

Factors influencing use of personal protective equipment among health workers in St. Francis Hospital Nsambya Makindye division Kampala, Uganda

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Abstract

The purpose of this study was to assess factors associated with usage of Personal Protective Equipment (PPE) among health workers in St. Francis Hospital Nsambya, Kampala Uganda. The specific objectives were establishing the level of utilization of PPE among health workers and describing the individual and organization factors associated with use of PPE. The study adopted a cross sectional research design in which quantitative data was collected using questionnaires from a random sample of 196 health workers.

The study found a low level of use of PPEs (33.3%) by the health workers. The study further established that the following organizational factors were significantly associated with the level of PPE use: Availability of PPE (AOR=1.71; 95% C.I: 0.010-0.130; p = 0.000); Availability of SOPs (AOR=3.47; 95% C.I: 1.49-8.08; p = 0.000). The cadre of the health worker as an individual factor was also established to be significantly associated with level of PPE use (AOR=6.51;95% C.I:2.10-20.19; p = 0.001) It was further established that PPE use was highest among employees who demonstrated a positive and good attitude regarding use of PPEs and who reported availability and accessibility of PPEs.

The study concludes that lack of SOPs and PPEs significantly contributes to low PPE use in the work place and is one of the occupational health and safety challenges in this hospital. And that the different cadres and training are important in the use of PPE. It is therefore recommended that safety supervisors should make available and enforce the use of PPE among all cadres of the health workers in this hospital.

Keywords

PPE,
health workers,
occupational health
and
safety challenges

Introduction and Background

Personal protective equipment (PPE) are designed to protect health care providers from serious workplace injuries or illnesses (Ayikoru *et al.*, 2019, (Youha *et al.*, 2021). Personal protective equipment provides a physical barrier between microorganism and wearer. It offers protection by preventing microorganism from contaminating hands, eyes, clothing, hair and shoes (Hakim *et al.*, 2016). A breach in infection control practices facilitates transmission of infection from patients to health care workers, other patients and attendants. Personal protective equipment (PPE) includes gloves, protective eye wear (goggles), mask, apron, gown, boots/shoe cover, hair cover (European Centre for Disease Prevention and Control, 2020).

Worldwide, three million Health Care Workers (HCWs) experience per-coetaneous exposure to blood-borne viruses such as hepatitis B, hepatitis C and HIV per year (Savoia *et al.*, 2020). To mitigate this danger the Center for Disease Control (CDC) developed the universal precautions (UPs) in 1987 and later updated it in 1996. Compliance with UPs protects health worker as well as reduces their risk of infections (Adeleye *et al.*, 2020).

Related to Universal precaution practices' proper donning and doffing of Personal Protective Equipment (PPE) has been identified as key in reducing muco-cutaneous injuries and contact with Blood Body fluid (BBF) splash. The use of PPE is essential in Infection Control (IC) and protects HCWs from acquiring dangerous infection and diseases of epidemic proportion. However, compliance with universal precautions amongst HCWs is poor even in the face of high-risk clinical situation (Alemu *et al.*, 2020).

In the developing countries the health care workers are at greater risk due to sub-optimal infection control practices like lack of equipment, training, compliance with universal precautions (European Centre for Disease Prevention and Control, 2020). A study amongst health care

workers in rural health care facilities showed that proportion exposed to BBF and subcutaneous was 37.1% and 63.2% respectively (Chalya *et al.*, 2016).

