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ASSESSMENT OF NURSES' KNOWLEDGE, ATTITUDE, AND PRACTICE TOWARDS OXYGEN THERAPY ADMINISTRATION IN CRITICALLY ILL PATIENTS AT A TERTIARY CARE HOSPITAL

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Abstract

Background

Oxygen therapy is an essential intervention in the management of critically ill patients and plays a vital role in preventing hypoxemia and improving tissue oxygenation. Nurses are primarily responsible for administering and monitoring oxygen therapy; therefore, adequate knowledge, a positive attitude, and appropriate clinical practice are necessary to ensure safe and effective patient care.

Aim

The study aimed to assess the knowledge, attitude, and practice of nurses regarding the administration of oxygen therapy to critically ill patients at Jinnah Hospital Lahore.

Methods

A descriptive cross-sectional study was conducted over a period of nine months among 157 registered nurses selected through purposive sampling. Data were collected using an adapted structured questionnaire assessing knowledge, attitude, and practice regarding oxygen therapy. The collected data were analyzed using Statistical Package for the Social Sciences (SPSS) version 22. Descriptive statistics, including frequencies and percentages, were used to summarize the findings.

Results

The findings showed that 49.7% of nurses had moderate knowledge, 45.2% had poor knowledge, and only 5.1% had good knowledge. Regarding attitude, 51.0% demonstrated a positive attitude, while 49.0% had a negative attitude. In terms of practice, 58.6% of participants had poor practice, 31.8% had moderate practice, and only 9.6% demonstrated good practice regarding oxygen therapy administration.

Conclusion

The study concluded that although nurses generally demonstrated a positive attitude toward oxygen therapy, their knowledge and clinical practice require significant improvement. Continuous professional education, competency-based

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training, and adherence to evidence-based guidelines are recommended to enhance safe oxygen therapy administration and improve patient outcomes.

INTRODUCTION

Oxygen is found almost 21 % in the atmosphere and less than hydrogen and helium (Dede Tisei, 2018). The mass of human body 65% is occupied by oxygen and it involve in numerous processes in the human body including metabolism production of energy. Human body each cells dependent on oxygen (Mayhob, 2017). Oxygen in human life is playing very important role and it is a drug which is used extremely universally and practiced by medical specialties in a large amount (Elhaj, 2022).Supplemental Oxygen is deliver for respiratory failure patients and its widely used in critical care areas (Demilew, Mekonen, Aemro, Sewnet, & Hailu, 2022).According to world health organization (WHO) oxygen is the fundamental source and it is effective drugs for the critical ill patients who has admitted in a hospital (Bizuneh, Getahun, Melesse, & Chekol, 2022).

The Proper administration of oxygen therapy achieve positive health outcomes and misuse of oxygen therapy is badly effect the patient health condition (Zeleke & Kefale, 2021). Oxygen therapy is very effective medicine to maintain the critical ill patient condition (Bizuneh et al., 2022). Oxygen therapy (OT) administration varies from 94% to 98% that bring the patient to normal condition. Patients who is diagnosis with hypercapnia respiratory failure. Oxygen saturation should be used less than from 88% to 92%. oxygen therapy saturation effective for acutely and critical ill patients. Oxygen therapy is the main source while resuscitating the patient, It is play major role for the survival of the patient (Argeta, Bezabih, & Kebede, 2022).

Worldwide the 16% of critical ill patient suffer from death due to lack of nurses knowledge about oxygen therapy (IRADUKUNDA, 2022). The study in Asia mentioned that the 51% of nurses carry a prescribed oxygen protocol. The 82.3% of most nurses have idea about the managing and accessing the oxygen therapy. The study in Pakistan identifies that the 57.3% of nurses have follow the WHO guidelines about oxygen therapy (Memon, Aziz, Memon, Aziz, & Hussain, 2022).The administration of oxygen therapy to the critical ill patient is used on a regular basis by ICU nurses. The basic responsibility of the ICU nurses to administer oxygen and provide care to the critical ill patients. Nurses play important in the recovery and to improve the condition of critical ill patients (Bunkenborg & Bundgaard, 2019). The administration of oxygen therapy is very helpful and have positive outcomes for patient on mechanical ventilation in ICU (Helmerhorst et al., 2014).

