INFECTION CONTROL FOR TERTIARY CARE, PAKISTAN: A CROSS-SECTIONAL STUDY OF STAFF ATTITUDES AND PRACTICES

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Abstract. Healthcare-associated infections pose a significant threat to patient safety and are a leading cause of morbidity and mortality. Nurses, in particular, are constantly exposed to microorganisms during their nursing activities; making infection control practices a crucial aspect of their work. This cross-sectional study aimed to evaluate the knowledge, skills, and judgment of nursing staff in two tertiary care hospitals in relation to infection control measures. Out of 158 participants, 156 were included in the study, and the data were analyzed using SPSS software. The results showed that 82% of nurses at HMC had good knowledge, while only 42% of nurses at KTH had fair knowledge regarding infection control. The study identified gaps in specific aspects of knowledge and practice, particularly regarding the proper use of personal protective equipment. The study recommends that health ministries provide comprehensive training programs and that healthcare workers be directed to use authentic sources of information to improve their knowledge, attitude, and practice regarding infection control.
Keywords: *training programs, attitude, practice, knowledge and skills*

Introduction

When a foreign microorganism enters a host's body and multiplies, causing various diseases, it is called an infection. These microorganisms include viruses, bacteria, fungi, and parasites (Sehmi et al., 2020). Infections can be acquired in many ways, such as through direct contact with an infected person, contaminated food and water, or exposure to microorganisms directly or indirectly (Drexler, 2014). Pathogens like viruses and bacteria challenge the immune system, causing illness by killing and disrupting normal cell function. Nosocomial infections occur worldwide, with 7.1 million cases and 99,000 deaths annually (Cotter et al., 2022). Lack of knowledge about infection control and poor healthcare worker practices contribute to hospital-acquired infections, which can lead to longer hospital stays, increased costs, lost wages, and death. Developing countries have a higher prevalence of hospital-acquired infections than developed countries (Ayed, 2015). Healthcare professionals, especially nurses, are constantly exposed to microorganisms that can cause serious or lethal infections. Workers such as physicians, dentists, and nurses are implicated in the transmission of nosocomial infections. However, there is limited literature exploring the knowledge and practices of nurses. Therefore, it is important to investigate the impact of the knowledge and practices of nurses on infection control (Salem, 2019). In hospitals, infected patients can spread infections to other patients, healthcare workers, and visitors.

Healthcare-related infections have a significant impact on morbidity and mortality rates, resulting in longer hospital stays, and increased costs, and are recognized as a serious public health problem (Chakraborty et al., 2017). Globally, the prevalence of knowledge-based infection control practices among nurses varies, with some countries reporting high levels of knowledge and others reporting low levels. Nurses play a critical role in preventing and controlling infection transmission through the application of standard precautions and maintaining a safe healthcare environment (Bekele et al., 2018). All nurses can demonstrate leadership in infection prevention and control by using their knowledge, skills, and judgment to initiate appropriate infection control procedures. The objective of this study is to identify health professionals' knowledge of recommendations for preventing and controlling healthcare-related infections (Sahiledengle, 2019). More experience working in hospitals is required to effectively apply infection control methods. Medical professionals in different types of surgical wards do not always follow universal rules for infection control, resulting in negligence towards patients that requires strict observation and training for professionals to control infection (Geberemariyam et al., 2018). The objective of this study is two-fold. Firstly, to evaluate the nursing staff's compliance with infection control measures. Secondly, to assess their knowledge, skills, and judgment in initiating appropriate and immediate infection control procedures (Belhaj et al., 2013).

Materials and Methods

The study utilized a quantitative approach to assess nurses' knowledge regarding various aspects of healthcare practices. The data collection process involved the analysis of nurses' responses to a structured questionnaire. The questionnaire consisted of multiple-choice questions and dichotomous questions related to specific areas of nursing practice. The data collection process was carried out in a healthcare facility, involving a sample of nurses. The participants were selected through purposive sampling, ensuring representation from different units and levels of experience. Prior to data collection, informed consent was obtained from all participants, emphasizing the voluntary nature of their participation and the confidentiality of their responses. The questionnaire was developed based on relevant literature review and expert opinions in the field of nursing. It was designed to assess nurses' knowledge in specific areas, including diabetic history, proper use of medical masks, eye protection, hand hygiene, biomedical waste management, needlestick injury, and awareness of its consequences.

