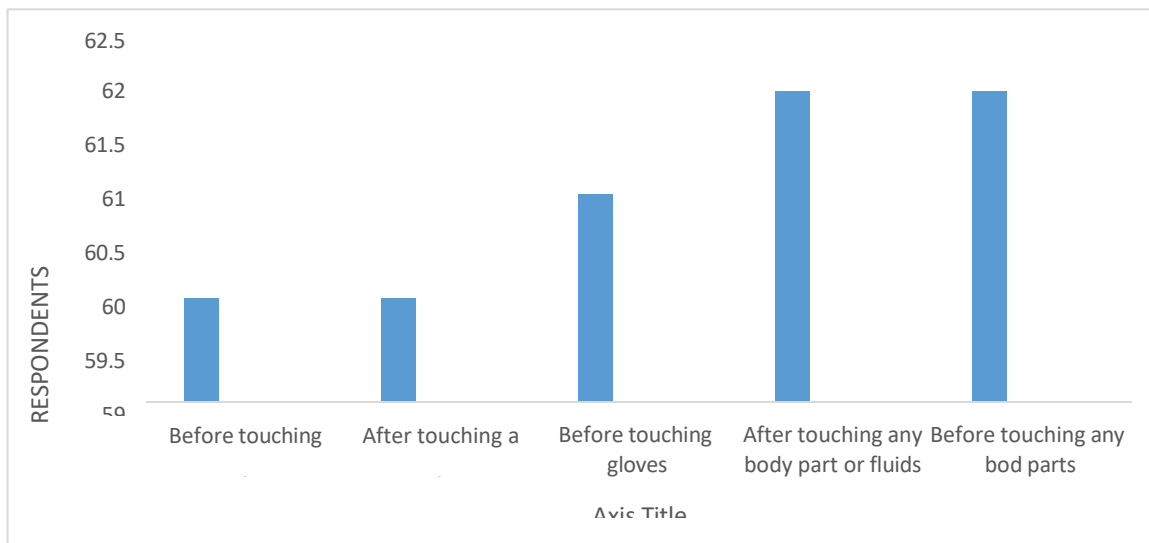


Figure 2 shows that of the 62 respondents who reported knowing the moments of hand washing, 60(97%) of the participants reported that they washed before touching a patient and after touching a patient, 61(98%) before touching gloves, and all of them, 62(100%) after touching any body fluids and before touching any body parts.

Table 2: showing respondents answers on the definition of what nosocomial infections are? (N=66).

Answers	Number of respondents	Percentage

An infection that is gotten while at home	00	00
An infection that is gotten after one has died	00	00
An infection that is gotten when one has stayed in hospital for some time	66	100
TOTAL	66	100

Table 2; indicates that, all the respondents reported correct definition of what nosocomial infections are.

Figure 3: showing knowledge of prevention of nosocomial infections.

