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Awareness Regarding to Nosocomial Infections and its Preventive Mesures among Nurses Working at Public Hospital

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ABSTRACT

Background: Nosocomial infectioin are major public health concern worldwide practicaly in hospital setting where patients are already immunocompromised. However, gaps in knowledge and inconsistent practices among nursing staff can contribute to the spread of infections.

Objective: To analyze the nurses knowledge releted to nosocomial infection and its preventive measure in hospital setting.

Methodology: A Cross sectional study was conducted, the target population consisted of nurses both male and female, total number of staff nurses working in this hospital was 82 and sample size selected in the study was 67 using rao soft software and the sampling technique used in the study was Non-Probability convenience Sampling.

Results: Out of 67 particioants, 68.7% were 30 years old and 47.8% held a Bachelor of Science in Nursing. Most nurses (47.8%) had 3–5 years of experience. Half (50.7%) had attended workshops on nosocomial infections. While 83.6% had general awareness about infection prevention, only 26.9% knew not to reuse gloves between patients, and just 46.3% were aware of correct color-coded waste disposal. Regarding disinfectant timing, 50.7% responded correctly, while knowledge about diseases spread via needle-stick injuries was highest for Hepatitis C (44.8%) and lowest for HIV only (9%).

Conclusion: Study showed nurses possess general awareness of nosocomial infection prevention, misconceptions about glove use, waste disposal and disinfection highlight the need for continuous education and practical training.

Keywords: Nurses, Nosocomial infection, prevention, knowledge.

Introduction

Nosocomial infections or healthcare associated infections occur in patients under medical care. These infections occur worldwide both in developed and developing countries. Nosocomial infections accounts for 7% in developed and 10% in developing countries.[1] Respiratory tract infections, urinary tract infections and bed sores were identified as common nosocomial infections by 50% of the staff,

but only 27% of respondents included surgical site infections in this category whereas, 14% considered sepsis and infected venous access to be frequently encountered hospital acquired infections. 28% of participants didn't consider recapping of needles to be a risk for getting infected whereas, 73% of staff overestimated the risk of sharing utensils. 89% of the staff had been given formal education on Hand Hygiene and 68% of staff claimed to wash their hands before touching patients. 28% of staff who didn't perform hand hygiene blamed it on unavailability of hand washing facilities while 4.5% did not consider hand hygiene necessary. In the same way, although 69% of staff acknowledged receiving training on the use of Personal Protective Equipment, only 42 % of staff claimed to wear gowns and 46% of staff agreed to wearing masks when needed.[2] 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. This includes promoting proper hand hygiene practices (i.e., handwashing or using hand sanitizers), and practicing safe injection practices.[3] While infections occur in different settings including at home, work and in outdoor settings, infections acquired at the healthcare facility pose a signifcant threat to the overall quality of healthcare delivery.According to the World Health Organisation the most common pathogens causing nosocomial infections include Staphylococcus aureus (including MRSA), Escherichia coli, Klebsiellapneumoniae, Pseudomonas aeruginosa, and Clostridioidesdifficile.[4] Prevention Strategies Effective prevention strategies include strict hand hygiene, sterilization of medical equipment, appropriate use of antibiotics to prevent resistance, and adherence to infection control protocols.[5] Risk factors for nosocomial infections include prolonged hospital stay, invasive procedures (e.g., catheterization, mechanical ventilation), immunosuppression, and poor hand hygiene among healthcare workers.[6] It is observed in a study that knowledge regarding HIAs among students of health care and control measures has been adequate. However, more practical components of hand hygiene and standard precautions in future educational approaches would be better effective.[7] Nosocomial Infections or hospital-acquired infections are a serious problem in public sector hospitals of developing countries such as Pakistan where there are no well-defined guidelines for hospital infection control and prevention. Public sector hospitals of both large and small cities of Pakistan are facing multifaceted problems due to rampant nosocomial infections and the emergence of multi-drug-resistant bacteria. If unchecked, these preventable and avoidable infections not only add to the suffering of patients but are also a considerable economic burden. Little literature is available on hospital acquired infections in Pakistan and related issues such as frequent occurrence of multi-resistantbacteria, and the economic loss and suffering of individuals, who bear the high healthcare costs.[8] Nosocomial infections can develop in patients during their stay in hospitals or healthcare facilities and were not present or incubating at the time of admission. They typically appear 48 hours or more after admission and may include infections such as urinary tract infections, surgical site infections, pneumonia, and bloodstream infections. These infections often arise due to invasive procedures, improper hand hygiene, contaminated medical equipment, and overuse of antibiotics.[9,10]. One of the most significant causes is poor hand hygiene and inadequate infection control practices by healthcare workers which allows for the easy transmission of pathogens from one patient to another. The use of contaminated medical equipment such as catheters, ventilators and surgical instruments also contributes to the spread of these infections when proper sterilization is not maintained. Invasive procedures further increase the risk by introducing foreign objects into sterile areas of the body providing a direct route for pathogens.[11] The role of nurses in preventing nosocomial infections is central, as they are involved in direct patient care and are responsible for executing standard precautions such as hand hygiene, sterilization, use of personal protective equipment (PPE), and safe handling of waste and sharps. Knowledge and consistent practice of these precautions are essential for infection control. Studies have shown that nurses with adequate knowledge and positive attitudes

