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Original Article

FACTORS INFLUENCING THE USE OF PERSONAL PROTECTIVE EQUIPMENT (PPE) AMONG HEALTH WORKERS IN KIRYANDONGO GENERAL HOSPITAL: ACROSS SECTIONAL STUDY.

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ABSTRACT

BACKGROUND

PPE is equipment worn to minimize exposure to hazards that cause serious workplace injury and illness, which may result from contact with workplace hazards. Therefore, the study aimed to determine the factors influencing the use of personal protective equipment among health workers in Kiryandongo General Hospital.

Methodology

The study was descriptive and cross-sectional in design, using quantitative methods for data collection and analysis done using SPSS version 29. A simple random sampling method was used to obtain the 41 respondents. Data was collected using a questionnaire.

Most of the health workers, 97.6% have a positive attitude towards PPE use, the Majority 63.4% always use PPEs, and the majority of the respondents 90.2% reported that accidental exposures influence the use of PPEs. The majority 51.2 % indicated that PPE design influences its use.

Conclusion

Utilization of PPEs among health workers in Kiryandongo Hospital is generally high among the diploma holders, PPE design and accidental exposures were among the key factors influencing the use of PPEs.

Recommendation

Hospitals should provide ongoing PPE training, adhere to SOPs, and promote professional development. MOH should ensure proper PPE procurement.

This implies that nurses must advocate for consistent PPE access, report exposures promptly, collaborate on selecting comfortable yet safe PPE, and ensure SOP adherence among all health workers.

Keywords: *Personal Protective Equipment, Health Workers, Kiryandongo General Hospital.*
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Background of the study

According to WHO (2021), Personal protective equipment, commonly referred to as PPE is equipment worn to minimize exposure to hazards that cause serious workplace injury and illness, these injuries may result from contact with chemical, radiological, physical, biological, or other workplace hazards. PPE may include gloves, masks, and face shields among others.

Despite the emphasis given to various policies and guidelines on PPE use, inconsistent use of PPE has been reported among HCWs and remains a greater challenge, many studies have reported deficient compliance with PPE use among HCWs and its use varies from individual to individual, (J. George et al, 2023).

Worldwide, three million HCWs experience exposure to blood-borne viruses such as hepatitis B, hepatitis C, and HIV per year (E. Savoia et al, 2020). A study on adherence to Infection Prevention and Control (IPC) measures among healthcare workers (HCWs) serving in COVID-19 Treatment Centers in Punjab, India, revealed a high (90%) level of PPE use (disposable gloves and N95 facemasks) while interacting with COVID-19 patients whereas nearly 45% used protective face shields and gowns before providing care to their patients (Mustafa, Majeed, Latif, Salman, Hayat, Mallhi, ... & Godman, 2023).

A cross-sectional study done in the UK to determine the knowledge and confidence of HCWs showed that only 15% of the 1055 respondents gave correct answers on PPE guidance and 33% indicated poor hospital communication, all these were related to inadequate information and training on the use of PPE, (M A Hossain et al., 2021).

In Africa, the need for these PPEs has increased over the years with increasing awareness of workplace hazards (Adelaya et al., 2020). A study on the use of personal protective equipment among health workers in a tertiary health institution, South East Nigeria: Pre-Ebola Period

revealed that only 22 (4.3%) of health workers claim to always wear the appropriate personal protective equipment during work (Aguwa, Arinze-Onyia, &Ndu, 2016).

Additionally, a study on knowledge, attitude, and practice of personal protective equipment utilization among healthcare workers at Adare Comprehensive Hospital, Ethiopia noted a high (78.2%) prevalence of PPE utilization (Ataro, Bilate, Addisie, Gebre, Dinku, & Mulatu, 2017).

A study conducted on PPE utilization and associated factors in Northwest Ethiopia showed that nearly 1in 2 workers wear PPE at work, this was associated with a lack of training in safety procedures and irregular workplace supervision, (Tewodros and Nisgusie, 2023). In Egypt in 2022, a study conducted on nurses indicated that compliance rate on the use of PPE was at 81.9% during the COVID-19 pandemic, (Noha and Hesham, 2022).