The ICU nurses are should be knowledgeable about administering oxygen therapy to provide supplemental oxygen for individuals to maintenance of low-flow oxygen therapy(Eastwood, O'Connell, & Considine, 2011). The normal respiratory rate is disturbing by hypoxemia (deficiency of oxygen in blood mainly in arteries). The knowledge of nurses is play a part to identify Hypoxemia which is recognizing by mental status changes (confusion, coma, disorientation, lethargy, impaired judgment, agitation), shortness of breath, change in heart rate, increase in blood pressure, dysrhythmias, cool extremities, central cyanosis (late sign) and diaphoresis (Dede Tisei, 2018). Pulse oximetry check the arterial oxygen saturation (SpO2) for hypoxemia (Amalakanti & Pentakota, 2016). The oxygen has two effect one is beneficial and the other have toxicity effect it bring the patient condition negative and some cause death when it use improperly (Steffan, Brevik, Burgess, & Cerdà, 2018). The flow rate of nasal cannula or nasal prongs device for oxygen therapy through nasopharynx is from 1 to 6 L/min (Arora, Mahajan, Zidan, & Sethuraman, 2012).

Attitude of the nurses is mostly dependent on the better practices. The attitude regarding administration of oxygen therapy refers to the nurse's beliefs and feeling towards the use of oxygen therapy as a medical intervention. Positive attitude of the nurses brings positive outcomes for the patients who are receiving oxygen therapy. Oxygen is a drug that is mostly administer to the critical ill patient in emergency situation, it is used

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one-third in emergency patients (Martin & Grocott, 2013). The lung tissue is harm by oxygen so it is necessary to Observing the patients while oxygen administration. The high concentration of oxygen is make the alveoli collapse and create oxygen toxicity (Nakane, 2020). Artificial humidification is necessary to administer with high flow system can control the drying of the airway secretion which may be irritating and unpleasant (Kuch & Venkataraman, 2022). The sterile water technique is use to destroy microorganism in humidifier for the prevention of nosocomial infection (La Fauci et al., 2017).

The practice of nurses to be consider as crucial element while administration of oxygen therapy. It is important to consider various factors and parameters to ensure the safe and effective delivery of oxygen towards the critical ill patients. The practices of the nurses are commonly effect by knowledge. The professionally trained nurses are the health care providers basically responsible for administering oxygen therapy and closely observing the risk of supplemental oxygen (Nippers & Sutton, 2014). The administration of oxygen is different system that are based on high-flow system, low-flow system, and reservoir system. No any devices to be used in airway of conscious patients for receiving oxygen (Badiger, John, Fearnley, & Ahmad, 2015). The hospital inpatients at any given time will be receiving oxygen 15-17% and the ambulance patients during transit about 34% receive oxygen (Kane, Decalmer, & O'Driscoll, 2013). The used of supplemental oxygen in specific time and appropriate amount can prevent the heart and lung diseases according to world health organization (WHO) guidelines (Diab, Ali, Abed, Elasrag, & Ramadan, 2022). The different studies are revealed that the nurses are faced difficulties regarding the correct dose, duration and flow rate of different devices while administration of oxygen therapy. So There is a gap between nurse's knowledge and practice in the research studies which is published in different states.

Methods

A descriptive cross-sectional study design was adopted to evaluate the KAP of registered nurses on oxygen therapy for critically ill patients. The study was carried out at Jinnah Hospital Lahore and took nine months to complete. The population of interest was registered nurses working in the Emergency Department, ICU, CCU, and the HDU. A purposive sampling technique was employed to select study participants. The sample size of 157 nurses was based on a total population of 260 nurses with a margin of error of 5% as calculated by Slovin's formula. Nurses with at least six months of work experience in a critical care environment and had direct involvement in the process of administering oxygen therapy were included. The following were not included in the study: nurses working outside the critical care environment, nursing students, interns, trainees, administrative personnel, nurses who did not directly provide oxygen therapy, and nurses who were on leave during the data collection period.

Data Collection Procedure

An adapted, structured questionnaire was used to measure knowledge, attitude, and practice of nurses on oxygen therapy for critically ill patients. Ethical approval was obtained from the Department of Nursing, Superior University, and permission was obtained from Jinnah Hospital Lahore. Before the study, participants were informed of the purpose, and objectives of the study, and were obtained written informed consent. The study protected the privacy and anonymity of all participants. Questionnaires were given and collected to/from eligible nurses during the duty hours. It was explained to the participants that the study was voluntary and they were free to exit the study any time with no consequences.