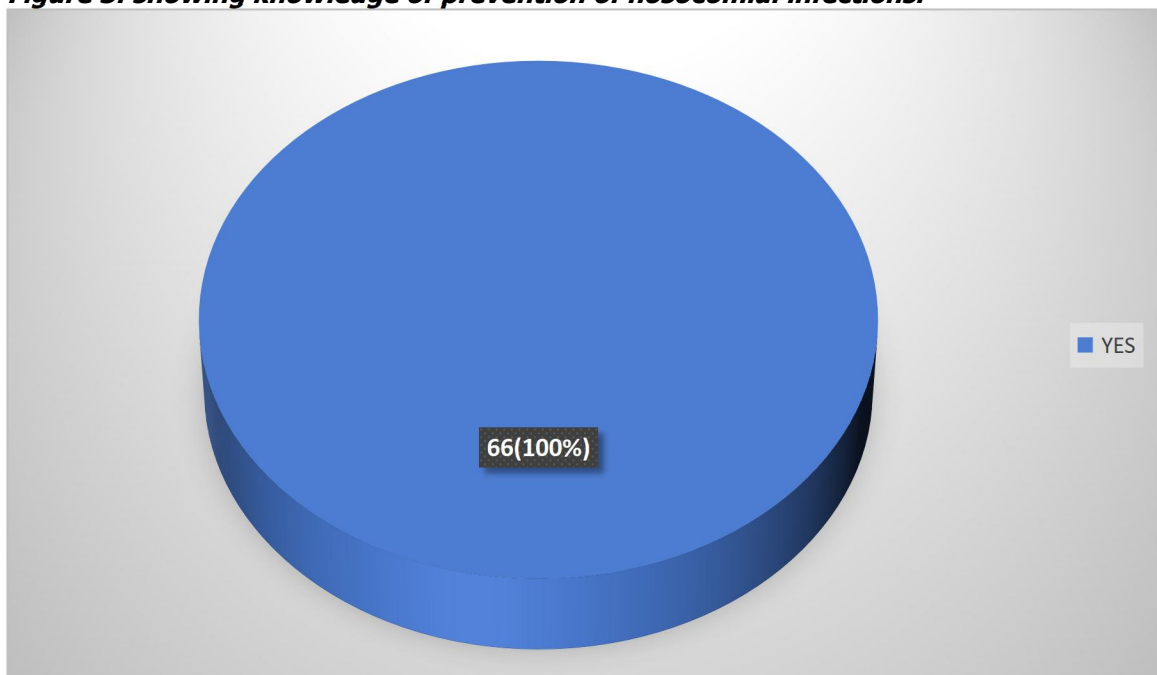


Figure 3 shows that, all the respondents 66(100%) had the knowledge of prevention of nosocomial infections.

Table 3: showing Methods of prevention of Nosocomial infections. (N=66).

Response	Number or respondents	Percentage (%)
Use of gloves	66	100
Proper waste disposal	66	100

Waste segregation	61	92
Opening windows	00	00
Avoidance of capping needles	55	83
Instrument sterilization before use	62	94

Table 3 shows that 66 (100%) of the respondents had reported using gloves and also proper waste disposal to prevent nosocomial infections, while 61(92%) of them reported waste segregation as a way to prevent nosocomial infections. 55(83%) reported using avoidance of capping of

needles, while 62 (94%) of them reported having used instrumentation being sterilized before use as a means of preventing nosocomial infections, while none reported using opening windows to prevent nosocomial infections.

Figure 4: showing familiarity with hospital-acquired infection prevention guidelines,