In Africa, the need for these PPEs has increased over the years with increasing awareness of workplace hazards, and the difficulties associated with overdependence on other control measures which for some agents cannot be totally eliminated or even monitored. This is especially important in hospital settings where workers are often exposed to biohazards and other infectious agents like hepatitis B, hepatitis C and HIV (Adeleye *et al.*, 2020). Recently, health facilities are rife with very hazardous agents for example Covid 19, Ebola viral disease, Lassa fever and Ziika Fever virus causing high mortality among health workers in the affected countries around the World. Control and management of these infections became particularly difficult and several measures including use of appropriate PPEs and Personal Protective Processes (PPP) were and are still being used to contain them (Mutekanga D. R., 2020). Apart from biohazards, hospital departments that work on radioactive materials (radiology department) and others that work on both biohazards and chemicals (laboratory department) are under constant exposure. As a result many hospitals have established policies on PPE (Alemu *et al.*, 2020). In Uganda, very few studies, with varying focus and differing research setting, have been conducted in this field, study on Barriers and factors affecting personal protective equipment usage in St. Mary's Hospital Lacor in Northern Uganda found that 23.7% do not know how to use PPEs, 13.6% do not use PPE even when indicated and 10% are not using an appropriate PPE. 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 (Okello *et al.*, 2017).

Lack of occupational health and safety of health workers comfort / fit and fogging of eyewear and the need to scratch as well as young age and lack of safety training has been reported as the main

impedance to use of PPE (Ketema *et al.*, 2020). Furthermore, amongst HCWs a large proportion (76%) feel the barrier to PPE use relates to inadequate training in the use of PPE. Being too busy to wear PPE and, not using PPE because colleagues also do not use or feeling that PPE may offend patients, and discomfort in PPE use was reported to be a significant barrier to effective PPE use amongst the nurses compared to doctors (Mijakoski *et al.*, 2020). In one study, health care workers cited various reasons for not using the PPE and emergencies were the reason cited by most of them (91.43%), followed by non-use of PPE by co-workers (67.14%), busy schedule (37.14%), risk of offending the patient (27.14%), discomfort (24.29%) and difficulty in carrying out the job (18.57%) (Savoia *et al.*, 2020). With regards to organization factors, 63.2% of respondents reported that appropriate PPE was readily available in their working place. As to behaviors of PPE use about 21% of respondents reported that their colleagues often forgot to use PPE during patient care, while a similar proportion reported themselves to forget to change PPE between patients (Youha *et al.*, 2021).

Health care workers are on the front lines of the Covid 19 struggle, and they are at a higher risk of getting the infection. The Ministry of Health in Uganda reported to the World Health Organization that there were 168,501 Covid 19 cases among whom were health workers in the period January 2020 – August 2022 of which 3,627 died of the disease (WHO 2022). Personal protective equipment is therefore very crucial in preventing not only deaths but also injuries and their potentially fatal consequences. The infection prevention and control (IPC) department of Nsambya hospital reported that 24% of health workers were not wearing the required PPE to protect themselves and their patients, and that night shift health workers were only wearing gloves as PPE (Nsambya Hospital 2019.) Also in 2018, the IPC unit of Nsambya hospital reported a significant increase in the number of needle stick injuries (by 13%), compared to the previous year (Nsambya Hospital, 2018). Apart from the fact that these types of accidents happen on a regular

basis, the vast majority of them go unnoticed and or unrecorded. The management team has made efforts to ensure the availability of PPE as well as trainings, yet PPE use continues to be substandard. While it is critical to comprehend the factors that contribute to non-use in order to develop effective interventions, little study has been done on this topic in hospitals. Hence this study seeks to assess factors Associated with usage of PPE among the health workers in St. Francis Hospital Nsambya in Kampala, Uganda.

The general objective of this study was to assess factors associated with usage of PPE among health workers in this hospital in order to develop measures that will help improve compliance of PPE use and contribute to health workers' safety. Specifically, the objectives were:

-) To describe factors that are related to the utilization of personal protective equipment among health workers in this hospital.
-) To determine the level of personal protective equipment use among health workers in this hospital.
-) To establish the association between individual, organizational factors and utilization of personal protective equipment among these health workers.

Literature review

A review of literature shows a number of gaps in previous related studies which were not addressed by the different scholars.

Concerning study designs and approaches, some used a prospective observational study, (Aryal *et al.*, 2017) and data was collected by direct observation; while some used only qualitative study approaches (Alao *et al.*, 2020; Tamene *et al.*, 2020), excluding quantitative approaches which would excavate more insights; some scholars as well collected data using online google forms (Alao *et al.*, 2020; Alfina B. *et al.*, 2021); hence study participants who could not afford getting access to internet were excluded

out; other scholars used only structured questionnaires with closed ended questions to collect data (Nanyama, 2018), which did not give chance for respondents to give out their expressions regarding their feelings, perceptions and attitudes.