Data Analysis Procedure

Collected questionnaires were screened for completeness, and then coded for entry into Statistical Package for Social Sciences (SPSS) version 22. To analyze data, descriptive statistics were used to calculate frequencies and percentages; means and standard deviations were used to describe knowledge, attitude, and practice scores regarding oxygen therapy. Data were analyzed and presented on tables and charts as

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required to facilitate better interpretation of the study results. **Results**

Demographic Analysis

Table 1 presents the demographic characteristics of the 157 participants included in the study. The findings show that most participants were aged 26–30 years (42.7%), followed by 21–25 years (33.8%), while only 0.6% were aged 36–40 years. The majority of respondents were female (84.7%), reflecting the predominance of females in the nursing profession. Regarding marital status, 52.9% were single and 47.1% were married. In terms of professional experience, 43.3% had 1–5 years of experience, followed by 41.4% with 6–10 years of experience. Furthermore, more than half of the participants (53.5%) held a Diploma in Nursing, while 42.0% had a Post RN qualification and only 4.5% possessed a BSN degree.

Table 1: Demographic Characteristics of the Participants (n = 157)

Variable	Category	Frequency (n)	Percentage (%)
Age	21–25 years	53	33.8
	26–30 years	67	42.7
	31–35 years	36	22.9
	36–40 years	1	0.6
Gender	Male	24	15.3
	Female	133	84.7
Marital Status	Single	83	52.9
	Married	74	47.1
Experience	1–5 years	68	43.3
	6–10 years	65	41.4
	11–15 years	23	14.6
	>15 years	1	0.6
Qualification	Diploma Nursing	84	53.5
	Post RN	66	42.0
	BSN	7	4.5

Table 2 illustrates the overall level of knowledge of nurses regarding the administration of oxygen therapy to critically ill patients. The results indicate that 49.7% of the participants had a moderate level of knowledge, representing the largest proportion of respondents. Additionally, 45.2% demonstrated poor knowledge, whereas only 5.1% achieved a good level of knowledge. These findings suggest that although nearly half of the nurses possessed an average understanding of oxygen therapy, a considerable proportion lacked adequate knowledge, highlighting the need for regular educational programs and evidence-based training to improve nurses' competency in oxygen therapy administration.

Table 2: Level of Knowledge Regarding Oxygen Therapy

Knowledge Level	Frequency (n)	Percentage (%)
Poor	71	45.2
Moderate	78	49.7
Good	8	5.1
Total	**157**	**100.0**

Figure 1 shows the overall attitude of nurses toward oxygen therapy administration. The findings reveal that 51.0% of the participants had a positive attitude, while 49.0% demonstrated a

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negative attitude toward oxygen therapy practices. The small difference between positive and negative attitudes indicates that nurses generally have favorable perceptions regarding oxygen therapy; however, nearly half still possess less favorable attitudes. This finding emphasizes the importance of continuous professional development, awareness sessions, and supportive workplace policies to further strengthen positive attitudes among nurses.

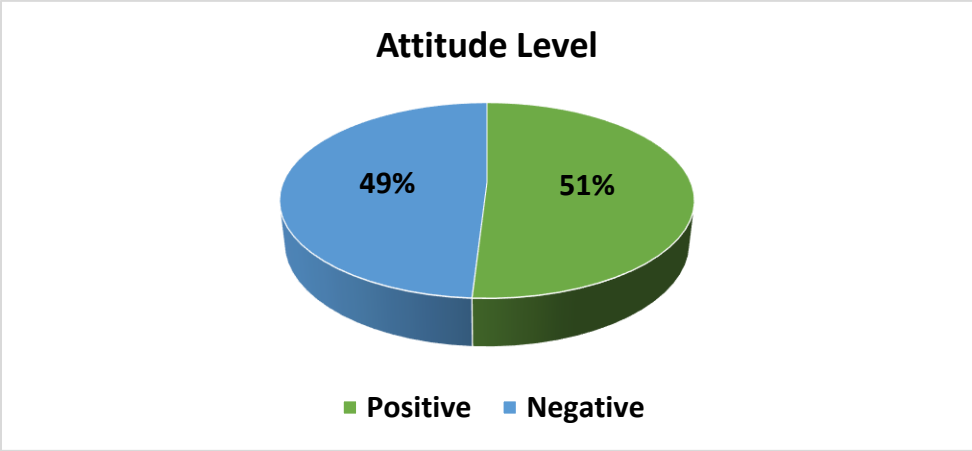


Figure 1: Attitude Toward Oxygen Therapy Administration

Figure 2 presents the overall practice level of nurses regarding oxygen therapy administration. The results demonstrate that the majority of participants (58.6%) had poor practice, while 31.8% showed a moderate level of practice, and only 9.6% demonstrated good practice. These findings indicate that despite having moderate knowledge and generally positive attitudes, many nurses were unable to translate their knowledge into appropriate clinical practice. This gap highlights the need for regular clinical training, competency-based workshops, supervision, and adherence to standardized oxygen therapy guidelines to improve nursing practice and ensure safe patient care.