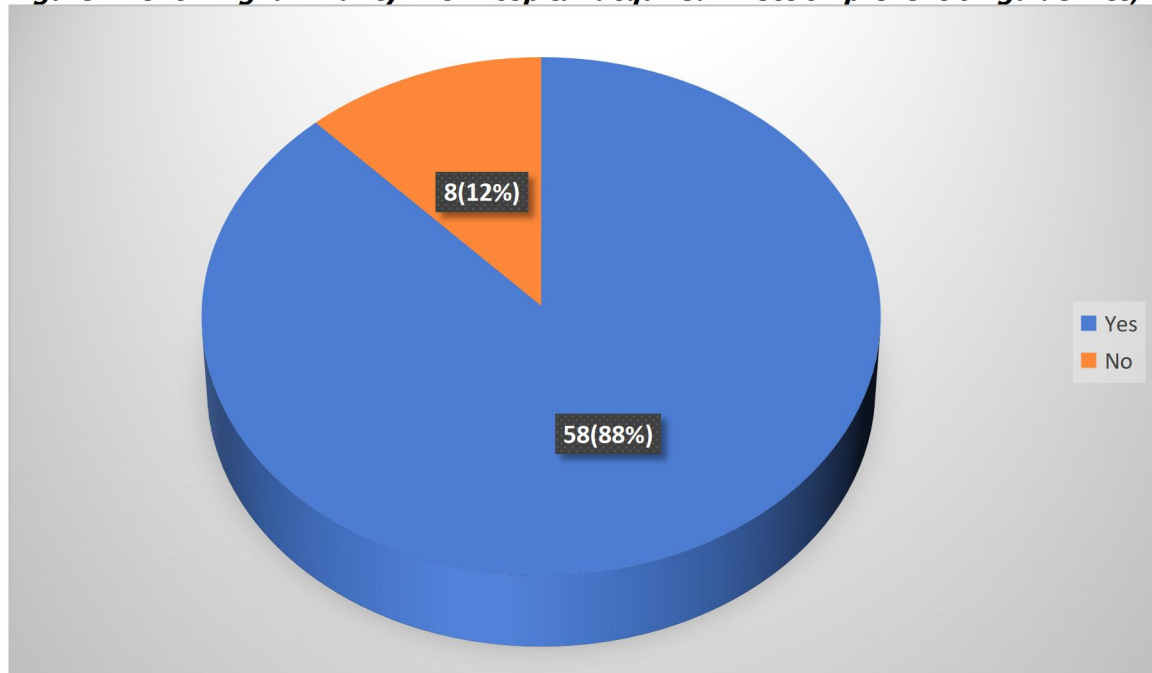


Figure 4: shows that the majority, 58(88%) of the respondents had familiarity with hospital-acquired infection prevention guidelines, while only 8(12%) reported having been not having familiarity with hospital-acquired infection prevention guidelines.

Table 4: Attitude of health workers towards NCI at KRRH (N=66)

Parameter	Response	Frequency	Percentages (%)
It is necessary to categorize hospital waste before disposal	Agree	66	100
	Disagree	00	00
	Not sure	00	00
Hand hygiene after removing gloves is essential	Agree	66	100
	Disagree	00	00
	Not sure	00	00
Use of antiseptic is necessary	Agree	66	100
	Disagree	00	00
	Not sure	00	00
Health worker hands are vehicle for transmission	Agree	60	91
	Disagree	06	09
	Not sure	00	00
Washing hands before and after contact with patients reduces the risks of getting HCAs	Agree	66	100
	Disagree	00	00
	Not sure	00	00
When caring for a patient, you must be concerned about	Agree	66	100
	Disagree	00	00
	Not sure	00	00

exposing your family and friends to HCAIs.		00	00
HCWs at my facility are concerned about contracting HCAIs while caring for patients	Agree Disagree Not sure	66 00 00	100 00 00
I believe PPE protect HCWs from infection	Agree Disagree Not sure	66 00 00	100 00 00
Posting universal safety precaution guidelines in the facilities encourages compliance and prevents infection spread.	Agree Disagree Not sure	66 00 00	100 00 00
Routine vaccination of health care workers can reduce the incidence of nosocomial infection.	Agree Disagree Not sure	66 00 00	100 00 00

Table 4: shows that, all the respondents 66(100%) reported having a good attitude towards prevention of nosocomial infections in which all reported that it was necessary to categorize hospital waste before disposal, Hand hygiene after removing gloves is essential, Use of antiseptic is necessary, washing hands before and after contact with patients reduces the risks of getting HCAIs, When caring

for a patient, you must be concerned about exposing your family and friends to HCAIs, PPE protect HCWs from infection, routine vaccination of health care workers can reduce the incidence of nosocomial infection while only 6(9%) disagreed that health worker hands are vehicle for transmission.