Regarding data sources and analysis, some scholars used secondary data sources for data collection (Brooks *et al.*, 2020); while Some scholars analysed data using correlation coefficients (Amoo & Ezoke, 2020; Mokhtari *et al.*, 2021), which only apply to continuous variables, but not categorical variables; whereas some analysed data using only descriptive statistics (Okello *et al.*, 2017; Ugochukwu & Onyejinaka, 2019), and eliminated the inferential data analysis to show the association of independent factors to the dependent variable, and the magnitude of significance; whereas some analysed data only at univariate and bivariate levels (Okello *et al.*, 2017), and excluded the multivariate level of analysis.

Looking at sample size and sampling techniques, in a number of studies, scholars used non-probabilistic sampling techniques (Alao *et al.*, 2020), which puts the study to high risks of sampling biasness; while some used very large sample sizes (Coelho *et al.*, 2020) which would be too expensive to manage financially and would require more time; and on the other hand some scholars used very small sample size during selection of respondents, (Coelho *et al.*, 2020; Munyua, 2017), which limits the study findings from being generalized to the whole population.

In reference to inclusion/exclusion criteria, some scholars only involved doctors, nurses and/or administrative staff as its study respondents, (Abukhelaif, 2019; Hakim *et al.*, 2016; Chia *et al.*, 2005; Okello *et al.*, 2017; Olajide *et al.*, 2020; Ugochukwu & Onyejinaka, 2019); and eliminated other categories of health workers; and some scholars conducted their studies on other categories of workers other than health workers (Ayikoru *et al.*, 2019; Baloh *et al.*, 2019; Diana & Widayanti, 2021).

As far as quality control is concerned, some scholars determined content validity using Pearson's correlation, and reliability using Cronbach's alpha coefficient, (Hossain *et al.*, 2021) which may not be applicable to instruments that have categorical variables; whereas others used the reliability index (Olajide *et al.*, 2020) to determine the consistency of the study instruments.

Methods

This study used quantitative research methods, and the study's specific research methodology was cross-sectional research. The reason for employing cross-sectional research is that it entails looking at data from a population at a single point in time. This study's participants were chosen based on certain variables of interest (Doyle *et al.*, 2016). It also allows examining factors associated with PPE use among health workers in St. Francis Hospital Nsambya. A Quantitative approach was used in data collection and analysis, and general information on the subject matter was collected.

Locale of the Study

The research study was carried out at St. Francis Hospital Nsambya located in Makindye Division of Kampala City Council Authority, Uganda. It is one of the major hospitals in Kampala and offers specialist services in surgery, internal medicine, pediatrics, obstetrics and gynecology. In addition, there are specialized services in urology, eye care, orthopedics, endocrinology, endoscopy, laparoscopy, mammography, HIV/AIDS, accidents and emergency. It has both general and private patient facilities. Founded in 1903, Nsambya is a Catholic Mission Hospital owned by the Archdiocese of Kampala and managed by the Little Sisters of St. Francis of Assisi.

This Hospital was chosen because it is one of the largest hospitals in Kampala it provides health services to wide spectrum of people not only from Kampala and Uganda but also from the East African sub-region. It is well established and it

has an active IPC committee, and is expected to have a well establishment PPE use policy and operation.

Study Population and Sample size

The target population comprised of (394) health workers at St. Francis Hospital Nsambya and they included health workers from different departments. The sample size was arrived at by using the predetermined sample size table by Krejcie & Morgan (1970) formula for obtaining a proportionate sample allocation. The appropriate sample size for a given population of 394,

according to Krejcie and Morgan (1970) table, is 196 (see Table 1 below).

Stratified and simple random sampling was used in selecting respondents from the target population of health workers according to their departments. A sampling frame for all full-time health workers who have worked at the hospital for more than 3 months was constructed with the help of human resources officials. Thereafter this stratified according to their cadres, calculated the percentage of each cadre that would be in the sample, then determined the exact proportion that each cadre would have in the sample Table 1 below).

