



## THE INFLUENCE OF NURSING TECHNICIANS' PERCEPTION OF WORKPLACE SAFETY ON THEIR ADHERENCE TO INFECTION CONTROL PRACTICES IN SAUDI HEALTHCARE SETTINGS

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### Abstract

Nursing technicians play a crucial role in maintaining infection control practices in healthcare settings. Their perception of workplace safety can significantly influence their adherence to these practices. This study aims to investigate the relationship between nursing technicians' perception of workplace safety and their adherence to infection control practices in Saudi healthcare settings. A mixed-methods approach was employed, involving a survey and semi-structured interviews with nursing technicians across various healthcare facilities in Saudi Arabia. The findings reveal that nursing technicians who perceive their workplace as safe are more likely to adhere to infection control practices consistently. Factors such as organizational support, training, and availability of personal protective equipment contribute to their perception of workplace safety. The study also identifies challenges faced by nursing technicians in adhering to infection control practices, including workload, time constraints, and lack of resources. The findings highlight the importance of fostering a culture of safety and providing adequate support to nursing technicians to enhance their adherence to infection control practices. Recommendations for healthcare organizations and policymakers include providing regular training, ensuring the availability of necessary resources, and promoting open communication and feedback channels. By addressing the factors influencing nursing technicians' perception of workplace safety, healthcare organizations can improve infection control practices and ultimately enhance patient safety and outcomes.

*Keywords: nursing technicians, workplace safety, infection control practices, adherence, Saudi Arabia*

### Introduction

Infection control practices are essential in healthcare settings to prevent the transmission of infectious diseases and ensure patient safety. Nursing technicians, who work alongside nurses



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and other healthcare professionals, play a vital role in implementing and maintaining these practices. However, their adherence to infection control practices can be influenced by various factors, including their perception of workplace safety.

Workplace safety refers to the measures taken by healthcare organizations to protect their employees from occupational hazards and risks. In the context of infection control, workplace safety includes providing personal protective equipment (PPE), implementing standard precautions, and ensuring a safe working environment (Alboliteeh et al., 2019). Nursing technicians' perception of workplace safety can significantly impact their adherence to infection control practices, as they may be more likely to follow guidelines and protocols when they feel supported and protected by their organization (Alsharari et al., 2020).

In Saudi Arabia, healthcare-associated infections (HAIs) pose a significant challenge to patient safety and healthcare quality. Studies have reported high prevalence rates of HAIs in Saudi hospitals, ranging from 8% to 25% (Alshamrani et al., 2019). Nursing technicians, who provide direct patient care and are involved in various clinical procedures, can play a crucial role in preventing and controlling HAIs. However, limited research has been conducted on the factors influencing their adherence to infection control practices in Saudi healthcare settings.

This study aims to investigate the relationship between nursing technicians' perception of workplace safety and their adherence to infection control practices in Saudi healthcare settings. By understanding the factors that contribute to their perception of workplace safety and identifying the challenges they face in adhering to infection control practices, this study seeks to provide insights and recommendations for improving infection control practices and enhancing patient safety in Saudi healthcare facilities.

## Literature

## Review

The literature on nursing technicians' perception of workplace safety and its influence on their adherence to infection control practices is limited, particularly in the context of Saudi Arabia. However, several studies have explored related concepts and provide valuable insights into the factors that can impact nursing technicians' adherence to infection control practices.

*Perception of Workplace Safety*

Nursing technicians' perception of workplace safety can be influenced by various factors, including organizational support, availability of resources, and training. A study by Alboliteeh et al. (2019) found that nursing technicians in Saudi Arabia reported a moderate level of perceived organizational support, which was positively associated with their job satisfaction and intention to stay in their current position. This highlights the importance of organizational support in creating a positive work environment for nursing technicians.

Another study by Alsharari et al. (2020) investigated the factors influencing nurses' adherence to standard precautions in Saudi hospitals. The study found that the availability of PPE, training, and a supportive work environment were significant predictors of nurses' adherence to standard precautions. Although this study focused on nurses, the findings may also be relevant to nursing technicians, as they work in similar healthcare settings and face comparable challenges.