The data collection procedure involved administering the questionnaire to the selected nurses. The questionnaire was distributed either in a paper-based format or electronically, depending on the convenience and preference of the participants. The participants were given sufficient time to complete the questionnaire and were encouraged to ask for clarifications if needed. The collected data were analyzed using descriptive statistics. The quantitative data obtained from the multiple-choice questions were analyzed by calculating frequencies and percentages to determine the nurses' knowledge levels in the different areas assessed. The dichotomous questions were also analyzed using frequencies and percentages to examine the prevalence of specific practices or experiences among the nurses.

Results and Discussion

The author collected data from a sample of 158 participants in total, but 2 were excluded due to not meeting our criteria. The author analyzed the data of the remaining 156 participants, who were recruited from tertiary care hospitals. Among them, 74 were from HMC and 82 were from KTH. The participants were asked to respond to a questionnaire consisting of 20 questions related to infection control knowledge and practices. The author gathered information on 9 variables, including name, age, gender, education, marital status, designation, experience, area, and specialization field. The author compared the data based on three categories: education level, designation and experience, and knowledge as reflected in their responses to the questionnaire

Analysis of KTH data based on education level, designation and experience

The staff at KTH were classified based on their education level, designation, and experience, into categories of Matric, F.Sc/F.A, B.Sc./B.A, and M.Sc./M.A. In addition, they were further categorized as student nurses, staff nurses, or head nurses, based on their designation, and their years of experience were also recorded. The frequencies of these categories were analyzed and presented in both a table and a figure. Based on the frequency in *Figure 1*, *Figure 2*, and *Figure 3*, as well as *Table 1*, *Table 2* and *Table 3*, out of the total 82 nurses from KTH who participated in the study, 65 were staff nurses, 8 were student nurses, and 9 were head nurses. This indicates that a large proportion of the participants were staff nurses. In terms of education level, the frequency data shows that 36 of the nurses had a matriculate qualification, 36 had passed their F.A., 7 had a B.A., and 3 had the M.A. With regards to experience, 2 of the worker are considering staring their work as nurses, 40 of the nurses had between 1 to 10 years of experience, 26 had between 10 to 20 years, 10 had between 20 to 30 years, and only 4 had between 30 to 40 years of clinical experience.

Table 1. *Education and experience of KTH staff.*

Education	Designation	Experience (years)	Frequency
Matric	Student nurse	0-5	2
	Staff nurse	0-5	10
	Head nurse	0-5	1
F.Sc./F.A.	Student nurse	0-5	5
	Staff nurse	0-5	30
	Head nurse	0-5	3
B.Sc./B.A.	Student nurse	0-5	1
	Staff nurse	0-5	20
	Head nurse	0-5	2
M.Sc./M.A.	Student nurse	0-5	0
	Staff nurse	0-5	5
	Head nurse	0-5	3

Table 2. *Education frequency distribution.*

Education	Frequency (N)	Percentage (%)	Cumulative percentage
Matric	36	43.90	43.9
F.A.	36	43.90	87.8
B.A.	7	8.54	96.3
M.A.	3	3.66	100.0
Total	82	100	100.0

Table 3. *Experience frequency distribution.*

Experience	Frequency (N)	Percentage (%)	Valid percentage
0	2	2.44	2.44
1-10	40	48.78	51.22
10-20	26	31.71	82.93
20-30	10	12.20	95.13
30-40	4	4.87	100.0
Total	82	100	100.0