Table 1: Sampling Procedure

Cadre	Population	Percentage	number of respondents
Clinical officers	30	7%	15
Doctors	32	8%	16
Lab technicians	16	4%	8
Nurses	174	44%	86
Midwives	142	36%	71
Total	394	100%	196

Data Collection Methods and Instruments

The study used close ended questionnaires as the main primary source of data collection which was researcher administered.

Before data collection, ethical approval was obtained from the Nsambya Institutional Review Board (IRB) and the administrator of the hospital. A written and verbal consent was obtained from the respondents after explaining the objectives of the study.

During the data collection process, the MoH Uganda standard operating procedures (SOP) were duly followed in order to prevent the spread of Covid 19.

SPSS version 20.0 was used to analyze the data collected. For the first and second objective, descriptive analysis was used to get frequencies while for the third objective both bivariate and

multivariate tests were conducted. At the bivariate analysis level, factors with a P-value of <0.05 were considered significant. All variables with P-values of less than 5% were reported as being independently significant after adjusted odds.

Results and Discussion

Of the targeted total of 196 of health workers as respondents only 144 (73.5%) responded.

Description of the individual and organizational factors associated with utilization of PPE among health workers

The individual and organizational factors associated with utilization of personal protective equipment among health workers in this hospital are given tables 2 and 3 below respectively.

Table 2: Individual Factors that Relate to Utilization of PPE Among Health Workers in St. Francis Hospital

Individual Factors		Frequency (N = 144)	Percentage (%)
Age	20-30	59	40.9
	31-40	64	44.4
	41-50	24	16.6
	Above 50	5	3.4
Sex	Male	40	27.8
	Female	104	72.2
Occupation	Doctor	16	11.1
	Nurse	56	38.8
	Mid wife	48	33.3
	Laboratory technician	8	5.5
	Clinical officer	15	10.4
Education Level	Bachelor level	84	58.3
	Post graduate level	60	41.7
Knowledge of HCW	High	91	83.3
	Low	53	16.7
Attitude of HCW	Good	126	87.5
	Poor	18	12.5
PPE discomfort	Yes	85	59.0
	No	59	40.9

The results from Table 2 above, show that the majority (85.3%) of the workers are youth (20 to 40 years) while only 3.4% were above 50 years of age. This could be mainly because hospitals generally recruit young graduates from colleges. These results compare well with those earlier found by Ciris Yildiz *et al.*, (2020) in their study on knowledge and intention to use PPE among health care workers, concluded that most of the health care workers were aged between the age of 22-55years old and they concluded that the PPE use was influenced by age.

The results further show that the majority of health workers (72.2%) were females (Table 2 above) this is in line with the global data where women are reported to be making up 70% of health workers globally (Mijakoski *et al.*, 2020). The same researcher concluded that female healthcare workers were 4.3 times more likely to be always compliant with PPE use compared to male. However, Hakim *et al.*, (2016) found males were more compliant to use of PPE as compared to the females.

On cadre ship in Table 2 indicates that majority of health workers were nurses 56 (38.8%). The minority of them were lab technicians 8(5.5%). This can be clearly attributed to the fact that hospitals recruit more nurse cadres than any other cadre of health workers. This finding is in line with one earlier reported by Nanyama (2018) from her study done in Uganda that the majority of her study participants were nurses and that this cadre had a significant association to use of PPEs ($p=0.808>0.05$). However, Okello *et al.*, (2017) reported Doctors and Registered Nurses were more likely to use PPEs compared to Enrolled nurses and cleaners (P-value 0.009).

The study results in Table 2 further show that most of health workers at this hospital (58%) had studied up to bachelor’s degree level, while 41% had studied up to postgraduate level. These results compare very well to the earlier findings of Abukhelaif (2019) in Saudi Arabia who reported that the majority of the study participants(74%) where holding a bachelor’s degree (in Nursing) as their highest level of education.

