RJNMSR
Review Journal of Neurological & Medical Sciences Review

Volume 3, Issue 7, 2025

ASSESS LEVEL OF KNOWLEDGE AMONG NURSES, CARING FOR NEONATAL CHILD ON MECHANICAL VENTILATOR AT TERTIARY CARE HOSPITALS PESHAWAR

Muhammad Iqbal[1], Amjad Ali[*2], Salman Faheem[3], Naeem Jan[4], Emad Khan[5], Waqas Ahmad[6], Asaf Khan[7], Akhter Ali[8], Ubaidullah[9], Muhammad Awais[10], Hassan Raza[11], Yahya Khan[12], Basit Ali[13]

[1]lecturer Khyber Medical University Peshawar
*[*2]BSN. MPH. MSc psychology MSN Scholar KMU*
[3]BSN 8 semester student Farabi college of nursing
[4]bsn 8 Semester Student Farabi College Of Nursing
[5]Bsn 8 Semester Student Farabi College Of Nursing
[6]Bashir Institute Of Nursing Islamabad
[7]Eagle College Of Nursing Swat
[8]Farabi College Of Nursing
[9]Hassan College Of Nursing Swat
[10]BSN 8 Semester Student Farabi College Of Nursing
[11]BSN 8 Semester Student Farabi College Of Nursing
[12]BSN 8th semester
[13]BSN 8th semester

Corresponding Author: *
Amjad Ali

DOI: https://doi.org/10.5281/zenodo.17748327

Received	Accepted	Published
01 October 2025	10 November 2025	26 November 2025

ABSTRACT

Neonatal care encompasses a wide range of medical attention and support provided to newborn infants, typically from birth to the first 28 days of life, although this period can extend depending on various factors. Neonatal care is crucial for ensuring the health and well-being of newborns, especially those who are premature, have medical complications, or are born with congenital abnormalities.

Mechanical ventilation (MV) is an automatic device that provides all or part of the work of breathing for neonates who are impotent to breathe sufficiently on their own. The goal of mechanical ventilation is to maintain adequate pulmonary gas exchange, reduce the work of breathing and decrease exhaustion for neonate.

Certainly, the level of knowledge among nurses caring for neonatal children on ventilators is critical for ensuring the safety and well-being of these fragile patients. Given the rapidly evolving nature of neonatal care and ventilation technology, nurses should be committed to ongoing learning and professional development to stay abreast of current best practices and advancements in the field.

Methodology: *The methodology used for the study was quantitative descriptive cross sectional approach, the target population was nurses working in the Neonatal ICUs (NICU), the sample size was drawn by using the open epi software and then the data was collected by an adopted structured questionnaire which contains the demographic data, the questions for assessing knowledge regarding mechanical ventilator, ETT insertion and extubation, and the respiratory syndrome. All the data was then analyzed by SPSS version 22.2 accordingly for the demographic and all the variables respectively. Interpretation of the data was made and the conclusion was drawn also given the possible suggestion and recommendation.*

Results: *The socio-demographic profile of the 180 study participants reveals a diverse group in terms of age, gender, education, and work experience. The majority are aged 24 to 29 years (65.0%), with smaller groups aged 18 to 23 years (16.7%) and over 30 years (18.3%). Females make up 63.3% of the participants, with males at 36.7%. Educationally, most participants have a Post RN MSN (48.3%), followed by those with a BSN (27.8%) and a Diploma in Nursing (21.7%). The participants' working experience is primarily between 2-5 years (36.1%), with others having 5-7 years (33.3%) and 7-9 years (30.6%) of experience. The data is evenly distributed across six hospitals (PIC, KTH, LRH, HMC, NWGH, and RMI), each contributing 16.6% of the participants.Knowledge about intubation and extubation equipment also saw 81.1% (146 respondents) rating their knowledge as good and 18.3% (33 respondents) as average. The "Poor" category was not filled in this section. For past knowledge of intubated patients, 76.7% (138 respondents) rated it as good, 20.0% (36 respondents) as average, and 3.3% (6 respondents) as poor.The data reveals the participants' experience and knowledge related to ventilator use and mechanical ventilation. A majority of participants (78.3%, or 141 individuals) regularly attend to ventilator patients. Regarding knowledge about mechanical ventilators, 79.3% of participants rate their knowledge as good, 23.1% as average, and 2.2% as poor. Similarly, for the use of ventilator modes, 73.9% consider their knowledge good, 23.9% average, and 2.2% poor.*

Conclusion:

The analysis of the socio-demographic data and knowledge levels of the 180 nurse participants regarding mechanical ventilation and respiratory syndrome reveals several key insights. The participants, predominantly aged between 24 to 29 years and mostly female, possess a diverse range of educational backgrounds and work experiences. There is a nearly even split between those with and without a specialty diploma in ICU, and a significant majority have attended ICU workshops, indicating a strong engagement in continuing professional development.

Keywords: *Mechanical ventilation, Neonatal care, ETT intubation and extubation, respiratory syndrome*

INTRODUCTION

Neonatal care encompasses a wide range of medical attention and support provided to newborn infants, typically from birth to the first 28 days of life, although this period can extend depending on various factors. Neonatal care is crucial for ensuring the health and well-being of newborns, especially those who are premature, have medical complications, or are born with congenital abnormalities. (Hassan Afify El-Garhy et al., 2020)Neonatal care on a ventilator is a critical aspect of medical management for infants who require respiratory support due to various conditions such as respiratory distress syndrome, congenital anomalies, or prematurity. Ventilators provide mechanical ventilation to support breathing and oxygenation, ensuring adequate gas exchange in fragile neonatal lungs. This form of care demands a delicate balance of expertise, technology, and compassion to optimize outcomes while minimizing potential complications.(Saritas et al., 2019)

One-third of the patients admitted to the intensive care unit (ICU) in the world need mechanical ventilation (MV) treatment. Mechanical ventilator support is one of the main indications for admission to the intensive care unit (ICU). i,e continuous development of mechanical ventilators and their clinical use have been critical factors for the development and growth of critical care and respiratory professions. (Hassen et al., 2023)

Mechanical ventilation (MV) is an automatic device that provides all or part of the work of breathing for neonates who are impotent to breathe sufficiently on their own. The goal of mechanical ventilation is to maintain adequate pulmonary gas exchange, reduce the work of breathing and decrease exhaustion for neonate.