toward infection control measures are more likely to follow standard protocols effectively. A global systematic review by Allegranzi et al. (2017) revealed that in low- and middle-income countries, HAIs were significantly higher compared to high-income settings. The review emphasized that lack of training, poor infrastructure, and irregular monitoring contributed to non-compliance with infection prevention protocols. In the context of pulmonary wards, these issues are further complicated by invasive procedures such as suctioning, intubation, nebulization, and use of ventilators, which increase the risk of airborne and contact transmission.[12] A study by Ahmed et al. (2019) conducted at a tertiary care hospital indicated that while nurses had basic awareness about nosocomial infections, their actual compliance with infection prevention measures was inadequate. Common barriers identified included heavy workload, inadequate staffing, lack of continuous training, and unavailability of PPE. These findings are consistent with Khan et al. (2020), who observed that although 80% of nurses could correctly define standard precautions, only 56% adhered to hand hygiene protocols regularly.[13] In light of these findings, it becomes evident that enhancing knowledge and encouraging consistent practice among nurses requires a multifaceted approach. Training, resource allocation, institutional support and behavioral reinforcement are all necessary. Given the high-risk environment of pulmonary wards, focused efforts are needed to ensure that infection prevention guidelines are not only understood but consistently applied.[14]

OBJECTIVE

- To identify knowledge and practice among nurses.
- To improving nurses knowledge and practices regarding to nosocomial infection.

SIGNIFICANCE

Nosocomial infections represent a significant challenge to patient safety, particularly in pulmonary wards where patients are often immunocompromised or suffering from chronic respiratory conditions. These infections not only increase morbidity and mortality rates but also prolong hospital stays and escalate healthcare costs. Nurses, being the frontline caregivers play a vital role in infection prevention and control through adherence to standard precautions and evidence-based practices.

RESEARCH METHODOLOGY

Cross sectional study was conducted at Liaquat University Hospital jamshoro to analyze nurses knowledge and preventive measure of nosocomial infection, The target population consisted of staff nurses both male and female working at Liaquat University Hospital jamshoro .Total number of staff nurses working in this hospital was 82. The sample size was Staff Nurses who were selected from hospital to participate in the study was 67. sample size collected by rao soft software and the sampling technique used in the study was Non-Probability convenience Sampling Technique. The instrument for data collection used a validate questionnaire, the questionnaire consists of 3 sections. Section A consists of socio demographic data which enquires concerning their age, gender, educational qualification and years of experience. Section B consist of 8 knowledge assessment data and section C consist of 10 level of knowledge of participants in preventive measure. The participants were explained about the study's objectives, purpose and their cooperation was requested. Written and verbal consent was obtained from those who agreed to participate. Data was analyzed on IBM SPSS version 27 and the descriptive statistics was applied.

RESULTS

DEMOGRAPHIC ANALYSIS

TABLE NO 1: Classification of Gender

CATEGORIES	FREQUENCY	PERCENTAGE
Male	13	19.4
Female	54	80.4
Total	**67**	**100.0**

Table: 1 shows that data was collected from both genders. The females respondents were 80.4% (n=54) while males account for 19.4% (n=13).

TABLE NO 2:
Classification of Age

CATEGORIES	FREQUENCY	PERCENTAGE
20 Years	16	23.9
30 Years	30	68.7
Above 40 Years	21	7.4
Total	**67**	**100.0**

Table No. 2 shows that 23.9% (n=16) respondents were 20 years old,68.7% (n=30) were 30 years of age, while those above than 40 years were 7.4 % (n=21) of the total sample.