The majority of the health workers (83%) reported having knowledge about the PPE. This could be attributed to the risk sensitivity that the hospital has in as far as the safety of its health workers are concerned. These results are quite similar to those earlier found by Aryal *et al.*, (2021) that 54.2% of study participants reported to have adequate knowledge of self- and patient protection, and fewer could correctly identify all components of PPE or exhibited correct knowledge of PPE use during patient care.

In relation to the individual attitudes towards use of PPE, the results (Table 2) show that majority (87.5%) of the health workers at this hospital had good attitude towards PPE use. However an

earlier report by Mokhtari *et al.*, (2021) indicated poor attitude in using the safety equipment including goggle, gloves, boots and masks during the Covid 19 pandemic.

Table 2 above indicates that majority of health workers (59%) at St Frances hospital reported that they feel discomfort when using PPE. This finding is in line with one earlier found by Aswad & Loleh (2021) who reported that health workers identified substantial physical discomfort when wearing PPE and this was considered as a barrier to adherence. These discomforts included difficulty in donning multiple PPE, difficulty in breathing and feelings of suffocation exhaustion and fatigue.

Table 3: Organizational Factors that relate to utilization of PPE among Health Workers in St. Francis Hospital

Organizational Factors		Frequency (N = 144)	Percentage (%)
Availability of PPE	Yes	113	78.4
	No	31	21.6
Accessibility of PPE	Yes	96	66.7
	No	48	33.3
Training	Yes	95	65.9
	No	49	34.1
SOP Regulations	Yes	48	33.3
	No	96	66.7
Supervision/Enforcement	Yes	24	16.7
	No	120	83.3
Working hours	Eight hours	60	41.7
	More than eight hours	84	58.3

On availability of PPE, the study results (Table 3) show that most of the health workers (78.4%) reported that PPE were available to them. This could be attributed to the significance the hospital administration places on the safety of their staff. The results are in line with what Hakim *et al.*, (2016) who found out that availability of PPEs was a significant factor associated to use of the PPEs, where physicians who reported that PPEs were always available were 1.34 times more

likely to use the PPEs compare to those who reported absence of PPEs.

On the issue of access to the PPE, the results above (Table 3) indicate the majority (66.7%) of health workers have access. These results are similar to those earlier found by Abiakam *et al.*, (2021) in the study on the use of PPE for nursing professionals in primary health care facilities.

The majority of the respondents (65.9%) reported having received training on use of PPE and that they learnt it on job. This result is contrary to what Alao *et al.*, (2020) found in their study in Nigeria where the majority of the study participants (52.2%) had not received any form of training about the use of PPE. However, this scholar only included participants who had internet access, and eliminated the eligible health workers who could not afford to get access to internet.

With relationship to standard operating procedures (SOPs) this study (Table 3) established that the majority of health workers (66.7%) reported that there is no written SOPs document in the work place. This is very important as reported by Worby & Chang (2020) that presence of PPE guidelines in the working areas positively asserts the compliance to safety requirements and promotes efficient and safe working conditions for the health workers.

In relation to supervision and enforcement in the usage of PPEs, most of the respondents (83.3%) reported that they did not get support from administrators. The presence of administrative support as reported by Diana & Widayanti (2021) suggested that managers could foster a safety culture by modelling appropriate infection control practices for all staff.

The results presented (Table 3) further show that most of the health workers (58.3%) worked more than eight hours a day. This could be associated with the capacity of the hospital and the demand for health services where the hospital is located.

These results are in line with what Xia *et al.*, (2020) revealed that 37.14% of the health workers were not using the appropriate PPE due to the reason that the health workers had busy schedules and heavy workloads. This scholar also reported that high workloads were significantly associated with low PPE use among the health workers.

Level of Personal Protective Equipment Use Practice among Health Workers in St. Francis Hospital

The results from the respondents show that the majority (66.7%) reported very low levels of use of PPE in the hospital.

The above findings differ slightly from that of Xia *et al.*, (2020), who had reported that 53% of health personnel in Kampala's eight major hospitals had indicated very low levels of use of PPE, which may be due to the hectic schedules that health workers face, as well as the lack of regular supervision from the hospital administration.