It takes a complex skill to administer mechanical ventilation (MV) to infants, kids, and teenagers. Although MV for infants and children can save lives, it can also have serious side effects like lung damage linked to the ventilator. Because of their high tidal volume, severely diseased lungs are particularly vulnerable to shear forces (TV) The goal of lung-protective MV is to avert lung damage

by establishing physiological conditions. Avoiding high TV and delta pressure (peak inspiratory pressure [PIP]—positive end-expiratory pressure [PEEP]) in cases of acute respiratory distress syndrome is advised by international guidelines for neonatal and pediatric mechanical ventilation. (Mehrzai et al., 2023)

Critically ill neonates who are hospitalized at neonatal intensive care units (NICUs) are at higher threat for several nosocomial infections and respiratory tract infections contributes to a significant proportion of nosocomial infections. Advances in mechanical ventilation (MV) in the neonatal intensive care units have back to markedly to the survival of neonate's infants in the last decades; especially extremely preterm ones. However, Mechanical ventilation is a unique compassionate modality in the intensive care unit but it conveys a lot of hazards and complications, the ultimate one being ventilator associated pneumonia which can significantly affect the outcome of critically ill neonates. (Abou Zed & Mohammed, 2019).

Over the past 20 years, newborn and under-five mortality rates have significantly decreased worldwide. Neonatal mortality, however, is still largely unchanged, particularly in underdeveloped nations. Pakistan comes in third place out of the ten high burden countries and contributes 7% of all newborn deaths worldwide.(Ayaz & Saleem, 2010)

Globally there has been a considerable decline in under-five and infant mortality in the past two decades. However neonatal mortality remains relatively unchanged especially in developing countries. Worldwide four million infants die in the first 28 days of life each year: the neonatal period. Infant and child mortality has been steadily declining over the last 20 years, neonatal mortality has stayed mostly stable. Ninety-nine percent of newborn mortality happen in developing nations, with most births taking place at home. There is evidence to suggest that basic, low-cost interventions and practices during pregnancy, childbirth, and the postnatal period could avoid these deaths. The government and foreign donors have worked hard in Pakistan over the past ten years to put these policies into effect.(Economics et al., 2020)

Ventilator-associated pneumonia (VAP) is a most common complication amongst neonates experiencing mechanical ventilation and one of the main forms of health care associated infection (HAI) related to mechanical ventilation. It considers the second most communal nosocomial infection in neonatal intensive care units (NICUs), subsequent great morbidity and mortality. It also extends the length of hospital stay and increase hospital costs. (Ebrahim et al., 2023)

Management of critically ill patients has become increasingly important in modern medical and nursing systems. Critical care nurses play a crucial role in improving the effectiveness of mechanical ventilation, preventing harm, and optimizing patient outcomes, skills and knowledge of health teams regarding the care of a patient on a mechanical ventilator and patients' clinical status enable them to fine tune ventilator settings to maximize the benefits of ventilator support while minimizing complications. Knowledge of nurses about the functions and limitations of ventilator modes, causes of distress, dysynchrony with ventilator, and appropriate management enable them to provide high-quality centered care. As nurses are the first-line manager challenged with patients' and ventilators' problems, it is crucial to recognize the problems such as respiratory distress, dyspnea, and increased work of breathing, and the actions to be taken to solve these problems. So, the nurses who provide care for ventilated patients must understand the basic ventilator support including ventilator mode, setting, and alarms. It is also important to be skilled in promptly identifying and managing common patient and ventilator-related problems to provide optimal patient-centered care and prevent complications. (Mustafa, 2019).

Data from Pakistan suggests that under-five mortality rates have declined from 117 to 94 per 1000 live births whereas the infant mortality rates have declined from 91 to 78 per 1000 live births during 1990–1991 to 2006–2007. However, the neonatal mortality rates have remained almost static from 56 to 54 per 1000 live births.(Priyanka et al., 2017)

Objectives:

To assess the level of knowledge among nurses regarding ventilator care of neonatal children.

Objective of the study will typically identify the basic knowledge and the gap in the knowledge among the nurses working at neonatal ICU

working for the children on mechanical ventilation.

Problem statement:

The level of knowledge among nurses caring for neonatal children on ventilators is a critical factor influencing the quality of care and patient outcomes in neonatal intensive care units (NICUs). Despite the pivotal role nurses play in the management of ventilated neonates, there exists variability in the depth and breadth of their understanding, which can lead to inconsistencies in care delivery and potential patient safety risks. This knowledge gap encompasses various aspects, including ventilator operation and troubleshooting, respiratory physiology, infection control practices, medication management, family education, interdisciplinary collaboration, and emergency preparedness. Inadequate knowledge in any of these areas can compromise the effectiveness of care, increase the likelihood of adverse events, and contribute to parental distress and dissatisfaction. Therefore, addressing and remedying these knowledge deficits is imperative to ensure optimal care delivery and positive outcomes for neonatal patients requiring ventilator support.

Research question:

What is the level of knowledge among nurses caring for neonatal patients on mechanical ventilation, and what are the specific areas where knowledge gaps exist?"

Operational definitions:

Neonatal care:

Neonatal care refers to the specialized medical care provided to newborn infants, typically during the first 28 days of life. This area of healthcare focuses on meeting the unique needs of newborns, particularly those who are premature, have low birth weights, or are born with medical conditions requiring intensive medical attention. Neonatal care encompasses a range of services aimed at promoting the health, development, and well-being of newborns, including respiratory support, nutritional support, temperature regulation, monitoring, infection prevention and treatment, developmental support, family-centered care, and preparation for transition to home care. It involves a multidisciplinary approach with healthcare professionals collaborating to ensure the best possible outcomes for newborn infants and their families.

Mechanical ventilation:

Mechanical ventilation is a medical intervention used to support or replace spontaneous breathing in patients who are unable to adequately exchange oxygen and carbon dioxide on their own. It involves the use of a mechanical ventilator, a device that delivers breathable air to the lungs through an artificial airway, such as an endotracheal tube or tracheostomy tube. Mechanical ventilation is commonly employed in various clinical settings, including intensive care units (ICUs), operating rooms, and emergency departments, to manage conditions such as respiratory failure, acute lung injury, pneumonia, neuromuscular disorders, and postoperative recovery.