TABLE NO 3:
Classification of Qualification

CATEGORIES	FREQUENCY	PERCENTAGE
Diploma	16	23.9
Degree	32	47.8
Master	19	28.4
Total	**67**	**100**

TableNo. 3 shows that 23.9% (n=16) of the participants hold a diploma, 47.8% (n=32) with a Bachelor of Science in Nursing (BSN) degree account for 36.5% (n=27) and 28.49(28.4) participant in was a Master of Science in Nursing (MSN) degree.

TABLE NO 4:
Classification of Experience

CATEGORIES	FREQUENCY	PERCENTAGE
1-2 Year	20	29.9%
3-5 Years	32	47.8%
Above 12 Years	15	22.4%
Total	**67**	**100.0**

Table 4 presents the classification of nurses according to their years of experience. Out of the total 67 participants:20 nurses (29.9%) have 1–2 years of experience. 32 nurses (47.8%) have 3–5 years of experience, making this the largest group. 15 nurses (22.4%) have more than 12 years of experience.

TABLE NO 5

PARTICIPATION IN WORKSHOP RELATED TO NOSOCOMIAL INFECTION

CATEGORIES	FREQUENCY	PERCENTAGE
YES	**34**	**50.7**
NO	**33**	**49.3**
	67	**100%**

Table 5 illustrates the participation of nurses in workshops related to nosocomial (hospital-acquired) infections. Out of the total 67 respondents: 34 nurses (50.7%) reported that they had attended a workshop on nosocomial infection.33 nurses (49.3%) stated they had not attended any such workshop.

TABLE NO 6
KNOWLEDGE ABOUT INSTRUMENT DISINFECTED

CATEGORIES	FREQUENCY	PERCENTAGE	MEAN	SD
10MINUTES	**34**	**50.7**		
24HOURS	**25**	**37.3**		
OTHER	**8**	**11.9**	**2.10**	**1.169**
TOTAL	**67**	**100.0%**		

The data in Table 6 reveals that the majority of participants (50.7%) believe that the disinfectant time for equipment is 10 minutes. This is followed by 37.3% of respondents who indicated 24 hours as the appropriate disinfectant time. A smaller proportion (13%) chose other options. The mean response score was 2.10 with a standard deviation of 1.169, indicating a moderate variation in participant knowledge.

TABLE NO 07

KNOWLEDGE ABOUT DISEASES TRANSMITED BY NEEDLE STICK INJURY

CATEGORIES	FREQUENCY	PERCENTAGE	MEAN	ST DEVI
HBV	19	28.4		
HCV	30	44.8		
HIV	11	16.4	2.3	
TB	1	9.0		2.598
TOTAL	67	100.0%	2.10	

Table 7 shows what diseases people know can be spread by needle-stick injuries. Out of 67 people, most knew about Hepatitis C (44.8%) and Hepatitis B (28.4%). Fewer people knew about TB (16.4%) and HIV (9.0%).The average knowledge score was 2.36, and the standard deviation was 2.598. This means people had different levels of knowledge. Overall, more awareness is needed, especially about HIV and TB. Overall knowlwdge about transmission of disease is good.

TABLE NO: 08 LEVEL OF KNOWLEDGE OF THE PARTICIPANTS

	YES	No	Mean	SD
1. Did you hear about infection prevention?	56 83.6	11 16.4	1.16	.373
2. Can gloves provide complete protection against acquiring or transmitting infections?	36 53.7	31 46.3	1.46	.502
3. Can washing your hands with soap or an alcohol-based antisepti decreases the risk of transmission of nosocomial infections?	49 73.1	18 26.9	1.27	.447
4. Is the use of an alcohol-based antiseptic for hand hygiene as effective as soap and water if hands are not visibly dirty?	53 79.1	14 20.9	1.21	.410
5. Should gloves be worn if blood or body fluid exposure is anticipated?	53 79.1	14 20.9	1.21	.410
6. Is there a need to wash hands before doing procedures that do not involve bodily fluids?	61 91.0	6 9.0	1.09	.288
7. Is there a need to wear the same pair of gloves for multiple patients as long as there is no visible contamination?	18 26.9	49 73.1	1.73	.447
8. Do you know specific waste disposal buckets according to the level of their contamination?	31 46.3	36 53.7	1.54	.502
	32	35	1.52	