In East Africa, a study done in Mombasa, Kenya, on the appropriateness of PPE against bio-hazards exposure showed that 93.3% had good compliance with the use of gloves, however, it also indicated that 44.7% had the highest mode of exposure to sharp related injuries (B K Macharia 2018).

In Uganda, very few studies, with varying focus and differing research settings have been conducted in this field. (Okello, Kansime, Odora, Apio, & Pecorella (2017) study on barriers and factors affecting personal protective equipment usage in St. Mary's Hospital Lacor in Northern Uganda established that 13.6% did not use PPE even when indicated and 10% did not use an appropriate PPE implying that the prevalence of PPE utilization was high. The main barriers relate to poor fitting and weak domestic gloves, few aprons, frequent stock out and inadequate PPE as well as lack of training in PPE.

Additionally, Osman, Mutekanga, Ddamulira& Katamba's (2022) study on factors influencing the use of personal protective equipment among health workers in St. Francis Hospital Nsambya, Makindye division, Kampala, Uganda found a low (33.3%) level of use of PPEs by the health workers. So the purpose of this study is to establish the factors influencing the use of personal protective equipment among health workers in Kiryandongo general hospital.

Methodology

Study design and rationale.

The researcher used a descriptive and cross-sectional study design in nature. The design used quantitative techniques of data collection. It was descriptive because data is described the way it exists then of data collection.

Study setting and rationale.

The study was carried out in Kiryandongo General Hospital, Kiryandongo District. Kiryandongo General Hospital is located 225km along the Kampala-Gulu highway in Kikube parish, Kibanda county, Kiryandongo District, about 50km Northeast of Masindi General Hospital. The coordinates of the hospital are latitude 01"52'N and longitude 32"03'4 E. It is a 109-bed capacity, government-owned, serving a population of over 400,000 people from areas of Kiryandongo District and parts of the Districts of Masindi, Nakasongola, Oyam, Apac, Amuru, and Nwoya. The hospital offers a variety of services including Out-patient, In-patient, Ophthalmology, X-ray, Ultrasound, Orthopedics, Health Promotion, Health Education, Occupational therapy, HIV, Immunization, Environmental health promotion, Special clinics, Support supervision to the lower-level health facilities among other services. The inpatient departments include a surgical ward, maternity, theatre, children's ward, medical ward, and neonatal unit among others.

Study population.

The study population included health workers in Kiryandongo General Hospital, Kiryandongo District.

Sample size determination.

In this study, the sample size was calculated using a formula that was originally developed by
Yamane (1967)

Where;

n- Sample size
N-population size
e- Acceptable sampling error
(95% confidence level and p =0.05 are assumed)

Therefore, the study population was 41participants

Sampling procedure.

The researcher used a simple random sampling method to select the respondents in the study area whereby all health workers in Kiryandongo General Hospital have an equal opportunity of being selected to participate in the study. The eligible participants were selected from the list of all health workers to participate in the study using a lottery where 41 participants who picked even numbers were selected to be the sample size.

Inclusion criteria.

All Health workers at the time of the data collection were included provided they consented to take part in the study.

Definition of variables.

Dependent variable

The dependent variable was the use of Personal protective equipment.

Independent variable

Independent variable which was factors influencing that are both individual and health facility-based

Research instruments.

Data was collected using a close-ended questionnaire with YES/NO, false/true, or multiple choice. A pilot study was done on 4 health workers at Panyadoli Health Centre III to ensure the reliability and validity of the tool.

Data collection procedure.

Before approaching and collecting data from respondents, the researcher was approved by the research committee of Florence Nightingale School of Nursing and Midwifery and the medical superintendent of Kiryandongo General Hospital respectively. The researcher was later then accompanied and introduced to the respondents by the in-charges of various wards after obtaining permission from the hospital administrator. I explained the questionnaire to them and finally got their consent**.** Daily,

Data management.