Association between Individual, Organizational Factors and Utilization of Personal Protective Equipment among Health Workers

To address the association between individual and organizational factors on use of PPEs, the Pearson Chi-square analysis and Multivariate analysis through fitting a binary Logistic Regression model was undertaken. The results are presented in Table 4 below.

Table 4: Pearson Chi-square Results for Association between Individual, Organizational Factors and Utilization of Personal Protective Equipment among Health Workers

Factors	PPE use		χ^2	df	p-Value	
	High	Low				
Individual Factors		N (%)	N (%)			
Age	20-30	24(40.6)	35(59.3)	.643	2	.768
	31-40	28(43.7)	36(56.3)			
	41-50	17(70.8)	7(29.1)			
	Above 50	5(100.0)	0(00.0)			
Sex	Male	12(30.0)	28(70.0)	.277	1	.599
	Female	36(34.6)	68(65.4)			
Occupation(Profession)	Doctor	10(62.5)	6(37.5)	7.432	1	.006**
	Others(Nurse, midwife, ...)	36(29.0)	88(71.0)			
Education Level	Bachelor	24(28.6)	60(71.4)	2.057	1	.151
	Post graduate	24(40.0)	36(60.0)			
Knowledge	High	36(30.0)	84(70.0)	3.600	1	.058
	Low	12(50.0)	12(50.0)			
Attitude	Good	103(81.7)	23(18.3)	72.000	1	0.000**
	Poor	18(100.0)	0(0.0)			
PEE Discomfort	Yes	54(63.5)	31(36.5)	24.000	1	0.000**
	No	91(88.3)	12(11.3)			
Organizational Factors						
Availability	Yes	94(83.1)	19(16.9)	9.000	1	0.003**
	No	16(51.6)	15(48.4)			
Accessibility	Yes	79(82.2)	17(17.7)	36.000	1	0.000**
	No	17(35.4)	31(64.6)			
Training	Yes	74(77.8)	21(22.1)	9.382	1	0.002**
	No	22(44.8)	27(55.2)			
SOPs Regulations	Yes	20(41.6)	28(58.3)	9.000	-	0.003**
	No	72(75.0)	24(25.0)			
Supervision/Support	Yes	12(50.0)	12(50.0)	3.600	1	0.058
	No	36(30.0)	84(70.0)			
Working hours	Eight hours	0(0.0)	60(100.0)	51.429	1	0.000**
	More than eight hours	48(57.1)	36(42.9)			

****Significant at 0.05 Level**

The study results as presented in the Table 4 above shows that individual factors among which is age ($\chi^2 = .643$, $df = 2$, $p = 0.768$), Sex ($\chi^2 = 0.277$, $df = 1$, $p = 0.599$), Education level ($\chi^2 = 2.057$, $df = 1$, $p = 0.151$) Supervision/ Support

($\chi^2 = 3.600$, $df = 1$, $p = 0.058$) and Knowledge ($\chi^2 = 3.600$, $df = 1$, $p = 0.058$) are not statistically associated with use of personal protective equipment at bivariate analysis level.

The study however further shows that individual attitude ($\chi^2=72.000$, $df = 1$, $p = 0.000^{**}$), PPE Discomfort ($\chi^2 =24.000$, $df = 1$, $p = 0.000^{**}$), availability of PPE equipment ($\chi^2 =9.000$, $df = 1$, $p = 0.003^{**}$), accessibility ($\chi^2 =36.000$, $df = 1$, $p = 0.000^{**}$), Training ($\chi^2 =9.382$, $df = 1$, $p =$

0.002^{**}), SOPs ($\chi^2 =9.000$, $df = 1$, $p = 0.003^{**}$) and working hours ($\chi^2 =51.429$, $df = 1$, $p = 0.000^{**}$) are the individual and organizational factors which are significantly associated with use of PPE at bivariate analysis level.