9. Do you know the written formula for preparing 0.5% chlorine solution?	47.8	52.2		.503

Table No: 08 Asseses the level of knowledge among nurses regarding infection prevention practices related to nosocomial infections. The responses to nine key statements were analyzed.Awareness of infection prevention was high, with 83.6% of participants indicating they had heard about it. Only 53.7% believed that gloves alone can fully protect against acquiring or transmitting infections, showing a knowledge gap. 73.1% correctly agreed that hand washing with soap or alcohol-based antiseptics is effective in reducing infection risk. Similarly, 79.1% acknowledged the effectiveness of alcohol-based hand rubs when hands are not visibly dirty. 79.1% were aware that gloves should be worn when there is a risk of exposure to blood or body fluids. A strong majority (91.0%) knew the importance of washing hands even before procedures thatdon't involve body fluids. Only 26.9% knew it is not appropriate to wear the same pair of gloves for multiple patients—even if there's no visible contamination—indicating a serious knowledge gap. Knowledge of color-coded waste disposal buckets was limited, with only 46.3% responding correctly. Lastly, only 47.8% knew thecorrect formula for preparing 0.5% chlorine solution for disinfection.The data reveal that while general awareness of infection prevention is high, specific knowledge about best practices—such as glove use, waste disposal, and disinfectant preparation—is lacking among a significant portion of nurses. These gaps highlight the need for targeted education and regular workshops to strengthen infection control practices in the pulmonary ward.

TABLE NO: 08
PRACTICE OF THE PARTICIPANTS

STATEMENT		Strongly disagree	disagree	agree	Strongly agree	Mean	SD
1. I am fully aware of nosocomial infections	Freq	31	6	4	26	2.37	1.402
	%	46.3	9.0	6.0	38.8		
2. Nosocomial infections are also known as hospital acquired infections	Freq	10	12	12	33	3.01	1.135
	%	14.9	17.9	17.9	49.3		
3. Nosocomial infections occur during 48 to 7 hours after admission or during a specifie period of 3 to 10 days after dismissal	Freq	28	7	20	12	2.24	1.182
	%	41.8	10.4	29.9	17.9		
4. Nosocomial infections may be transmitted via medical equipment such	Freq	3	3	18	43	3.51	.786
	%	4.5	4.5	26.9	64.2		

as syringes, thermometers, needles, catheters, stethoscopes etc.							
5. Nosocomial infections can be transmitted from one person to another	Freq	18	14	3	32	2.73	1.309
	%	26.9	20.9	4.5	47.8		
6. Transmission of healthcare-associated pathogens takes place through direct and indirect contact, droplets, air, and a common vehicle.	Freq	8	8	34	17	2.90	.923
	%	11.9	11.9	50.7	25.4		
7. Healthcare workers are immune to nosocomial infections	Freq	49	5	7	6	1.55	1.004
	%	73.1	7.5	10.4	9.0		
8. . Invasive procedures increase the risk of nosocomial infections	Freq	23	23	17	4	2.03	.921
	%	34.3	34.3	25.4	6.0		

Table No:8 A significant portion of participants (46.3%) strongly agree that they are fully aware of nosocomial infections, while a smaller percentage disagree (9.0%).Regarding the definition of nosocomial infections, 14.9% strongly agree that they are also known as hospital-acquired infections.There is some uncertainty regarding the timing of nosocomial infections, with 41.8% strongly disagreeing that they occur within 48-72 hours after admission or within 3-5 days after dismissal.A majority of participants (64.2%) strongly agree that nosocomial infections can be transmitted via medical equipment.47.8% of participants strongly agree that nosocomial infections can be transmitted from person to person.There is a mixed response regarding the transmission of healthcare-associated pathogens, with 50.7% agreeing or strongly agreeing.A large majority of participants (73.1%) strongly disagree that healthcare workers are immune to nosocomial infections.Only 6.0% strongly agree that invasive procedures increase the risk of nosocomial infections, with a large portion disagreeing (34.3%).