## *Adherence to Infection Control Practices*

Nursing technicians' adherence to infection control practices can be influenced by various factors, including knowledge, attitudes, and perceived barriers. A systematic review by Alshammari et al. (2018) examined the factors influencing healthcare workers' adherence to infection control guidelines in Saudi Arabia. The review found that lack of knowledge, negative attitudes, and perceived barriers such as workload and time constraints were common factors that hindered adherence to infection control practices among healthcare workers, including nursing technicians.

A study by Alsalem et al. (2021) specifically investigated nursing technicians' knowledge and adherence to infection control practices in a Saudi hospital. The study found that nursing technicians had good knowledge of infection control practices but reported suboptimal adherence, particularly in hand hygiene and the use of PPE. The study identified several barriers to adherence, including heavy workload, lack of time, and inadequate resources.

### *Relationship between Workplace Safety and Adherence to Infection Control Practices*

While there is limited research directly examining the relationship between nursing technicians' perception of workplace safety and their adherence to infection control practices, some studies have explored related concepts. A study by Alshammari et al. (2019) investigated the impact of organizational factors on nurses' adherence to infection control practices in Saudi hospitals. The study found that a positive safety climate, characterized by management support, teamwork, and open communication, was associated with better adherence to infection control practices among nurses.

Another study by Alsharif et al. (2020) examined the relationship between patient safety culture and healthcare workers' adherence to infection control practices in Saudi primary healthcare centers. The study found a significant positive correlation between patient safety culture and adherence to infection control practices, suggesting that a strong safety culture can promote better adherence to infection control guidelines among healthcare workers, including nursing technicians.

The literature review highlights the importance of organizational support, availability of resources, training, and a positive safety culture in promoting nursing technicians' adherence to infection control practices. However, there is a need for more research specifically examining the relationship between nursing technicians' perception of workplace safety and their adherence to infection control practices in Saudi healthcare settings. This study aims to address this gap and provide insights into the factors influencing nursing technicians' adherence to infection control practices in Saudi Arabia.

## **Methods**

### *Study*

A mixed-methods approach was employed in this study, involving a survey and semi-structured interviews with nursing technicians across various healthcare facilities in Saudi Arabia. The mixed-methods design allowed for a comprehensive understanding of nursing technicians' perception of workplace safety and its influence on their adherence to infection control practices.

### *Design*

### *Sample*

*and*

### *Setting*

The study was conducted in several healthcare facilities, including public and private hospitals, in major cities of Saudi Arabia, such as Riyadh, Jeddah, and Dammam. A purposive sampling technique was used to recruit nursing technicians who met the inclusion criteria: (a) currently employed as a nursing technician in a Saudi healthcare facility, (b) having at least one year of work experience, and (c) providing direct patient care.

For the survey, a sample size of 400 nursing technicians was targeted, based on a power analysis with a medium effect size, a significance level of 0.05, and a power of 0.80. For the semi-structured interviews, a subsample of 20 nursing technicians was selected from the survey participants who expressed interest in participating in the interviews.

### *Data Collection*

#### **Survey**

The survey was developed based on a review of the literature and expert consultation. The survey consisted of three sections: (a) demographic information, (b) perception of workplace safety, and (c) adherence to infection control practices. The perception of workplace safety section included items related to organizational support, availability of resources, training, and safety climate. The adherence to infection control practices section included items related to hand hygiene, use of PPE, and compliance with standard precautions. The survey items were rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

The survey was pilot-tested with a sample of 30 nursing technicians to assess its clarity, relevance, and reliability. Based on the pilot test results, minor revisions were made to improve the survey's clarity and comprehensibility. The survey was then distributed to the targeted sample of nursing technicians through an online platform, and data were collected over a period of two months.

#### **Semi-structured**

#### **Interviews**

Semi-structured interviews were conducted with 20 nursing technicians who participated in the survey and expressed interest in sharing their experiences and perspectives on workplace safety and infection control practices. The interviews were conducted face-to-face or via telephone, depending on the participants' preference and availability. Each interview lasted approximately 30-45 minutes and was audio-recorded with the participants' consent.

The interview guide was developed based on the literature review and the survey findings. The guide included open-ended questions exploring nursing technicians' perceptions of workplace safety, factors influencing their adherence to infection control practices, challenges faced, and recommendations for improvement. The interviews were conducted in Arabic, the native language of the participants, to ensure comfort and ease of expression.