Respiratory distress syndrome:

Respiratory distress syndrome (RDS), also known as hyaline membrane disease, is a breathing disorder that primarily affects premature infants. It occurs due to immature lungs that lack sufficient surfactant, a substance that helps keep the small air sacs in the lungs open. Without enough surfactant, the air sacs collapse, making it difficult for the infant to breathe effectively. RDS typically manifests shortly after birth, with symptoms including rapid or shallow breathing, grunting sounds, flaring nostrils, and retractions (visible sinking of the chest between the ribs or under the breastbone during inhalation). Infants with RDS may also have bluish skin due to inadequate oxygenation. RDS is more common in premature infants born before 37 weeks of gestation, particularly those born very prematurely, before 28 weeks.

Prematurity:

Prematurity, also known as preterm birth, refers to the condition where a baby is born before completing 37 weeks of gestation in the womb. A full-term pregnancy typically lasts about 40 weeks from the first day of the mother's last menstrual period to the baby's birth. However, when a baby is born prematurely, they have not had enough time to fully develop and mature in the womb, which can lead to various health challenges and complications.

Neonatal ICU: (NICU)

A neonatal intensive care unit (NICU) is a specialized medical facility within a hospital that provides intensive care to newborn infants, particularly those who are premature, critically ill, or born with medical conditions requiring specialized medical attention. The NICU is equipped with advanced medical equipment and staffed by a multidisciplinary team of healthcare professionals trained in neonatal care, including neonatologists, nurses, respiratory therapists, pharmacists, dietitians, and social workers.

Ventilator associated pneumonia:

Ventilator-associated pneumonia (VAP) is a type of pneumonia that develops in patients who are receiving mechanical ventilation in intensive care units (ICUs) or other healthcare settings. It is defined as pneumonia that occurs 48 hours or more after endotracheal intubation and initiation of mechanical ventilation. VAP is a significant cause of morbidity and mortality among ventilated patients and is associated with prolonged hospital stays and increased healthcare costs.

CHAPTER-2 LITERATURE REVIEW

This chapter will give a summary of the literature search out from different search engines both nationally and internationally. This unit will brief about the literature search up to 5-10 years old publish through various journals and publications sites.

2.1 objective of literature review

This literature review aims to explore existing research on the knowledge and competencies of nurses in neonatal intensive care settings, with a particular focus on the challenges and educational needs related to the care of neonates on mechanical ventilation. Additionally, the review will examine the specific context of tertiary care hospitals in Peshawar, identifying any gaps in knowledge and potential areas for training and development

2.2 summary of literature review

The literature review explored the critical role of nurses in neonatal intensive care units (NICUs), particularly in the management of neonates on mechanical ventilators. Research consistently highlights that nurses' knowledge and competencies in this area are vital for ensuring the safety and optimal outcomes of these vulnerable patients. Studies emphasize the complexity of caring for neonates on mechanical ventilators, requiring nurses to be well-versed in both the technical aspects of ventilation and the nuances of neonatal care.

Several studies have identified significant variations in the level of knowledge among nurses, influenced by factors such as educational background, years of experience, and access to ongoing training. The literature indicates that while some nurses demonstrate strong competencies in ventilator management, others may lack the necessary knowledge, potentially compromising patient care.

In the context of Peshawar's tertiary care hospitals, the review reveals a scarcity of region-specific studies assessing nurses' knowledge in this critical area. The available literature suggests a need for more focused research on the training and educational needs of nurses in this region, given the unique challenges faced in resource-limited settings. Additionally, there is a call for the implementation of standardized training programs and continuous professional development to bridge knowledge gaps and enhance the quality of neonatal care.

Overall, the literature underscores the importance of equipping nurses with the necessary skills and knowledge to manage neonatal patients on mechanical ventilators effectively. Addressing the identified gaps through targeted interventions and research will be crucial in improving the quality of care provided in NICUs, particularly in the context of tertiary care hospitals in Peshawar.

Finding different of literature review

The term "newborn care" describes the medical attention given to a baby by a mother or other career from the time of birth until the baby is one month old. This includes nursing, immunizations, thermal care, hygiene care, cord care, eye care, and identification of newborn danger indicators. (Sakelo et al., 2020)

A mechanical ventilator is a positive pressure breathing apparatus that causes air or an oxygen mixture to be pushed intermittently into the lungs in a fashion similar to natural breathing. Mechanical ventilation is a technique used to support pulmonary function in neonates until they are able to breathe on their own with

minimal assistance. Mechanical ventilation serves to decrease respiratory effort, promote alveolar ventilation and carbon dioxide elimination, and supply sufficient tissue oxygenation.(Mohamed Elsayed Hegazy & El Sayed Abusaad, 2019)

The mechanical ventilation (MV) technique can save the lives of patients with respiratory insufficiency or hypoxemia, However, there is a chance that it can have life-threatening side effects and consequences. Among these problems may be considered lengthier hospital stay, higher mortality, prolonged mechanical ventilation, and high expense. Approximately one-third of patients hospitalized to intensive care units (ICUs) worldwide require mechanical ventilation (MV) treatment. The nursing care and interventions are crucial in preventing the problems that come with using a mechanical ventilator, which is frequently utilized in intensive care units. (Saritas et al., 2019)

Children are admitted to intensive care units most frequently due to respiratory failure, and the ventilator is the primary therapeutic device utilized to treat these patients. The psychosocial requirements of the child and family, equipment function, fluid and electrolyte management, nourishment, skin care, mobilization of secretions, sedation and pain management, and weaning strategies are all included in the supportive care of a kid on mechanical ventilation. (Priyanka et al., 2017)

A descriptive study was conducted in Mumbai India, to evaluate the pediatric intensive care unit nurses' practices and caring for children on ventilators. The study's conclusion indicated that nurses must regularly improve their skill sets. They must consistently practice in a methodical manner in order to improve their talent. (Priyanka et al., 2017)

To prevent various complications such as pneumothorax, airway injury, alveolar damage, ventilator-associated pneumonia, acute lung injury, and respiratory distress syndrome, the nurse needs to be knowledgeable about the indications, modes, and settings of the ventilator as well as various aspects of nursing care of children on a mechanical ventilator. (Priyanka et al., 2017)

In the last 20 years, there has been a notable drop in newborn and under-five mortality worldwide. Neonatal mortality hasn't decreased much, though, particularly in underdeveloped nations. Every year, four million infants worldwide pass away within the first 28 days of life—the neonatal period.(Ayaz & Saleem, 2010)