Each close-ended questionnaire was labeled with a unique respondent identification number for easy identification and correction. Information from the questionnaires was then checked immediately for accuracy and completeness to ensure that unnecessary errors were avoided. Data cleaning was done by ensuring that only data from the completed structured interview guide was used for analysis. Data on hard copies was kept in a cupboard under lock and key to ensure confidentiality of the data collected.

Data analysis.

The data was collected, cleaned, and analyzed using SPSS version 29 to discover meaningful patterns. Data was presented in the form of text, tables, pie charts, and graphs.

Ethical consideration.

A letter of introduction was obtained from the principal of Florence Nightingale School of Nursing and Midwifery. Permission to carry out the study was then sought from the Medical Superintendent of Kiryandongo General Hospital. The researcher was introduced by the in charge of various departments. The objectives of the study were explained to the respondents, and confidentiality was emphasized. A consent form was given to each respondent and after reading or explaining to them the details of the consent form, the respondents voluntarily participated in the study by signing on the consent form. The completed interview guides were kept under lock only accessed by the researcher.

RESULTS

Socio-demographic data

Variables	Frequency (f)	Percent (%)
Age of respondents		
20-29	27	65.9
30-39	12	29.3
40-49	2	4.9
Sex of the respondents		
Female	17	41.5
Male	24	58.5
Level of education		
Certificate	16	39.0
Degree	7	17.1
Diploma	18	43.9
Occupation		
Clinical officer	4	9.8
Medical officer	4	9.8
Midwife	5	12.2
Nurse	23	56
Others	5	12.2

(Source: Primary Data)

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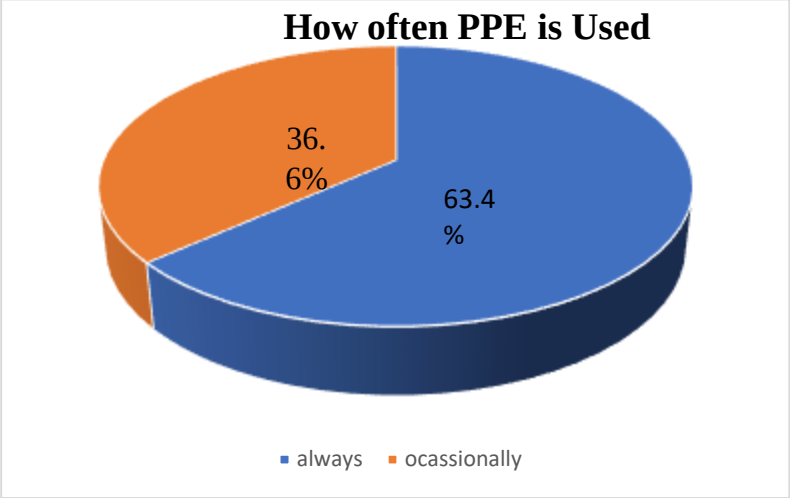
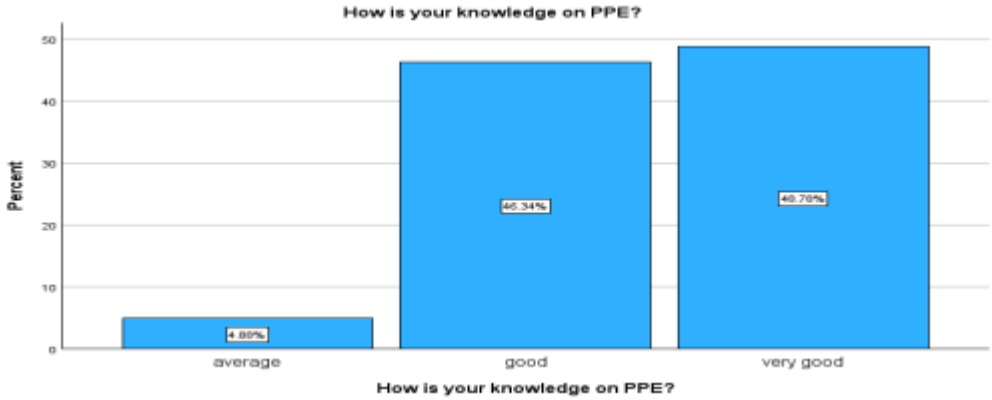
Level of utilization of PPE among health workers in KGH.