DISCUSSION

The findings of this study indicate a generally high level of awareness regarding infection prevention practices among nurses at liaquat hospital jamshoro. However, deeper analysis reveals significant gaps in specific knowledge areas and practical application, which could hinder effective infection control. The demographic analysis showed that the majority of participants were in their 30 year of age and held either a BSN or diploma in nursing. Most had 3–5 years of clinical experience, which may contribute positively to their foundational knowledge but might not be sufficient to ensure full competency without continued professional development. In contrast, A study conducted in iran the overall knowledge of nurses regarding to prevention of NCI was only 57%.[15] On other side A study conducted in Ghana found that the overall knowledge score of nurses was 88.7% and the study conducted in Nigeria 90%

of participants had highest knowledge.[16,17] Similarly, the study conducted in Bahir Dar indicated that the overall nurses' knowledge on prevention of hospital acquired infections was found to be 84.5%.[18] Present study showed that 47% of participants had BSN degree This is supported by study conducted in united state shows that hospitals with more university-educated nurses had lower patient mortality. It proves that nurses education impact on patient's survival.[19,20]

These results are inconsistent with hospital reports of Odisha, where higher attitude scores were recorded in ≥16 years of experience.[21] Notably, nearly half of the participants had not attended any workshop on nosocomial infections, highlighting the need for regular, structured educational programs.Although 83.6% of respondents had heard about infection prevention, misconceptions remain. For instance, over half believed that gloves alone can fully protect against infections, and only 26.9% knew that gloves should not be reused between patients. These misunderstandings suggest that while the nurses are generally informed, there is a lack of in-depth, evidence-based understanding of standard precautions A plausible explanation for this result could be that in-service training and workshops serve as reinforcement mechanisms for existing knowledge. Even if nurses have received prior education on infection control, attending training sessions provides an opportunity to refresh their knowledge, identify areas for improvement, and correct any misconceptions or outdated practices. The repetition of key concepts and information during the training sessions has the potential to reinforce the importance of NCI prevention and increases retention of knowledge among nurses.[22] Knowledge regarding disinfectant preparation and waste management was also inadequate. Less than half correctly identified the method for preparing a 0.5% chlorine solution or recognized color-coded waste disposal systems. These deficiencies point to an urgent need for hands-on training and clearer institutional guidelines.When asked about the timing and transmission of nosocomial infections, responses were mixed. Although many agreed that these infections could spread through medical equipment and person-to-person contact, confusion about the exact time frame of occurrence and routes of transmission was evident. Only a small number strongly agreed that invasive procedures increase risk, indicating a possible underestimation of certain high-risk clinical activities.Furthermore, a study in three hospitals in Trinidad and Tobago in 2017, which indicated that 53.3% of participants had a positive attitude toward infection prevention and control. Additionally, 87.7% of HCWs agreed that a new pair of gloves should be worn for each new patient attended. This translated to a practice level of 56.0%, demonstrating the influence of attitude on practice.[23]

Overall, the results underline that while general awareness exists but there are serious knowledge gaps in critical areas such as personal protective equipment use, infection timelines, waste management and high-risk procedures. These gaps can compromise patient safety and nurse protection, especially in a sensitive setting. To address these issues, it is recommended that hospitals implement regular training sessions, workshops, and assessments focused on infection control, with special emphasis on practical demonstrations and real-life case discussions. Strengthening hospital policies and supervision can also promote adherence to infection prevention protocols.

CONCLUSION

This study assessed the knowledge and practices regarding the prevention of nosocomial infections among nurses working in , LUMHS Jamshoro, with a total population of 82 nurses. The findings indicated that while a considerable number of nurses demonstrated adequate knowledge about nosocomial infection prevention, there remained a gap in consistent implementation of proper practices. Contributing factors included limited availability of resources, lack of continuous professional training, and workload pressures. These results highlight the importance of regular in-service training, availability of infection control supplies, and reinforcement of infection prevention protocols. By addressing these gaps, healthcare institutions can enhance patient safety and reduce the prevalence of hospital-acquired infections in critical care areas such as the pulmonary ward.

LIMITATIONS

- Data were self-reported through questionnaires, which may have led to response bias.
- The sample size was confined to 82 nurses, which may affect the generalizability of results.
- The study did not explore the impact of previous infection control training on nurses' current knowledge and practices.
- The cross-sectional design of the study limits the ability to assess changes in knowledge and practice over time.
- The study did not differentiate between knowledge and practice levels based on nurses' years of experience or educational background.
- The study focused only on nurses and excluded other healthcare workers who also contribute to infection control practices.

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