The majority of newborn deaths occur in underdeveloped nations and are largely related to home births. Sub-Saharan Africa has the highest rates of infant mortality. Although average rates are lower in Asia, the region's high fertility rate and vast population allow it to account for more than 60% of the estimated global total. Pakistan is ranked third out of ten countries with high birth rates, contributing 7% of all birth deaths worldwide. Save the Children USA launched Saving Newborn Lives (SNL) in 12 countries in June 2000. In order to improve basic services, it helped the Ministry of Health in Pakistan train 4000 LHWs and over 3000 healthcare practitioners in maternity and newborn care. (Ayaz & Saleem, 2010)

The leading causes of neonatal death worldwide are asphyxia (23%), preterm birth (28%) and severe infections (36%), which include pneumonia/sepsis {26%}, tetanus {7%}, and diarrhoea {3%}. There is evidence to suggest that low-cost, straightforward practices and interventions throughout pregnancy, birth, and the postnatal period could avert a sizable percentage of newborn morbidity and mortality in underdeveloped nations. Vaccination against tetanus toxoid, iron, folate, and iodine supplements, clean and skilled delivery care, neonatal resuscitation, prevention of hypothermia, early and exclusive breastfeeding, clean umbilical cord care, and management of pneumonia and sepsis are a few of these.(Ayaz & Saleem, 2010)

CHAPTER-3 METHODOLOGY

Study design:

Quantitative (descriptive cross sectional study design was used in the study)

Study setting:

Both public and private hospital were approach for study to carry out the study smoothly and access the sample size easily. The selected hospitals were (in private sector hospital Rehman medical institute, north west general hospital and research center, while in public sector hospitals Khyber teaching hospital and Hayat Abad medical complex Peshawar were chosen for sampling.

Study duration:
After approval from the Ghandara university, and hospitals ERB committee 6 months was taken by the study.

Sample size:
Sample size was calculated by openepi.com sample size calculator by applying the 95% confidence interval and 5% margin of error, the sample size calculated 169.

Data collection:
After Approval from the Ghandara university and ERB committee of the hospital data was collected by an adopted questionnaire including 15 question. Along with written inform consent. The first section included the sociodemographic data, second section include knowledge regarding ventilator use and third section was knowledge regarding ETT care neonatal care on mechanical ventilators.

Sampling technique:
Non probability convenient sampling technique was used for the sampling criteria.

Inclusion criteria:
The inclusion criteria were the staff nurses working at neonatal ICU (NICU) having experience of more than 2 years, whose attend the patient with respiratory disorders and who are willing for participation.

Exclusion criteria:
The exclusion criteria for the study was the staff nurses whose were not willing for the study, who's not attend the respiratory or ventilated patients and who has less experience than 2 years.

Data Analysis:
Data was analyzed through SPSS software version 22.2 the data was analyzed for the demographic variable and study variables accordingly drawn the tables and graphs later on interpretation and conclusion has been written.

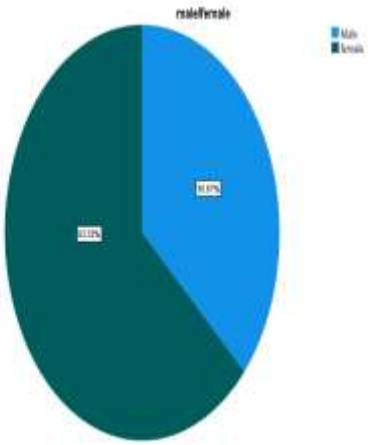
CHAPTER-4 RESULT AND ANALYSIS

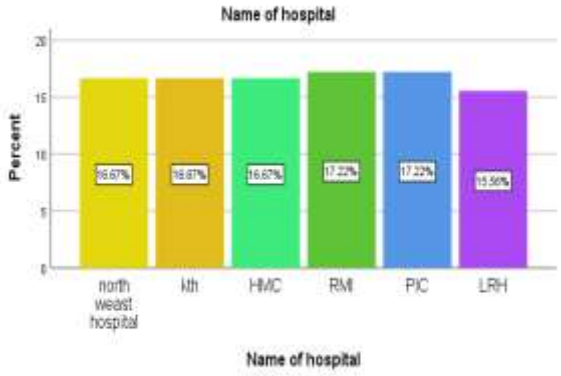
For the result analysis and interpretation, the data divided into two main parts which are the socio demographic data and the part 2 represents the knowledge level of the nurses regarding the mechanical ventilation specifically for the neonatal children.
The total number of participants were 180 calculated by open epi software as discussed in the chapter-3 the sociodemographic results of the participants are as follows.

Table 1: Socio-Demographic profile of the participants, n=180

	Frequency	Percent	Valid Percent	Cumulative Percent
Age of the participants				
18 to 23 Years	30	16.7	16.7	16.7
24 to 29 Years	117	65.0	65.0	81.7
More than 30 Years	33	18.3	18.3	100.0
Total	180	100.0	100.0	
Gender of the participants				
Male	66	36.7	36.7	36.7
Female	114	63.3	63.3	100.0
Total	180	100.0	100.0	
Education status of the participants				
Diploma Nursing	39	21.7	21.7	21.7
BSN	50	27.8	27.8	49.4
Post RN	87	48.3	48.3	97.8
MSN	4	2.2	2.2	100.0
Total	240	100.0	100.0	
Working Experience of the participants				
2-5 years	65	61.3	61.3	61.3
5-7 years	60	37.5	37.5	98.8
7-9 years	55	1.3	1.3	100.0

Total	180	100.0	100.0	
Data from hospitals				
PIC	30	16.6	16.6	
KTH	30	16.6	16.6	
LRH	30	16.6	16.6	
HMC	30	16.6	16.6	
NWGH	30	16.6	16.6	
RMI		16.6	16.6	