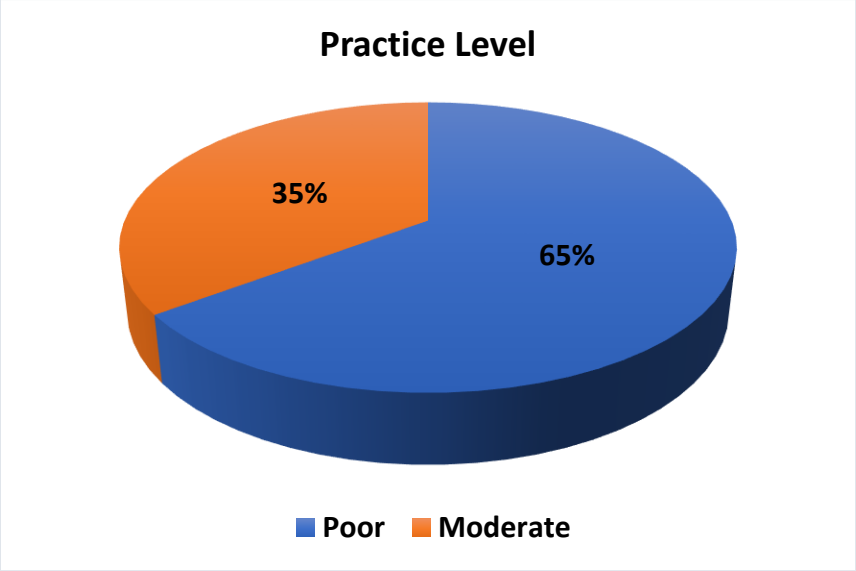


Figure 2: Level of Practice Regarding Oxygen Therapy Administration

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Discussion

This study measured the knowledge, opinions, and practices of nurses providing oxygen therapy to critically ill patients at Jinnah Hospital Lahore. The demographics described mostly female nurses aged 26 to 30 with 1-10 years of clinical practice and a nursing diploma. As the majority of first responders in critical care units are females, these demographics are consistent with the nursing workforce of multiple tertiary care hospitals, as evidenced in other studies. Young female nurses working in critical care units are the majority of respondents in the study of Elhaj (2022), and the present demographics are consistent with those of Elhaj (2022). An increase in the number of respondents with a bachelor's degree was recorded in the study by Arga et al. (2022), in contrast to the present study, which recorded the largest number of diploma-qualified nurses.

In the present study, 49.2% of nurses were said to have a moderate level of knowledge of oxygen therapy, 45.2% had a poor knowledge, while 5% had a good knowledge. These findings indicate that the majority of nurses only have a limited comprehension of the fundamentals of oxygen therapy and are in need of education. These findings are consistent with the findings of Elhaj (2022), where it was noted that the majority of nurses had a moderate level of knowledge of oxygen therapy. The research study of Hanson et al. (2021) indicated critical care nurses had higher levels of knowledge following the implementation of structured educational programs, indicating that knowledge of nurses can be improved significantly through the implementation of continuing professional education. The variance in results can be attributed to the regular inter-departmental and institutional educational support that is available at the respondents' place of employment.

Responses to the individual knowledge questions indicated that nearly all respondents correctly associated the provision of oxygen therapy with the presence of hypoxemia. Respondents also correctly identified flow rates for oxygen delivery through face masks and non-rebreathing masks. However, many respondents showed low levels of correct responses to questions regarding the classification of oxygen as a medication and the interpretation of normal oxygen saturation levels. These results indicate that, typically, nurses are more comfortable with procedural knowledge than with the cognitive concepts associated with oxygen therapy. This finding aligns with that of Thomson et al. (2017), who reported that nurses had better knowledge of practical aspects of oxygen therapy than of the theoretical aspects. Additionally, a study conducted by Considine et al. (2015) reported greater overall knowledge for nurses employed in hospitals with the presence of institutional oxygen therapy guidelines, thus, highlighting the role of institutional guidelines.