(Source: Primary Data)

Individual factors influencing the use of PPE among health workers in KGH,



(Source: Primary Data)

The figure indicates that the majority of 20 (47.8%) reported having very good knowledge of the use of PPE.

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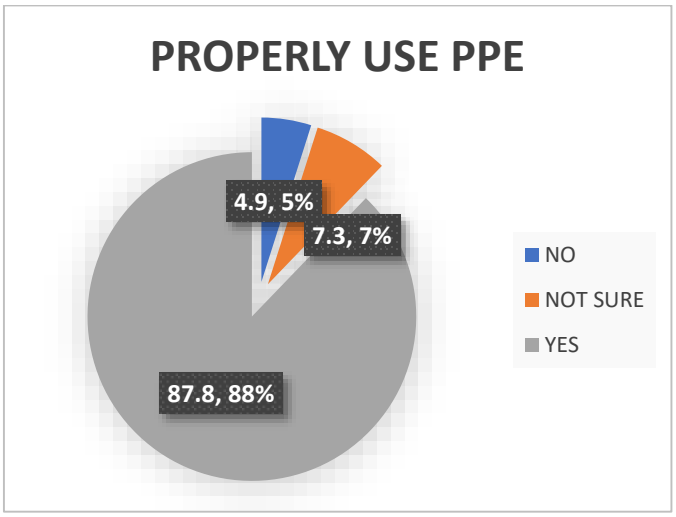

(Source: Primary Data)

Whether

Table shows respondents response on whether they feel uncomfortable when using PPE (n=41)

Responses	Frequency	Percent
No	30	73.2
Yes	11	26.8
Total	41	100.0

(Source: Primary Data)

Most of the respondents (73.2%) reported that they feel comfortable when using PPE while only 26.8% reported being uncomfortable while using PPE.

Attitude

Attitude on PPE use	Frequency	Percent
not sure	1	2.4
Positive	40	97.6
Total	41	100.0

(Source: Primary Data)

The table shows the attitude towards the use of PPE where 97.6% reported having a positive attitude towards PPE use.

Health facility factors influencing the use of PPE among health workers in KGH.

Responses	Frequency	Percent
No	14	34.1
not sure	1	2.4
Yes	26	63.4
Total	41	100.0

(Source: Primary Data)

Availability

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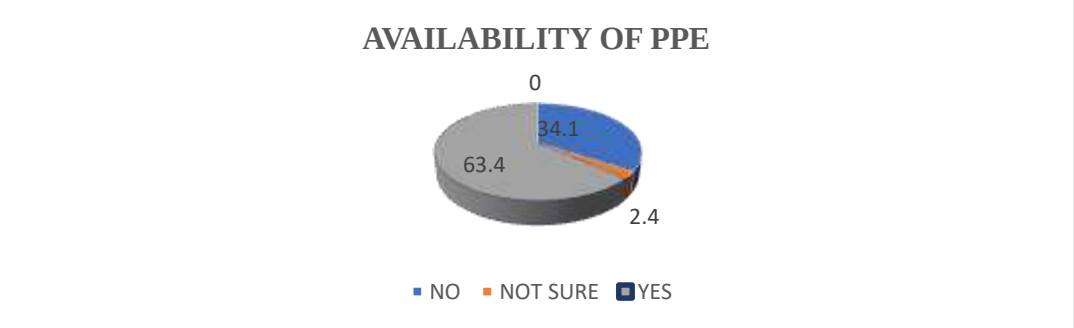
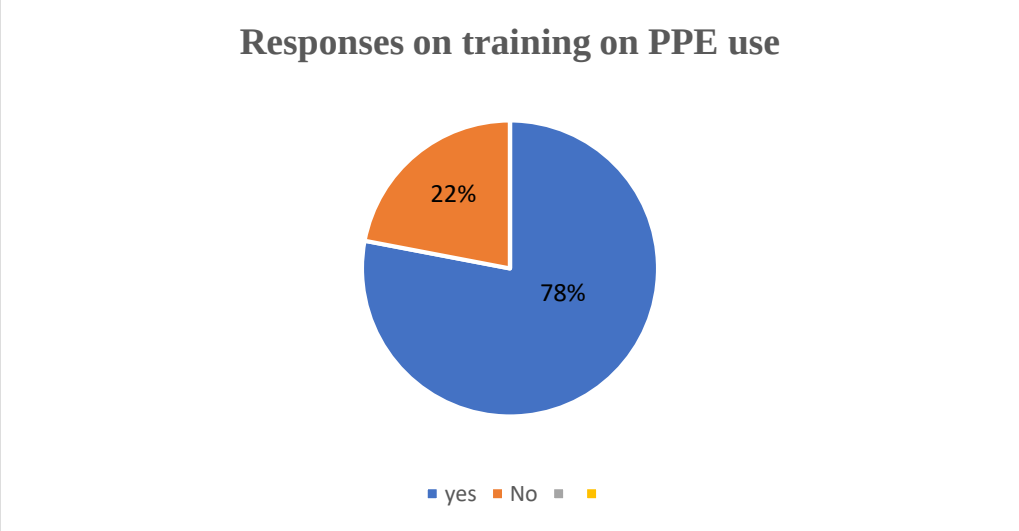
The figure shows that the majority 26 (63.4%) of respondents reported that PPEs are available, indicating a positive trend in workplace safety.