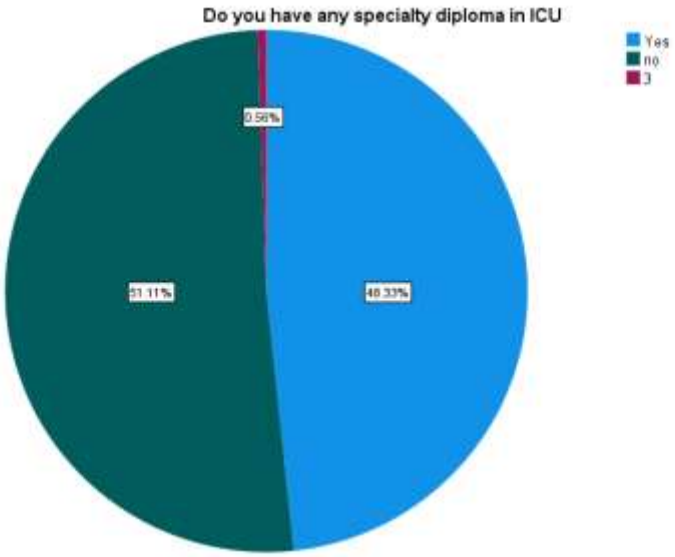




The socio-demographic profile of the 180 study participants reveals a diverse group in terms of age, gender, education, and work experience. The majority are aged 24 to 29 years (65.0%), with smaller groups aged 18 to 23 years (16.7%) and over 30 years (18.3%). Females make up 63.3% of the participants, with males at 36.7%. Educationally, most participants have a Post RN MSN (48.3%), followed by those with a BSN (27.8%) and a Diploma in Nursing (21.7%). The participants' working experience is primarily between 2-5 years (36.1%), with others having 5-7 years (33.3%) and 7-9 years (30.6%) of experience. The data is evenly distributed across six hospitals (PIC, KTH, LRH, HMC, NWGH, and RMI), each contributing 16.6% of the participants. (Table 1).

Table 2: statistics of ICU specialty of the participants, n=180

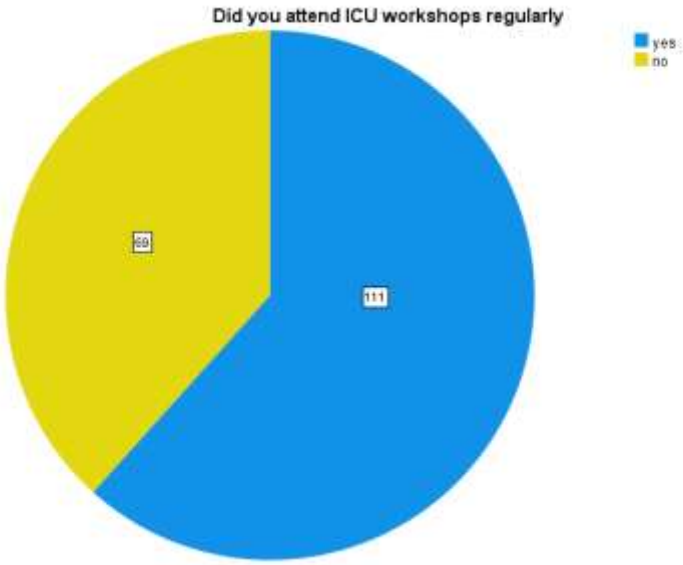
Specialty diploma in ICU				
	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	88	48.3	48.3	48.3
no	92	51.1	51.1	99.4
Total	180	100.0	100.0	



The data on the specialty diploma in ICU among the 180 participants indicates that just under half of the participants (48.3%) have a specialty diploma in ICU, with 88 individuals affirming this qualification. In contrast, a slight majority (51.1%) of 92 participants do not possess this specialty diploma. This distribution shows a nearly even split among participants regarding ICU specialization, highlighting a balanced mix of those with and without this additional qualification. (table 2).

Table 3: statistics of attending ICU workshop of the participants, n=180

Attending ICU workshops					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	111	61.7	61.7	61.7
	no	69	38.3	38.3	100.0
	Total	180	100.0	100.0	

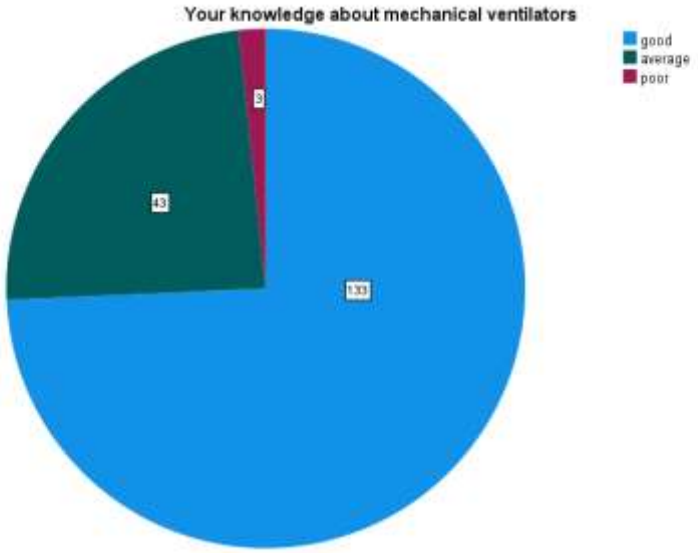


Regarding attendance at ICU workshops, the data shows that a significant majority of the participants (61.7%) have attended such workshops, accounting for 111 individuals. Conversely, 38.3% of the participants, or 69 individuals, have not attended any ICU

workshops. This indicates that a substantial portion of the study group has engaged in additional ICU training and educational opportunities, which may reflect a commitment to continuing professional development in critical care among these healthcare professionals. (Table 3)

Table 4: knowledge regarding ventilator use of the participants, n=180

	Frequency	Percent	Valid Percent	Cumulative Percent
Are you attend ventilator patients regularly?				
Yes	141	78.3	78.3	78.3
NO	39	21.7	21.7	100
Total	180	100	100	
knowledge about mechanical ventilator?				
Good	133	79.3	79.3	79.3
Average	43	23.1	23.1	98.8
Poor	4	2.2	2.2	100
Total	180	100	100	
Your knowledge about use of ventilator mode?				
	133	73.9	73.9	73.9
Good	43	23.9	23.9	97.8
Average	4	2.2	2.2	100.0
Poor	180	100.0	100.0	
Total				
Your knowledge regarding ventilator trouble shoot?				
	104	57.8	57.8	57.8
Good	57	31.7	31.7	89.4
Average	19	10.6	10.6	100.0
Poor	180	100.0	100.0	
Total				
Your knowledge regarding principle of mechanical ventilator?				
	118	65.6	65.6	65.6
Good	54	30.0	30.0	95.6
Average	8	4.4	4.4	100.0
Poor	180	100.0	100.0	
Total				