Findings from this study show that 51.0 of surveyed nurses expressed a positive attitude toward oxygen therapy, while 49.0 of the surveyed nurses expressed a negative attitude. Most respondents agreed that oxygen therapy should be delivered in accordance with medical orders and recognized the importance of maintaining the prescribed level of oxygen saturation for patients with chronic pulmonary illness. Dede Tisey (2018) reported similar results that SMS in general had a positive attitude toward oxygen therapy and recognized oxygen therapy as being important to the safety of the patient. The study conducted by Chua et al. (2019) showed an increased positive attitude toward oxygen therapy among nurses who had attended continuing education programs, thus, indicating that continuing education results in a positive change in the attitude toward the delivery of oxygen therapy.

The data from the clinical practice section revealed that the majority of respondents (58.6%) exhibited poor practice, while only 9.6% were classified as good practice. While most nurses stated they adhered to the hospital policy and used sterile water in the humidifiers and modified the oxygen therapy interventions based on the oxygen saturation, there were gaps in the practice concerning the replacement of equipment and the adherence to the infection prevention recommendations. These findings are consistent with the findings of Arga, Bezabih, and Kebede (2022), where it was reported that nurses who had inadequate oxygen therapy practice had a relatively good level of knowledge. Aloushan et al. (2021)

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found that the clinical practice of nurses improved when nurses were provided with regular competency evaluations and supervision, suggesting that both supervision and evaluation are vital in improving practice.

The present study documented a gap between knowledge and attitude versus practice. What this suggests is that knowledge and a positive attitude do not suffice to practice appropriately. Nurses face multiple barriers that include a heavy workload, inadequate number of staff, limited access to updated protocols, and lack of continuing education. These barriers prevent nurses from practicing oxygen therapy in line with the available evidence. Thomson et al. (2017) arrived at the same conclusion when they stated that the inadequate resources in a clinical setting, including a lack of supportive supervision, affect nurses' adherence to the recommended practice of oxygen therapy. Hanson et al. (2021) demonstrated that practical simulation training had a positive impact on improving nurses' clinical practice, further suggesting the value of competency-based education interventions.

The overall conclusions show that nurses have a moderate understanding, somewhat favorable attitudes, and poor practice of administrating oxygen therapies. Generally, the results agree with the available literature in Sudan (Elhaj, 2022), Ethiopia (Arga et al., 2022), and Ghana (Dede Tisey, 2018). However, there were some discrepancies in the extent of knowledge and practices. Such discrepancies could be due to the differences in the educational systems/distortions, existence of institutional frameworks, availability of CPD opportunities, and accessibility of clinical setups. The results call for a need to orient toward educational interventions, standard-setting for oxygen therapy, and formulation of practice-based strategies with improvements in knowledge and practice. This approach will improve the standard of care and bring effective and safe practices for the benefit of patients in critical care.

Conclusion

The current study concluded that the knowledge was moderate and practice regarding administration of oxygen therapy to the critical ill patients was poor and the attitude was positive. This is the need of the time to educate nurses and bring better knowledge and practice regading the administration of oxygen therapy, so the patients care can improve and the side effects due to malpractice should be minimize. there is intense need to providing education and conduct trainings programs for enhancing the knowledge and improving the practice of nurses regarding oxygen therapy administartion to the critical ill patients.

Recommendations

Based on the findings of the present study, the following recommendations are proposed:

1. Regular in-service education programs and workshops should be organized to improve nurses' knowledge regarding oxygen therapy administration.
2. Evidence-based clinical guidelines and protocols for oxygen therapy should be readily available and implemented in all critical care units.
3. Hospitals should conduct regular competency assessments and refresher training sessions to ensure nurses maintain safe oxygen therapy practices.
4. Continuous clinical supervision and monitoring should be carried out by nurse managers to ensure adherence to standard oxygen therapy guidelines.
5. Simulation-based training and practical demonstrations should be incorporated into continuing nursing education to enhance nurses' clinical skills.
6. Nursing curricula should place greater emphasis on oxygen therapy management and evidence-based critical care practices.
7. Hospitals should ensure the continuous availability of oxygen delivery equipment, pulse oximeters, humidification devices, and updated clinical protocols.
8. Future studies should include multiple tertiary care hospitals with larger sample sizes to improve the generalizability of the findings.
9. Analytical studies should be conducted to identify factors associated with nurses' knowledge, attitude, and practice regarding oxygen therapy administration.

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10. Healthcare institutions should encourage nurses to participate in continuing professional development (CPD) programs to enhance their competence and improve the quality and safety of patient care.

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