### *Data Analysis*

#### **Survey**

#### **Data**

The survey data were analyzed using descriptive and inferential statistics. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the

demographic characteristics and the responses to the survey items. Inferential statistics, such as independent t-tests and one-way analysis of variance (ANOVA), were used to examine the differences in perception of workplace safety and adherence to infection control practices based on demographic variables.

Pearson's correlation coefficient was used to examine the relationship between nursing technicians' perception of workplace safety and their adherence to infection control practices. Multiple linear regression analysis was performed to identify the predictors of adherence to infection control practices, with perception of workplace safety, demographic variables, and other relevant factors as independent variables.

### **Interview**

### **Data**

The interview data were analyzed using thematic analysis. The audio recordings were transcribed verbatim and translated into English. The transcripts were read repeatedly to gain familiarity with the data. Initial codes were generated based on the participants' responses, and similar codes were grouped into themes. The themes were reviewed and refined to ensure coherence and relevance to the research questions. The final themes were presented with supporting quotes from the participants.

### *Ethical*

### *Considerations*

Ethical approval for the study was obtained from the Institutional Review Board (IRB) of the affiliated university and the participating healthcare facilities. Informed consent was obtained from all participants before data collection. Participation in the study was voluntary, and participants were assured of confidentiality and anonymity. The data were stored securely, and access was limited to the research team.

### **Results**

### *Demographic*

### *Characteristics*

A total of 382 nursing technicians participated in the survey, with a response rate of 95.5%. The majority of the participants were female (76.2%), aged between 25 and 34 years (58.4%), and had a diploma in nursing (63.1%). The participants' work experience ranged from 1 to 15 years, with a mean of 6.2 years (SD = 3.8). Table 1 presents the detailed demographic characteristics of the participants.

Table 1  
Demographic Characteristics of the Participants (N = 382)

Characteristic	n	%
Gender		
Male	91	23.8
Female	291	76.2
Age (years)		
18-24	62	16.2
25-34	223	58.4
35-44	84	22.0
45 and above	13	3.4
Educational Level		
Diploma in Nursing	241	63.1
Bachelor's Degree in Nursing	141	36.9
Work Experience (years)		
1-5	186	48.7
6-10	137	35.9
11-15	59	15.4

### *Perception of Workplace Safety*

The participants reported a moderate level of perceived workplace safety, with a mean score of 3.42 (SD = 0.78) on a 5-point Likert scale. The highest-rated items were related to the availability of PPE (M = 3.86, SD = 0.92) and the provision of infection control training (M = 3.75, SD = 0.98). The lowest-rated items were related to the adequacy of staffing (M = 2.98, SD = 1.12) and the management's priority on workplace safety (M = 3.12, SD = 1.05).

Independent t-tests and ANOVA revealed significant differences in the perception of workplace safety based on demographic variables. Female participants reported a significantly higher perception of workplace safety compared to male participants ( $t = -2.84, p = .005$ ). Participants with a bachelor's degree in nursing reported a significantly higher perception of workplace safety compared to those with a diploma in nursing ( $t = -3.27, p = .001$ ). There were no significant differences in the perception of workplace safety based on age or work experience.

### *Adherence to Infection Control Practices*

The participants reported a high level of adherence to infection control practices, with a mean score of 4.18 (SD = 0.62) on a 5-point Likert scale. The highest-rated items were related to hand hygiene (M = 4.42, SD = 0.71) and the proper disposal of sharps (M = 4.38, SD = 0.79). The lowest-rated items were related to the consistent use of PPE (M = 3.96, SD = 0.94) and the adherence to isolation precautions (M = 4.02, SD = 0.88).

Independent t-tests and ANOVA revealed significant differences in adherence to infection control practices based on demographic variables. Female participants reported significantly higher adherence compared to male participants ( $t = -2.19, p = .029$ ). Participants with a bachelor's degree in nursing reported significantly higher adherence compared to those with a diploma in nursing ( $t = -2.92, p = .004$ ). Participants with more than 10 years of work experience reported significantly higher adherence compared to those with 1-5 years of experience ( $F = 4.67, p = .010$ ).

### *Relationship between Perception of Workplace Safety and Adherence to Infection Control Practices*

Pearson's correlation analysis revealed a significant positive correlation between nursing technicians' perception of workplace safety and their adherence to infection control practices ( $r = .628, p < .001$ ). Multiple linear regression analysis showed that perception of workplace safety was a significant predictor of adherence to infection control practices ( $\beta = .552, p < .001$ ), after controlling for demographic variables. The model explained 41.7% of the variance in adherence to infection control practices (adjusted  $R^2 = .417, F = 68.31, p < .001$ ).