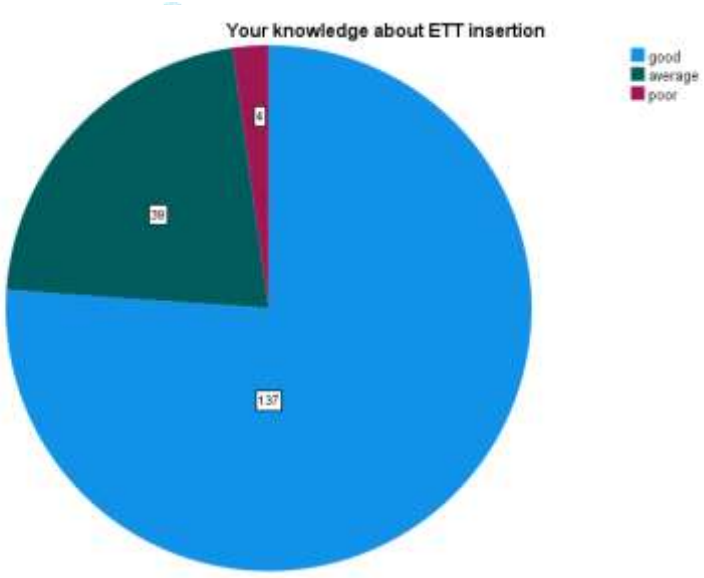
The data reveals the participants' experience and knowledge related to ventilator use and mechanical ventilation. A majority of participants (78.3%, or 141 individuals) regularly attend to ventilator patients. Regarding knowledge about mechanical ventilators, 79.3% of participants rate their knowledge as good, 23.1% as average, and 2.2% as poor. Similarly, for the use of ventilator modes, 73.9% consider their knowledge good, 23.9% average, and 2.2% poor.

When assessing their knowledge of ventilator troubleshooting, 57.8% rate it as good, 31.7% as average, and 10.6% as poor. Lastly, regarding the principles of mechanical ventilation, 65.6% of participants report good knowledge, 30.0% average knowledge, and 4.4% poor knowledge. These results indicate that while a significant portion of participants feels confident in their understanding and use of ventilators, there are notable proportions with average or poor knowledge, particularly in troubleshooting and the principles of mechanical ventilation, suggesting potential areas for further training and education.

Table 5: knowledge regarding intubation of the participants, n=180

	Frequency	Percent	Valid Percent	Cumulative Percent
Your knowledge about ETT insertion?				
Good	137	76.1	76.1	76.1
Average	39	21.7	21.7	97.8
Poor	4	2.2	2.2	100.0
Total	180	100.0	100.0	
Knowledge regarding correct ETT Extubation procedure?				
Good	66	36.7	36.7	36.7
Average	114	63.3	63.3	100.0
Poor	180	100.0	100.0	
Your knowledge about intubated patients care?				
Good	146	81.1	81.1	81.1
Average	33	18.3	18.3	99.4
Poor	1	0.6	0.6	100.0
Total	180	100.0	100.0	

Your knowledge about intubation and extubation equipment's				
Good	146	81.1	81.1	81.1
Average	33	18.3	18.3	99.4
Poor	1	0.6	0.6	100.0
Total	180	100.0	100.0	
Your past knowledge of intubated patients?				
Good	138	76.7	76.7	76.7
Average	36	20.0	20.0	96.7
Poor	6	3.3	3.3	100.0
Total	180	100.0	100.0	



The table presents survey results on knowledge about various aspects of endotracheal tube (ETT) insertion, extubation, and care of intubated patients among a group of 180 respondents.

Regarding ETT insertion, 76.1% (137 respondents) reported having good knowledge, 21.7% (39 respondents) indicated average knowledge, and 2.2% (4 respondents) admitted to having poor knowledge.

For knowledge regarding the correct ETT extubation procedure, only 36.7% (66 respondents) rated their knowledge as good, while a significant majority, 63.3% (114 respondents), considered their knowledge average. Notably, the "Poor" category was not represented in this survey section. When it comes to caring for intubated patients, 81.1% (146

respondents) felt confident in their knowledge, rating it as good, while 18.3% (33 respondents) felt their knowledge was average, and a mere 0.6% (1 respondent) considered their knowledge poor.

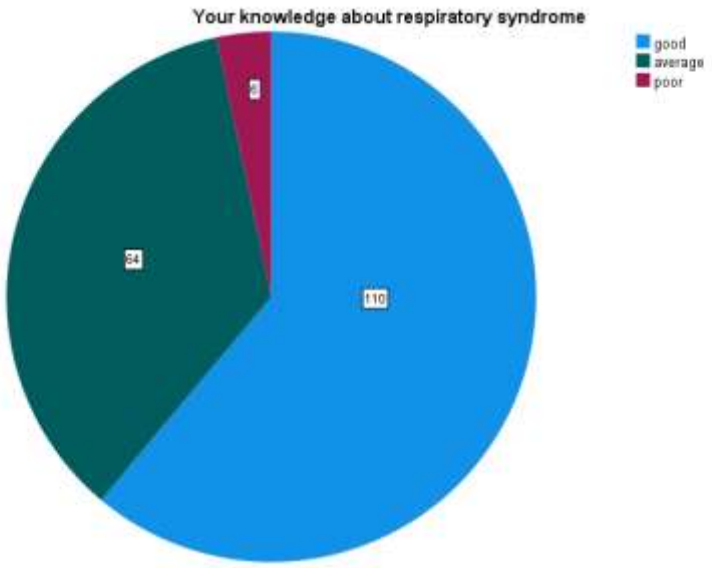
Knowledge about intubation and extubation equipment also saw 81.1% (146 respondents) rating their knowledge as good and 18.3% (33 respondents) as average. The "Poor" category was

not filled in this section. For past knowledge of intubated patients, 76.7% (138 respondents) rated it as good, 20.0% (36 respondents) as average, and 3.3% (6 respondents) as poor.