Table 5, showing Practice of respondents towards prevention of NCIs (N=66)

Practice	Response	Frequency	Percentage
Do you recap a needle after use?	Yes	15	23
	No	51	77
Do you wash hands within hospitals?	Yes	66	100
	No	00	00
When do you do Hand washing	Before starting work	12	18
	Before handling new patient	35	53
	After handling new patient	19	29

If you accidentally touch patient's blood, what do you do?	I do Wipe with cotton wool Wash with soap and water Wash under running water	00 32 34	00 48 52
Do you use personal protective equipment (PPEs)?	Yes No	66 00	100 00
Do you place disposable sharps in safety box immediately after use	Sometimes Always Never	08 58 00	12 88 00
How often do you use gloves when doing procedure	Sometimes Always Never	00 66 00	00 100 00
When do you do Changing gloves before starting handling new patient	Sometimes Always Never	10 56 00	15 85 00
Do you do clean your working environment at the end of the working time	Sometimes Always Never	00 66 00	00 100 00

Table 5, shows that, majority of the respondents 51(77%) recap a needle after use, all of the respondents 66(100%) reported to use PPEs, cleaned their working environment at the end of working time, used gloves always, used gloves during procedures and also washed hands at their work place however majority 35(53%) reported washing before

handling new patient while the 12(18%) before starting work. The majority of the respondents, 34(52%), washed under running water if accidentally had blood splashed on them, 58(88%) placed disposable sharps in a safety box immediately after use, while 8(12%) sometimes placed disposable sharps in a safety box immediately after use.

Figure 5: showing how respondents do you conduct waste disposal at your department

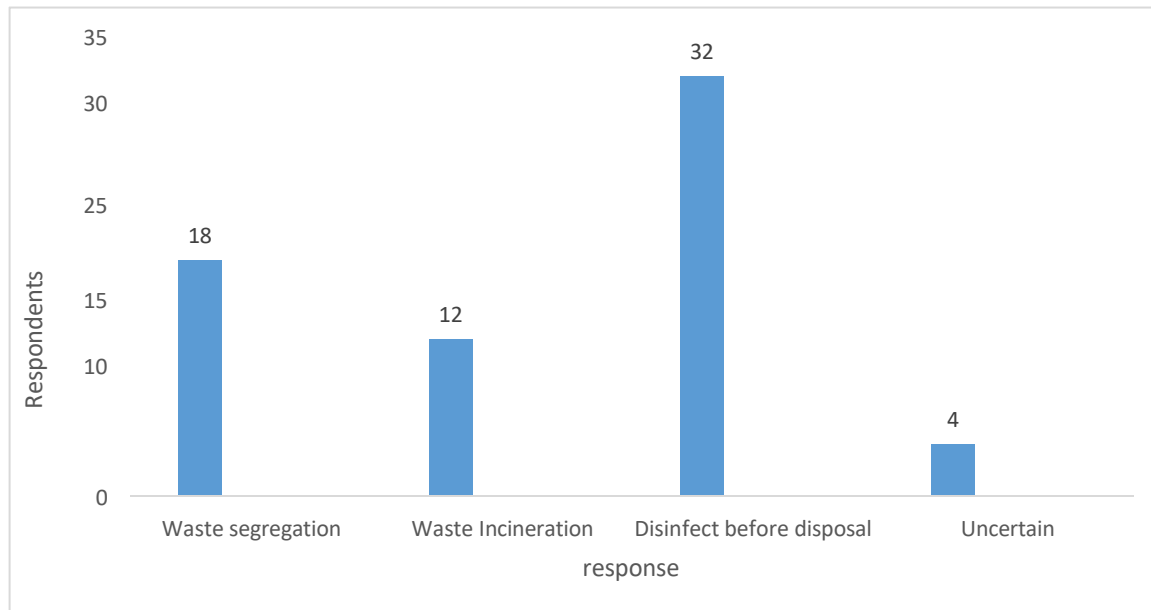


Figure 5 shows that the majority (32) of the respondents reported disinfecting waste before disposal, 18 did waste segregation, 12 incinerated, and 4 respondents were not aware of the ways the wastes were being disposed of.