(Source: Primary Data)

Training

The figure shows the responses on the availability of PPEs, and the majority of the respondents 26 (63.4%) reported that PPEs are available.



(Source: Primary Data)

Standard Operating Procedures

The figure shows responses on whether participants were trained on PPE use, the majority of the respondents have received training on PPE use.

Responses	Frequency	Percent
not sure	1	2.4
Yes	26	63.4
Total	41	100.0

(Source: Primary Data)

Design of PPE

The table shows the majority of the respondents 26 (63.4%) reported that SOPs for PPE use are available at the health facility.

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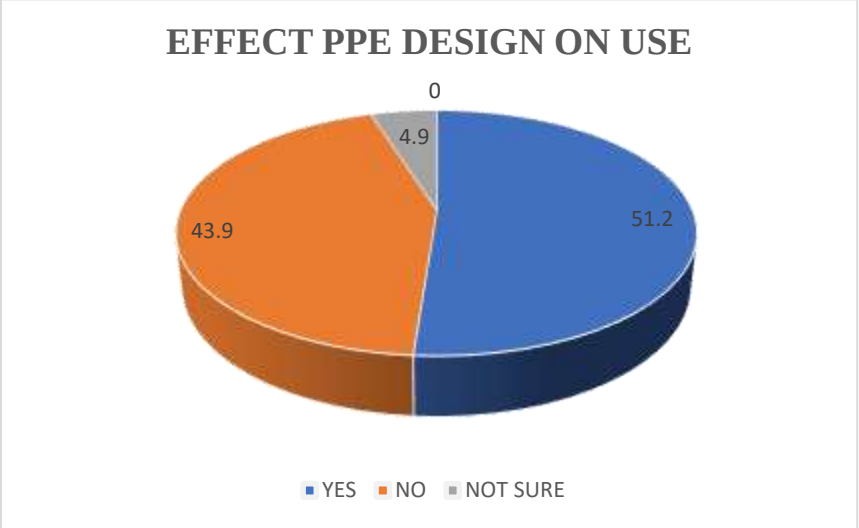
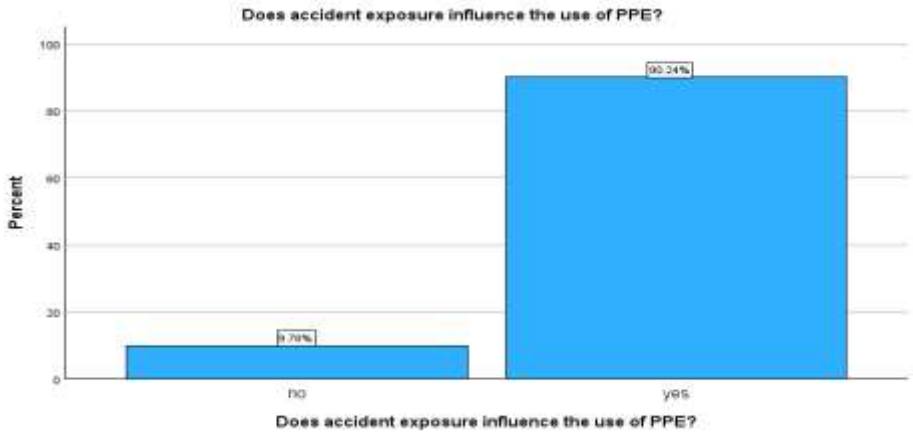