Table 5: Association between Individual, Organizational Factors and Utilization of Personal Protective Equipment among Health Workers using the Binary Logistic Analysis

Factors	PPE use		COR (95%p-Value C.I.)	AOR (95%p-Value C.I.)	(95%p-Value C.I.)
	High N (%)	Low N (%)			
Individual Factors					
Occupation(Profession)Cadre ship					
Doctor	10(62.5)	6(37.5)	3.67(1.38-9.72)	6.51(2.10-20.19)	0.001**
Others(Nurse, midwife, ...)	36(29.0)	88(71.0)	1	1	-
Organizational Factors					
Availability					
Yes	94(83.1)	19(16.9)	0.33(0.16-0.69)	1.71(0.010-0.130)	0.000**
No	16(51.6)	15(48.4)	1	1	-
SOPs Regulations					
Yes	20(41.6)	28(58.3)	3.00(1.45-6.23)	3.47(1.49-8.08)	0.004**
No	72(75.0)	24(25.0)	1	1	-

****Significant at 0.05 Level**

On cadre ship, the results in Table 5 above show the high use of PPE is mainly among the doctors (60%) but lowest amongst the other cadres like the Nurses, midwives, laboratory technicians and clinical officers (29.0%). At bivariate analysis level, cadre ship was significantly associated with use of PPE (COR=3.67;95%CI:1.38-9.72; $p = 0.009$). When subjected to multivariate analysis, cadre ship was also significantly associated with use of PPE (AOR=6.51;95% C.I:2.10-20.19; $p = 0.001$). Since p value at multivariate level is less than 0.05, therefore cadre ship is a significantly personal factor associated with use of PPE. Health workers who are doctors are 6.51 times most likely to use PPEs compared other cadres. This

results are in agreement with earlier findings by Brooks *et al.*, (2020) and Piche-Renolds *et al.*, (2021).

At bivariate analysis level (Table 5 above), availability of PPE was significantly associated with use of PPE (COR=0.33; 95%CI: 0.16-0.69; $p = 0.000$). When subjected to multivariate analysis, availability was also significantly associated with use of PPE (AOR=1.71; 95% C.I: 0.010-0.130; $p = 0.000$). Since p value at multivariate level is less than 0.05, therefore availability of PPEs is a significant organizational factor associated with use of PPE.

Health workers are 1.71 times most likely to use PPEs when they are available compared to when they are not. This finding is in agreement with earlier reports by Efstathiou *et al.*, (2011) and Munyua (2017) who established that inadequacy and unavailability of the PPE itself were important in use.

Furthermore, at bivariate analysis level presence of written SOPs was significantly associated with use of PPEs (COR=3.00; 95%CI: 1.45-6.23; p = 0.004). When subjected to multivariate analysis, SOPs was also significantly associated with use of PPEs (AOR=3.47; 95% C.I: 1.49-8.08; p = 0.000). Since p value at multivariate level is less than 0.05, therefore SOPs is a significantly organizational factor associated with use of personal protective equipment. Health workers are 3.47 times most likely to use PPEs when SOPs are in place, which is in agreement with a study by Hossain *et al.*, (2021) who found that HCWs had shown high compliance to PPE when SOPs are in place.

Conclusion and Recommendation

In conclusion, the occupational health and safety concerns in Nsambya hospital include a lack of SOPs for PPE use and a low level of PPE use in the workplace. PPE use is further influenced by organizational factors such as availability, accessibility, and training, as well as the availability of standard operating procedures (SOPs) and administrative assistance.

The above conclusion calls for a need to improve on sensitization of all cadres in the facility, availability and accessibility of PPEs and written guidelines and policies to improve use of PPEs in the hospital.

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DOI: 10.22192/ijamr.2022.09.12.024	

How to cite this article:

Abdirahman Mohamed Osman, David R. Mutekanga, Christopher Ddamulira, Paul Katamba. (2022). Factors influencing use of personal protective equipment among health workers in St. Francis Hospital Nsambya Makindye division Kampala, Uganda. Int. J. Adv. Multidiscip. Res. 9(12): 302-316.

DOI: <http://dx.doi.org/10.22192/ijamr.2022.09.12.024>