Overall, the majority of respondents have rated their knowledge as good in most categories, with some variation seen in the extubation procedure, where average knowledge was more commonly reported. (Table 5)

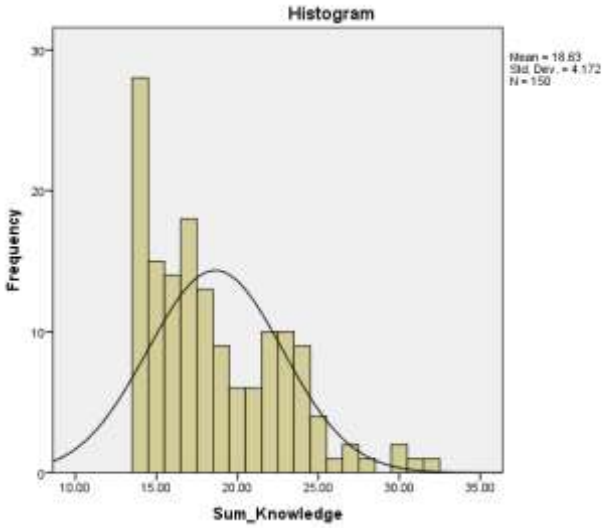
Table:6 knowledge about respiratory syndrome

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	good	110	61.1	61.1	61.1
	average	64	35.6	35.6	96.7
	poor	6	3.3	3.3	100.0
	Total	180	100.0	100.0	



The table:6 provides insights into the respondents' knowledge about respiratory syndrome. Among the 180 participants, a majority of 61.1% (110 respondents) rated their knowledge as good. A significant portion, 35.6% (64 respondents), considered their knowledge to be average. Only a small fraction, 3.3% (6 respondents), admitted to having poor knowledge. This distribution indicates that while the majority of respondents feel confident in their understanding of respiratory syndrome, a notable portion still views their knowledge as moderate, with a very small percentage feeling they lack sufficient knowledge. Overall, the cumulative data shows that 96.7% of the respondents have at least an average level of knowledge about respiratory syndrome. (Table:6)

Sum of Knowledge score



The frequency distribution of the knowledge scores (Sum_Knowledge) among the 150 participants indicates that the most common scores are 14 (18.7%), 17 (12.0%), and 15

(10.0%). The scores range from 14 to 32, with the majority of participants scoring between 14 and 24. The distribution shows that the higher knowledge scores (above 25) are less frequent, indicating a general trend towards moderate knowledge levels within the group. There are 20 missing cases, accounting for 11.8% of the total sample.

Correlation between knowledge and demographic date

Correlations			
		demo_1	Knowledge_1
demo_1	Pearson Correlation	1	.447**
	Sig. (2-tailed)		.000
	N	151	150
Knowledge_1	Pearson Correlation	.447**	1
	Sig. (2-tailed)	.000	
	N	150	150
**. Correlation is significant at the 0.01 level (2-tailed).			

The analysis reveals a statistically significant positive correlation between the demographic variable (demo_1) and the knowledge score (Knowledge_1) among the participants, with a Pearson correlation coefficient of 0.447 ($p < 0.01$). This suggests that as the demographic variable increases, the knowledge score tends to increase as well, indicating a moderate relationship between the two variables.

One-Sample Statistics for knowledge

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Knowledge_1	150	18.6333	4.17152	.34060

One-Sample Test						
	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Knowledge_1	54.707	149	.000	18.63333	17.9603	19.3064

The one-sample t-test conducted on the knowledge score (Knowledge_1) of 150 participants shows that the mean score is 18.63 with a standard deviation of 4.17. The test statistic ($t = 54.707$) is highly significant ($p < 0.001$), indicating that the mean knowledge score is significantly greater than zero. The 95% confidence interval for the mean difference ranges from 17.96 to 19.31, confirming that the knowledge score is statistically significant and not due to random chance.

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Knowledge_1	18.6333[a]	150	4.17152	.34060
	Sum_Knowledge	18.6333[a]	150	4.17152	.34060
a. The correlation and t cannot be computed because the standard error of the difference is 0.					

The paired samples statistics for Knowledge_1 and Sum_Knowledge show identical mean values of 18.63, with a standard deviation of 4.17 across 150 participants. Since both sets of scores are identical, the standard error of the difference is 0, making it impossible to compute the correlation and t-test. This suggests that Knowledge_1 and Sum_Knowledge represent the same dataset, leading to no variation between the paired samples.

ANOVA Table							
			Sum of Squares	df	Mean Square	F	Sig.
Do you have any specialty diploma in ICU * Knowledge regarding correct ETT extubation procedure	Between Groups	(Combined)	1.756	2	.878	3.432	.035
	Within Groups		37.860	148	.256		
	Total		39.616	150			
Did you attend ICU workshops regularly * Knowledge regarding correct ETT extubation procedure	Between Groups	(Combined)	.760	2	.380	1.688	.188
	Within Groups		33.332	148	.225		
	Total		34.093	150			
Your knowledge about respiratory	Between Groups	(Combined)	.035	2	.017	.055	.947

syndrome * Knowledge regarding correct ETT extubation procedure	Within Groups		46.985	148	.317		
	Total		47.020	150			
Do you attend to vantilator patient regularly * Knowledge regarding correct ETT extubation procedure	Between Groups	(Combined)	6.091	2	3.045	18.513	.000
	Within Groups		24.346	148	.165		
	Total		30.437	150			
Your knowledge about mechanical ventilators * Knowledge regarding correct ETT extubation procedure	Between Groups	(Combined)	3.568	2	1.784	9.265	.000
	Within Groups		28.305	147	.193		
	Total		31.873	149			

The ANOVA analysis reveals significant differences in knowledge regarding correct ETT extubation procedures based on several factors:

1. **ICU Specialty Diploma**: There is a statistically significant difference in knowledge based on whether participants have a specialty diploma in ICU, with an F-value of 3.432 and a p-value of 0.035, indicating that those with different levels of specialty diplomas have varying knowledge levels.
2. **ICU Workshop Attendance**: No significant difference in knowledge was found based on regular attendance at ICU workshops, with an F-value of 1.688 and a p-value of 0.188.
3. **Knowledge about Respiratory Syndrome**: There is no significant difference in knowledge related to respiratory syndrome, with an F-value of 0.055 and a p-value of 0.947.
4. **Regular Attendance to Ventilator Patients**: A highly significant difference in knowledge was observed based on whether participants regularly attend to ventilator patients, with an F-value of 18.513 and a p-value of <0.001.
5. **Knowledge about Mechanical Ventilators**: There is also a significant difference in knowledge based on participants' knowledge about mechanical ventilators, with an F-value of 9.265 and a p-value of <0.001.

These results suggest that certain factors, such as regular attendance to ventilator patients and knowledge about mechanical ventilators, have a significant impact on the knowledge of correct ETT extubation procedures.