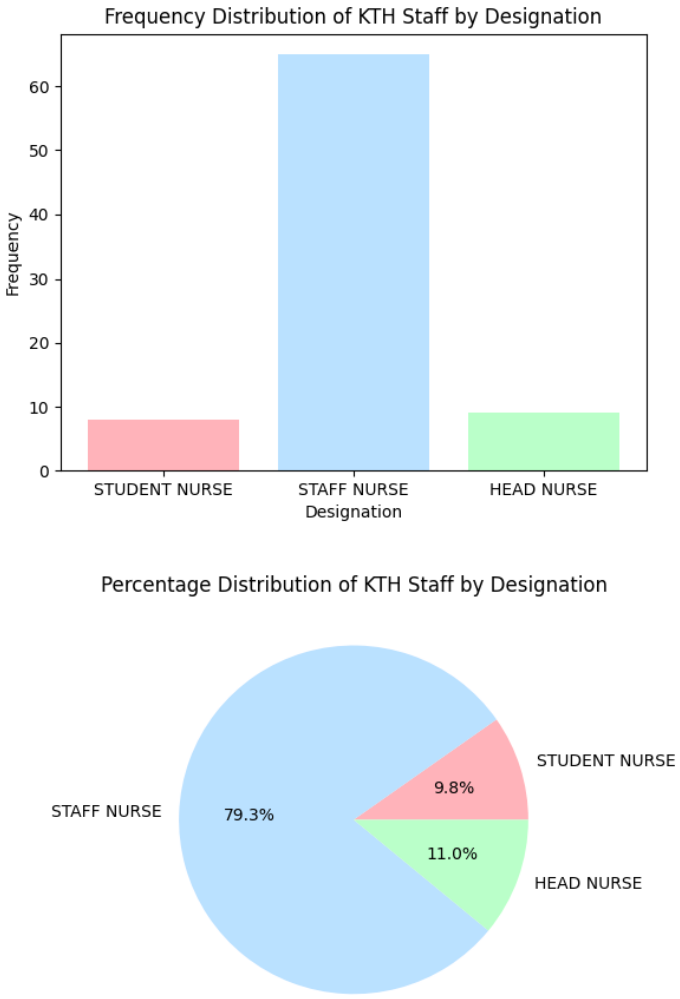

Figure 1. *Designation frequency and percentage distribution.*

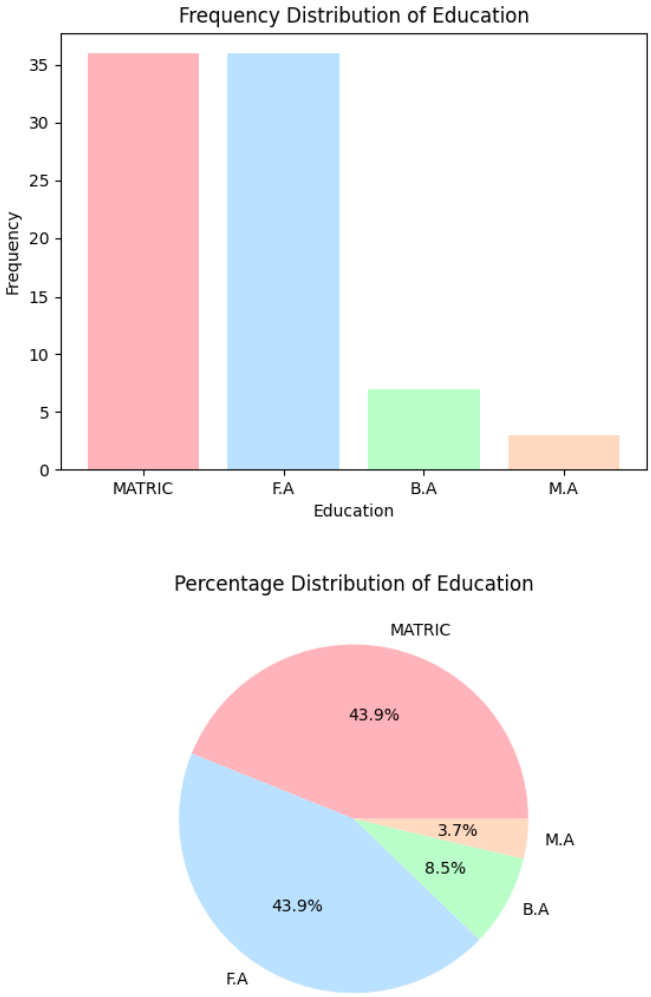

Figure 2. *Education frequency and percentage distribution.*

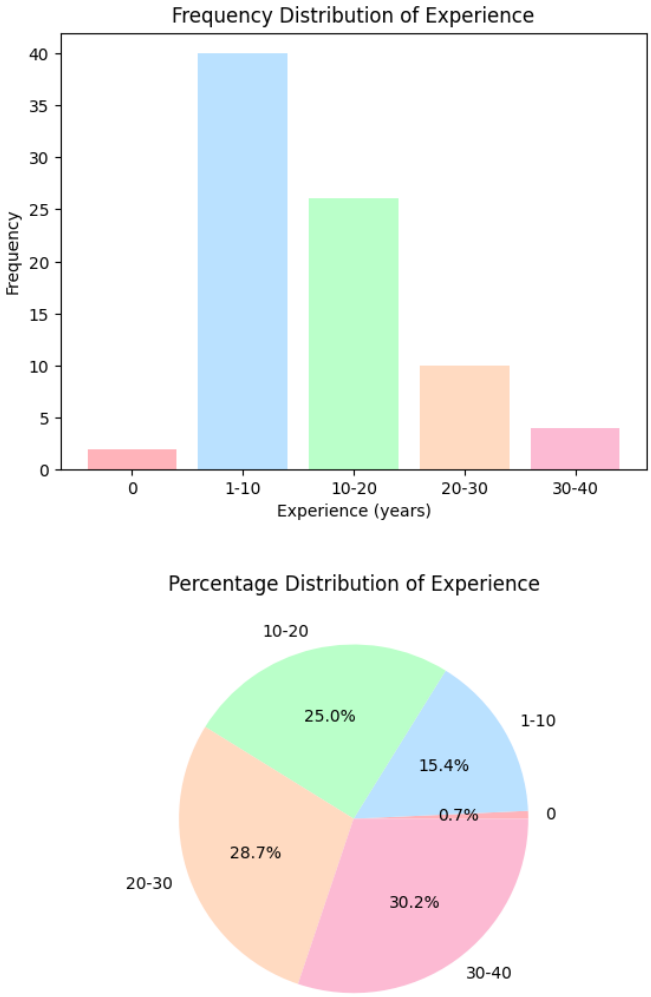

Figure 3. *Experience frequency and percentage distribution.*

Based on the analysis of nurses' knowledge

Based on the analysis of nurses' knowledge, *Figure 4* to *Figure 7* depict the findings related to proper use of medical masks, eye protection, hand hygiene biomedical waste management, and color-coding segregation of biomedical waste. The figures present the percentage of nurses who demonstrated adequate knowledge in each respective area.