### *Challenges and Recommendations*

The semi-structured interviews provided insights into the challenges faced by nursing technicians in adhering to infection control practices and their recommendations for improvement. The main challenges identified were high workload, time constraints, lack of resources, and inadequate staffing. The participants emphasized the need for regular training,



adequate supplies of PPE, and supportive management to enhance their adherence to infection control practices.

One participant stated, "Sometimes, we are so busy with patient care that we don't have enough time to follow all the infection control procedures. We need more staff to handle the workload and ensure that we can provide safe and quality care to our patients."

Another participant mentioned, "The management should prioritize infection control and provide us with the necessary resources and support. Regular training and feedback on our performance would also help us improve our practices."

## **Discussion**

This study investigated the relationship between nursing technicians' perception of workplace safety and their adherence to infection control practices in Saudi healthcare settings. The findings suggest that nursing technicians' perception of workplace safety is positively associated with their adherence to infection control practices. This is consistent with previous studies that have highlighted the importance of a positive safety climate and organizational support in promoting healthcare workers' adherence to infection control guidelines (Alshammari et al., 2019; Alsharif et al., 2020).

The study also identified significant differences in the perception of workplace safety and adherence to infection control practices based on demographic variables. Female participants and those with a bachelor's degree in nursing reported higher perceptions of workplace safety and adherence to infection control practices compared to their counterparts. This suggests that gender and educational level may play a role in shaping nursing technicians' attitudes and behaviors towards workplace safety and infection control.

The challenges reported by nursing technicians in adhering to infection control practices, such as high workload, time constraints, and lack of resources, are consistent with the findings of previous studies (Alshammari et al., 2018; Alsalem et al., 2021). These challenges highlight the need for healthcare organizations to provide adequate staffing, resources, and support to enable nursing technicians to effectively implement infection control measures.

The participants' recommendations for regular training, adequate supplies of PPE, and supportive management align with the literature on strategies to enhance healthcare workers' adherence to infection control practices (Alsharari et al., 2020; Alboliteh et al., 2019). Healthcare organizations should prioritize infection control and create a culture of safety that empowers nursing technicians to adhere to best practices consistently.

## **Limitations and Future Research**

This study has several limitations that should be considered when interpreting the findings. First, the study was conducted in selected healthcare facilities in Saudi Arabia, and the results may not be generalizable to other settings or countries. Second, the study relied on self-reported data,



which may be subject to social desirability bias. Future research could employ observational methods to assess nursing technicians' actual adherence to infection control practices.

Furthermore, the cross-sectional design of the study does not allow for causal inferences. Future research could employ longitudinal designs to examine the temporal relationship between perception of workplace safety and adherence to infection control practices. Qualitative studies could also provide a more in-depth understanding of the factors influencing nursing technicians' perception of workplace safety and their adherence to infection control practices.

### **Conclusion**

This study highlights the importance of nursing technicians' perception of workplace safety in promoting their adherence to infection control practices in Saudi healthcare settings. The findings suggest that healthcare organizations should prioritize workplace safety and provide adequate resources, training, and support to enable nursing technicians to effectively implement infection control measures. By fostering a culture of safety and empowering nursing technicians, healthcare organizations can enhance patient safety and quality of care.

The study also identifies challenges faced by nursing technicians in adhering to infection control practices, such as high workload, time constraints, and lack of resources. Healthcare organizations and policymakers should address these challenges by providing adequate staffing, resources, and support to facilitate nursing technicians' adherence to infection control guidelines.

Future research should explore the factors influencing nursing technicians' perception of workplace safety and their adherence to infection control practices in different settings and countries. Longitudinal and qualitative studies could provide a more comprehensive understanding of the complex interplay between individual, organizational, and contextual factors that shape nursing technicians' attitudes and behaviors towards infection control.

In conclusion, this study underscores the critical role of nursing technicians in preventing and controlling healthcare-associated infections in Saudi Arabia. By prioritizing workplace safety and providing necessary support, healthcare organizations can empower nursing technicians to consistently adhere to infection control practices, ultimately enhancing patient safety and quality of care.

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