(Source: Primary Data)

EXPOSURE TO ACCIDENTS

The figure shows the majority of the respondents reported that accidental exposures influence the use of PPEs.



(Source: Primary Data)

DISCUSSIONS

Socio-demographic characteristics

The survey revealed a predominant representation of respondents aged 20-29 (65.9%), with males comprising 58.5% while diploma holders constituted the majority (43.9%), reflecting the prevalence of diploma and certificate qualifications among health workers; notably, nurses accounted for 56% of respondents, mirroring their substantial presence in the hospital setting.

Level of utilization of PPE among health workers in KGH

The majority of respondents (63.4%) reported that they always used PPE, while 36.6% reported they use PPE occasionally, indicating a good level of utilization. However, these findings contrast with previous research conducted in a tertiary health institution in Southeast Nigeria before the Ebola outbreak, which showed that only 4.3% of health workers consistently wore appropriate PPE while on duty (Aguwa, Arinze-Onyia, and Ndu, 2016). Similarly, a study by Okello, Kansime, Odora, Apio, and Pecorella (2017) at St. Mary's Hospital Lacor in Northern Uganda found that 13.6% of health workers did not use PPE when necessary. In contrast, research conducted in Ethiopia demonstrated a significant level of PPE utilization at 78.2%, similar to the findings in this study (Ataro, Bilate, Addisie, Gebre, Dinku, and Mulatu, 2017). The variation in these

findings could be attributed to differences in the research settings.

Individual Factors influencing the use of PPE among health workers.

The study found that a majority of respondents reported having very good knowledge about the use of PPE, with 48.8% indicating a very good understanding, 46.3% reporting good knowledge, and 4.9% describing their knowledge as average. Additionally, 88.7% of participants demonstrated very good knowledge of the proper use of PPE, which can be attributed to their exposure and experience. Supporting these findings, a study conducted in Ethiopia by Ataro, Bilate, Mulatu, Geta, Agana, Endirias, and others (2024) showed that 90.3% of healthcare workers knew about PPE utilization. These high levels of knowledge emphasize the effectiveness of current training and exposure sensitization programs, highlighting the importance of continued education and practice to maintain and improve PPE use among healthcare workers.

The study revealed that the majority of respondents (97.6%) reported having a positive attitude towards PPE use, primarily due to their understanding of its value. Supporting this finding, a study by Tom, Shing, and Alan (2020) highlighted various factors affecting PPE utilization, including attitudes towards PPE usage, habituation, risk perception, safety consciousness, perceived ease of use, perceived usefulness, and social influence. The overwhelmingly positive attitude towards PPE use among respondents emphasizes the importance of continuous education on the value and benefits of PPE. By reinforcing positive attitudes, we can enhance PPE compliance and improve overall safety in healthcare and other environments.

The majority of respondents (90.2%) reported that accidental exposures influence the use of PPE, while only 9.8% disagreed. This indicates that accidental exposures significantly contribute to the high utilization of PPE among health workers in Kiryandongo Hospital. Similarly, a study conducted in Punjab, India, on healthcare workers serving in COVID-19 treatment centers found that the lack of infection prevention and control (IPC) training significantly influenced the low level of PPE use (Mustafa, Majeed, Latif, Salman, Hayat, Mallhi, & Godman, 2023). These findings suggest that accidental exposures play a crucial role in motivating the use of PPE. Therefore, enhancing IPC training could further improve PPE utilization, ensuring better protection for healthcare workers.