Discussion of results

Knowledge of Health care workers towards prevention of NCI at Kayunga Regional Referral hospital

In this study, all of the respondents, 66(100%), had good knowledge of the prevention of nosocomial infections by virtue of most of the parameters being positively and correctly answered, like the definition (100%) and prevention ways 66(100%). This study was similar to a cross-sectional study conducted among healthcare workers in Babcock University Teaching Hospital, Ilisan-Remo, Ogun State, Nigeria, by Mbon et al 2023), involving 250 respondents, showed that the majority of the respondents, 235 (94.0%), were aware of nosocomial infections. The majority of the clinical staff, 140 (92.1%), had good knowledge, and 12(7.9%) had average knowledge, compared to the non-clinical staff, 98(100.0%), with average knowledge of nosocomial infections. This was because in the training of the health workers, infection prevention as well as the clinical Standard operating procedures are adhered to during training.

This study showed that the majority of the respondents, 62 (94%), were knowledgeable of the WHO moments of Hand washing, and also 58(88%) of the respondents had familiarity with hospital-acquired infection prevention guidelines, while only 8(12%) reported having been not having familiarity with hospital-acquired infection prevention guidelines. This finding was similar to one

conducted in Ghana, which showed that a majority (96.8%) of the respondents said they knew how to prevent and control hospital-acquired infections. About 78.8% of respondents were, however, familiar with health-acquired infection prevention guidelines, and more than half (53.8%) of the respondents were not aware of the WHO “five moments of hand hygiene” (Abdul et al, 2021). This is most likely because of the continuous quality improvement on hygiene training that is conducted within the hospital by the peer departments to improve patient outcomes and also promote safety while handling them.

This study showed that 66 (100%) of the respondents knew the methods of prevention of infections, having reported using gloves and also proper waste disposal to prevent nosocomial infections, while 61(92%) of them reported waste segregation as a way to prevent nosocomial infections. 55(83%) reported using avoidance of capping of needles, while 62 (94%) of them reported having used instrumentation being sterilized before use as a means of preventing nosocomial infections, while none reported using opening windows to prevent nosocomial infections. This result was consistent with one done in Northwest Ethiopia which showed that the majority (96.6%) had better knowledge about the need for implementation of SOP in reduction of HAI with (95.3%) of the respondents knowing how Nosocomial Infections development is favored, 92% of study participants having answered that hand washing before and after patient care and wearing

personal protective equipment (PPE) were vital to prevent HAI. (Bayleyegn et al 2021).

Attitude of Health care workers towards prevention of NCI at Kayunga Regional Referral hospital

Page | 14 From the results of the study, all the respondents 66(100%) reported having a good attitude towards prevention of nosocomial infections in which all reported that it was necessary to categorize hospital waste before disposal, Hand hygiene after removing gloves is essential, Use of antiseptic is necessary, washing hands before and after contact with patients reduces the risks of getting HCAs, while only 6(9%) disagreed that health worker hands are vehicle for transmission. These results are consistent with a study at one of the Specialized Hospitals in Northwest Ethiopia by Bayleyegn et al 2021) that found that more than half of the respondents, 135 (57.2%), had a favorable attitude towards HAI prevention, with 91.1% of study participants strongly agreeing that use of antiseptics is necessary to prevent HAIs. This was attributable to the intensive training the health workers have to go through while becoming health professionals.

The results of the study showed a good attitude towards prevention of nosocomial infections in which all the respondents 66(100%) reported having a good attitude towards prevention of nosocomial infections in which all reported that it was necessary to categorize hospital waste before disposal, Hand hygiene after removing gloves is essential, use of antiseptic is necessary, washing hands before and after contact with patients reduces the risks of getting HCAs. This was consistent with a study in Turkey by Uzair et al 2021), which indicated that 98.9 % of the participants said that aseptic technique was necessary to control the infection, while only 1.1 % of the participants said that aseptic techniques are not necessary to prevent infection. Similarly, 91 % of the participants have positive attitudes towards the use of PPE, hand washing, and face masks during the care of the patient, while 9 % have negative attitudes towards the use of PPE, hand washing, and face masks during the care of the patient. This was because they believed that using PPE actually prevented this infection transmission, thus its use.