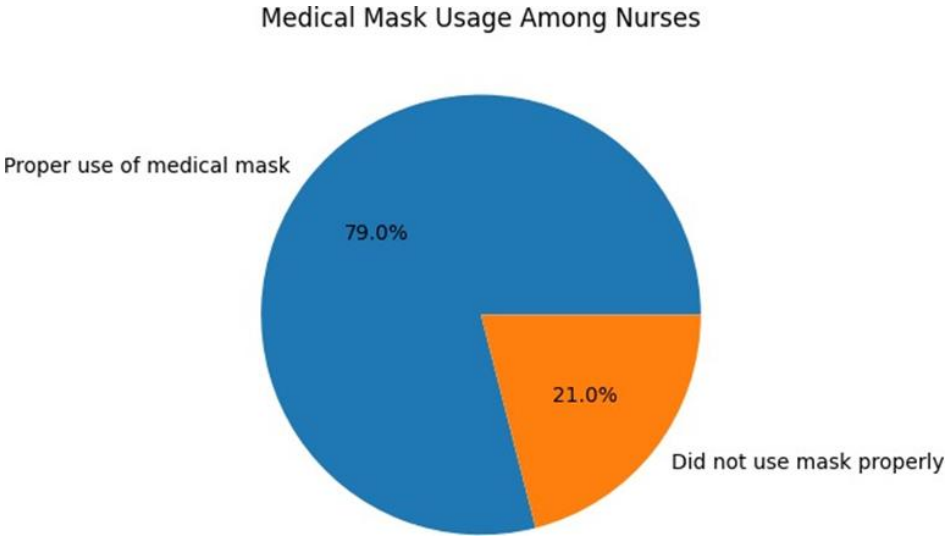

Figure 4. *Proper use of medical masks.*

Figure 5. *Proper use of eye protection.*

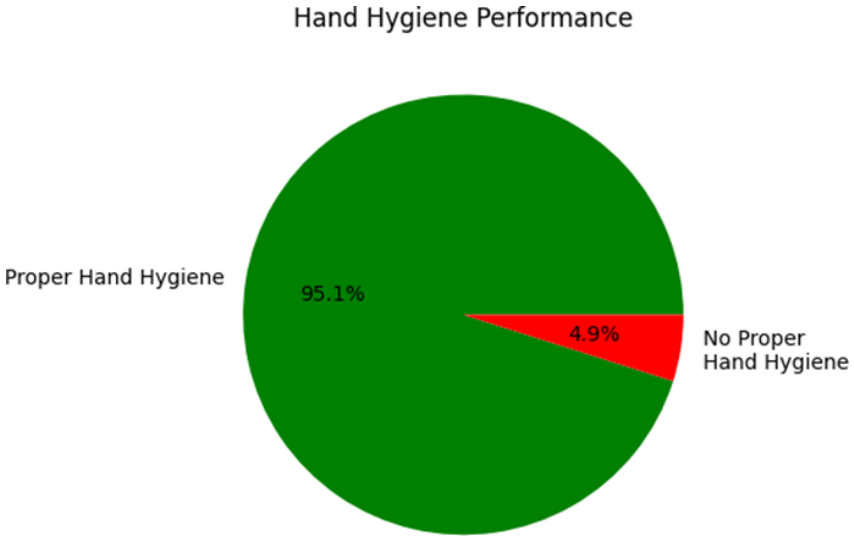

Figure 6. *Hand hygiene performance.*

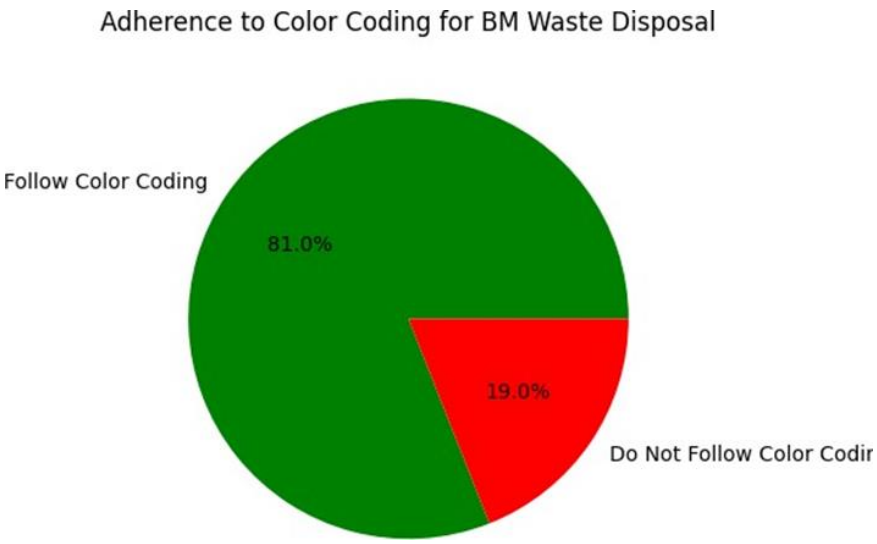

Figure 7. *Adherence to color-coding segregation of biomedical waste.*

Discussion

The results presented in the study provide insight into the infection control knowledge and practices of healthcare workers in tertiary care hospitals. The study conducted a questionnaire-based survey of 156 participants from two tertiary care hospitals, KTH, in which the participants were asked to respond to 20 questions about infection control knowledge and practices. The data collected from the participants was analyzed based on three categories: education level, designation and experience, and knowledge reflected in their responses to the questionnaire. The analysis of the KTH data based on education level, designation, and experience provides a clear picture of the demographics of the participants. The frequency figures and tables show that a large proportion of the participants were staff nurses (65), and most nurses had a matriculate or F.A. qualification (36 each). In terms of experience, most nurses had between 1 to 10 years of experience (40), followed by those with10 to 20 years of experience (26). These findings are consistent with previous studies that have reported that nurses with lower education levels and less experience have lower levels of knowledge and adherence to infection control practices (Zakeri et al., 2017). Overall, the findings of this study highlight the importance of education and experience in infection control knowledge and practices among healthcare workers. The results can inform the development of targeted training programs to improve infection control knowledge and practices among healthcare workers with lower education levels and less experience. The results presented in the study provide insight into the infection control knowledge and practices of healthcare workers in tertiary care hospitals. The study conducted a questionnaire-based survey of 156 participants from two tertiary care hospitals KTH, in which the participants were asked to respond to 20 questions related to infection control knowledge and practices. The data collected from the participants was analyzed based on three categories: education level, designation and experience, and knowledge reflected in their responses to the questionnaire.

The findings from the analysis of nurses' knowledge in this study provide important insights into the gaps that exist between knowledge and practice in infection control. Although a majority of the nurses had knowledge about infection control, they were not

effectively applying it in practice. The survey on preferred patient examination methods revealed that only 31 of nurses preferred to use gloves, while 26 preferred gloves at times and 23 depended on the case. This suggests a lack of consistency in the use of gloves, which is a key infection control practice. Similar findings have been reported in previous studies that have highlighted the importance of consistent glove use in preventing healthcare-associated infections (Antwis et al., 2017). The results of the survey on the frequency of practicing the correct wash-up technique in an operation theater setting also highlight the need for improvement