Health facility-related factors influencing the use of PPE among health workers

Almost two-thirds of the respondents (63.4%) reported that PPEs were available. This availability positively impacts PPE utilization since accessible PPE encourages its use among many. Contrary findings were noted in a study at Mbarara Regional Referral Hospital by Viola, Hassan, Nuruh, and Obeagu (2023), which highlighted factors that negatively affect the utilization of PPEs, such as limited access and scarcity of PPE. Ensuring the consistent availability of PPE is crucial for its effective utilization. Addressing issues of limited access and scarcity, as identified in other studies, can significantly enhance PPE use and improve safety for healthcare workers.

Nearly two-thirds of the health workers (63.4%) agreed that they have Standard Operating Procedures (SOPs) in place for the use of PPE, while 31.7% did not have SOPs and 2.4% were unsure. The availability of SOPs positively influences the utilization of PPE, as they provide a clear guide for health workers. Similarly, studies conducted in South East Nigeria by Aguwa, Arinze-Onyia, and Ndu (2016) and in Uganda by Osman, Mutekanga, Ddamulira, and Katamba (2022), emphasized the importance of adherence to SOPs in enhancing PPE use, noting that it improves utilization rates. Ensuring the implementation and adherence to SOPs is crucial for improving the utilization of PPE among health workers. By providing clear guidelines, SOPs enhance compliance and safety in healthcare settings.

Almost half of the respondents (51.2%) indicated that the design of PPE influences its use, affecting utilization. This is because some designs are uncomfortable to use, thus discouraging many people from utilizing PPE. A similar finding was reported in a study conducted in India, which identified substandard sizing and quality as barriers to PPE use (Sharma, Sharma, Sharma, Mohanty, Khapre, Kalyani, 2022).

Improving the design, sizing, and quality of PPE is crucial to enhance its utilization. Addressing these issues can encourage more consistent use of PPE, thereby improving safety and protection for health workers.

Conclusions

Almost half of the respondents (51.2%) indicated that the design of PPE influences its use, affecting utilization. This is because some designs are uncomfortable to use, thus discouraging many people from utilizing PPE. A similar finding was reported in a study conducted in India, which identified substandard sizing and quality as barriers to PPE use (Sharma, Sharma, Sharma, Mohanty, Khapre, Kalyani, 2022).

Recommendations

The District Health Office and Kiryandongo General Hospital should ensure continuous fresher training for health workers on the use and application of PPEs during routine patient care and the management of hospital wastes.

The hospital management should ensure adherence to the Standard Operating Procedures (SOPs) provided for the various PPE available for use by hospital staff.

Kiryandongo General Hospital should ensure continuous professional development participation, with an emphasis on PPE use and the dangers of poor adherence to PPE protocols.

LIST OF ACRONYMS/ABBREVIATIONS

PPE: Personal Protective Equipment
HCW: Health Care Worker
MOH: Ministry of Health
OSH: Occupational Safety and Health
KGH: Kiryandongo General Hospital
CDC: Center for Disease Control
WHO: World Health Organization
UNMEB: Uganda Nurses and Midwives Examination Board
SOPs: Standard Operating Procedures
IPC: Infection Prevention and Control

OPERATIONAL DEFINITIONS

Personal protective equipment: Personal protective equipment, commonly abbreviated as PPE is equipment worn to minimize exposure to hazards that cause serious workplace injury and illness, for example; gloves, gumboots, facemasks, face shields, apron, etc.

Individual Factors: Refer to individual variation within user characteristics. Aspects of individual differences include psychological factors such as personality, cognitive abilities, cognitive style, and domain-specific knowledge.

Use: to take, hold, or deploy (something) to accomplish or achieve something.

Health facility factors: Refers to activities, policies, and guidelines at the health facility that ensure availability and proper use of PPEs, this may include timely ordering of supplies to ensure availability, continuous professional development on PPE use, availability of SOPs, and others.

Source of Funding

The study was not funded.

Conflict of Interest

The author declares no conflict of interest.

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