Practices of Health care workers towards prevention of NCI at Kayunga Regional Referral hospital

The study findings showed that From the results, majority of the respondents 51(77%) recap a needle after use, all of the respondents 66(100%) reported to use PPEs, cleaned their working environment at the end of working time, used gloves always, used gloves during procedures and also washed hands at their work place however majority 35(53%) reported washing before handling new patient while the 12(18%) before starting work. This finding was in line with a systematic survey by Saleem et al 2019) that noted that respondents knew how to use PPE and 174 (88.8%) knew that wearing PPE reduces infection risk.

The possible reason for this practice was that the health workers undergo rigorous training on infection prevention monthly at the health facility aimed at minimizing infections in both patients and health workers.

In this study, majority of the respondents had a good practice towards prevention of nosocomial infections with majority of the respondents 51(77%) recapping a needle after use, all of the respondents 66(100%) reported to use PPEs, cleaned their working environment at the end of working time, used gloves always, used gloves during procedures and also washed hands at their work place however majority 35(53%) reported washing before handling new patient while the 12(18%) before starting work. This study was, however, not in line with a study at one of the Specialized Hospitals in Northwest Ethiopia by Bayleyegn et al 2021). We found out that regarding infection prevention practice, the majority of the respondents have poor practice, 151 (64%), towards HAI prevention. Half of HCWs (50.4%) always change gloves before handling a new patient, whereas 39.4% of respondents never use safety cabinets in the laboratory. This was, however, in line with one by Majeed et al 2018) that showed that respondents had good practices against the prevention of infections in hospitals.

Conclusion

The study shows that generally, most of the respondents at Kayunga regional referral hospital have adequate knowledge of nosocomial infection prevention, a good attitude, and good practice, evidenced by the high score in the positive findings of the study.

Limitations of the study

Limited funding to conduct the study was one of the anticipated limitations.

Time constraint to the study was also anticipated as a possible limitation.

Recommendation

There is a need to continue improving the health workers' engagement in the prevention of nosocomial infections in all spheres, especially in those that were poorly scored by increasing the continuous medical education on hand washing moments, so as to increase outcomes in the infection prevention and control, hence nosocomial infections.

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List of abbreviations

HAIs	:	Hospital Acquired Infections
HBV	:	Hepatitis B Virus
HCV	:	Hepatitis C Virus
HIV	:	Human Immunodeficiency virus
ICU	:	Intensive Care Unit
IPC	:	Infection prevention and Control
NCI	:	Nosocomial infection
NCIs	:	Nosocomial infections
WHO	:	World Health Organization

Source of funding

There is no source of funding.

Conflict of interest

No conflict of interest declared.

Availability of data

Data used in this study is available upon request from the corresponding author

Author's contribution

LE designed the study, conducted data collection, cleaned and analyzed data, drafted the manuscript, and JOs supervised all stages of the study from conceptualization of the topic to manuscript writing.

Ethical consideration

The research was conducted after the approval of the research proposal from Kampala School of Health Sciences, during which an introductory letter was acquired from Kampala School of Health Sciences, which introduced the researcher to the Medical director of Kayunga regional referral hospital, where this research study was done. After getting the signature for approval from the director of the facility, giving me permission to start collecting the data, we started meeting patients and introducing ourselves with the approval letter.

Informed Consent

After explaining the objectives of the study, the research team asked the participant to consent before participation in the study. For those who requested to drop out of the study due to personal reasons, they were allowed to do so, although they were encouraged to complete the study. Before the study was started, the researcher assured the participant that the information was kept confidential and used for study purposes only, and their details, like names, were not used in the study.

Author's biography

Lauben Erimirwa is a student of diploma in Clinical medicine and community health Kampala School of Health Sciences.

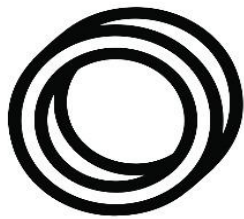
Julius Oluka is a research supervisor at Kampala School of Health Sciences

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