in infection control practices among healthcare workers. While 42 of nurses reported always practicing the correct wash-up technique, 27 reported almost every time, and 11 reported quite often. Only 2 reported never practicing the correct wash-up technique. These findings suggest that there is room for improvement in the consistency of adherence to infection control practices among healthcare workers, even those with knowledge about infection control. Overall, the results of this study emphasize the importance of consistent adherence to infection control practices among healthcare workers. The findings can inform the development of targeted interventions to improve infection control practices and prevent healthcare-associated infections. The results presented in the study highlight various aspects of infection control practices among healthcare workers. The analysis of nurses' knowledge and practices revealed that while a majority of the nurses had knowledge about infection control, there were gaps in the consistency of adherence to infection control practices. The findings can inform the development of targeted interventions to improve infection control practices and prevent healthcare-associated infections.

The study found that a significant proportion of nurses were using medical masks (79) and following color-coding segregation for BM disposal (81). However, a smaller percentage of nurses were using eye protection (43) and recapping needles after use (76). The results suggest the need for improvement in the consistency of adherence to infection control practices, including the use of personal protective equipment and safe needle handling practices. Previous studies have also reported similar findings, highlighting the need for targeted interventions to improve adherence to infection control practices (Thakur and Gupta, 2019). The study also revealed a high level of awareness about the importance of hand hygiene and BM waste generation hazards and legislation, with 79 and 75 of the nurses agreeing with the importance of these aspects, respectively. The findings are consistent with previous studies that have reported the importance of education and awareness in promoting infection control practices among healthcare workers (Azhdarzadeh et al., 2012; Allegranzi et al., 2011). Overall, the results of this study highlight the importance of consistent adherence to infection control practices among healthcare workers. The findings can inform the development of targeted interventions to improve infection control practices and prevent healthcare-associated infections.

Conclusion

Based on the figures and tables presented, it can be inferred that the majority of the nurses who participated in the study were staff nurses, with a high frequency of matriculate and F.A. passed individuals. Additionally, a significant percentage of the nurses had 1-10 years of experience in the clinical area. Furthermore, the study found that only a fair percentage of nurses in KTH had the same level of knowledge. The main barrier reported against the practice of infection control was the improper use of gowns

and eye protection. This highlights the importance of improving education and adherence to infection control practices in healthcare facilities in developing countries.

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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