Report

Your knowledge about care for intubated pateint		Do you have any specialty diploma in ICU	Did you attend ICU workshops regularly	Your knowledge about respiratory syndrome	Do you attend to vantilator patient regularly	Your knowledge about mechanical ventilators
good	Mean	1.49	1.30	1.40	1.19	1.18
	N	118	118	118	118	117
	Std. Deviation	.519	.459	.557	.419	.385
	% of Total N	78.1%	78.1%	78.1%	78.1%	78.0%

	% of Total Sum	76.2%	75.4%	76.4%	74.6%	73.8%
average	Mean	1.66	1.50	1.56	1.47	1.50
	N	32	32	32	32	32
	Std. Deviation	.483	.508	.564	.507	.622
	% of Total N	21.2%	21.2%	21.2%	21.2%	21.3%
	% of Total Sum	22.9%	23.6%	23.1%	24.9%	25.7%
poor	Mean	2.00	2.00	1.00	1.00	1.00
	N	1	1	1	1	1
	Std. Deviation	.	.	.	.	.
	% of Total N	0.7%	0.7%	0.7%	0.7%	0.7%
	% of Total Sum	0.9%	1.0%	0.5%	0.5%	0.5%
Total	Mean	1.53	1.34	1.43	1.25	1.25
	N	151	151	151	151	150
	Std. Deviation	.514	.477	.560	.450	.463
	% of Total N	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total Sum	100.0%	100.0%	100.0%	100.0%	100.0%

The report on knowledge about the care of intubated patients across different factors reveals the following:

1. **Specialty Diploma in ICU**:
   - **Good**: Mean = 1.49, N = 118, Std. Deviation = 0.519
   - **Average**: Mean = 1.66, N = 32, Std. Deviation = 0.483
   - **Poor**: Mean = 2.00, N = 1
2. **ICU Workshops Regularly**:
   - **Good**: Mean = 1.30, N = 118, Std. Deviation = 0.459
   - **Average**: Mean = 1.50, N = 32, Std. Deviation = 0.508
   - **Poor**: Mean = 2.00, N = 1
3. **Knowledge about Respiratory Syndrome**:
   - **Good**: Mean = 1.40, N = 118, Std. Deviation = 0.557
   - **Average**: Mean = 1.56, N = 32, Std. Deviation = 0.564
   - **Poor**: Mean = 1.00, N = 1
4. **Regular Attendance to Ventilator Patients**:
   - **Good**: Mean = 1.19, N = 118, Std. Deviation = 0.419
   - **Average**: Mean = 1.47, N = 32, Std. Deviation = 0.507
   - **Poor**: Mean = 1.00, N = 1
5. **Knowledge about Mechanical Ventilators**:
   - **Good**: Mean = 1.18, N = 117, Std. Deviation = 0.385
   - **Average**: Mean = 1.50, N = 32, Std. Deviation = 0.622
   - **Poor**: Mean = 1.00, N = 1

Summary:

- **Good Knowledge**: Most participants (78%) scored within the "good" range for all factors, indicating a generally high level of knowledge in this group.
- **Average Knowledge**: A smaller group (21%) showed average knowledge across the factors.
- **Poor Knowledge**: Very few participants (0.7%) had poor knowledge in these areas.

Overall, the majority of the participants demonstrate good knowledge regarding intubated patient care, with higher means observed in the "good" category for all factors.

Summary of the Result

Summary of Knowledge on Mechanical Ventilation and Intubation Care

Participants and Socio-Demographic Profile

- **Total Participants:** 180
- **Age Distribution:** Majority are aged 24-29 years (65%), with smaller groups aged 18-23 (16.7%) and over 30 (18.3%).
- **Gender:** 63.3% female, 36.7% male.
- **Education Levels:** 48.3% have Post RN MSN, 27.8% hold a BSN, and 21.7% have a Nursing Diploma.

- **Work Experience:** Predominantly 2-5 years (61.3%), with others having 5-7 years (37.5%) and 7-9 years (1.3%).
- **Hospital Distribution:** Participants are evenly distributed across six hospitals, each contributing 16.6% of the total.

ICU Specialty Diploma

- **Diploma Holders:** 48.3% have an ICU specialty diploma.
- **No Diploma:** 51.1% do not have this qualification.

ICU Workshop Attendance

- **Attended Workshops:** 61.7% of participants have attended ICU workshops.
- **Did Not Attend:** 38.3% have not participated in these workshops.

Knowledge on Mechanical Ventilation and Intubation

- **Ventilator Use:**
  - 78.3% of participants regularly attend to ventilator patients.
  - Knowledge about mechanical ventilators is rated as good by 79.3%, average by 23.1%, and poor by 2.2%.
  - Knowledge about ventilator modes is good for 73.9%, average for 23.9%, and poor for 2.2%.
  - Troubleshooting knowledge is rated good by 57.8%, average by 31.7%, and poor by 10.6%.
  - Knowledge about ventilator principles is good for 65.6%, average for 30%, and poor for 4.4%.
- **Intubation Care:**
  - ETT insertion knowledge is good for 76.1%, average for 21.7%, and poor for 2.2%.
  - Correct ETT extubation knowledge is good for 36.7% and average for 63.3%.
  - Intubated patient care knowledge is rated good by 81.1%, average by 18.3%, and poor by 0.6%.
  - Knowledge about intubation and extubation equipment is good for 81.1% and average for 18.3%.
  - Past knowledge of intubated patients is good for 76.7%, average for 20%, and poor for 3.3%.
- **Knowledge on Respiratory Syndrome:**
  - Good knowledge is reported by 61.1%, average by 35.6%, and poor by 3.3%.

Statistical Analysis

- **Mean Knowledge Scores:** The overall mean knowledge score is 18.63 with a significant t-value, indicating high confidence in knowledge across participants.
- **Correlation Analysis:** A significant positive correlation exists between demographic variables and knowledge scores ($r = 0.447$, $p < 0.01$).
- **ANOVA Findings:**
  - Significant differences in knowledge related to ETT extubation procedures based on ICU specialty diploma and regular attendance to ventilator patients.
  - No significant differences were observed related to ICU workshop attendance or knowledge about respiratory syndrome.

Conclusion

The data indicates that most participants possess good knowledge regarding mechanical ventilation and care for intubated patients, with some variability in knowledge levels related to specific areas like ETT extubation and troubleshooting. Regular exposure to ventilator patients and formal ICU training are associated with higher knowledge scores.

Chapter five discussion

DISCUSSION:

The analysis of the socio-demographic data and knowledge levels of the 180 nurse participants regarding mechanical ventilation and respiratory syndrome reveals several key insights. The participants, predominantly aged between 24 to 29 years and mostly female, possess a diverse range of educational backgrounds and work experiences. There is a nearly even split between those with and without a specialty diploma in ICU, and a significant majority have attended ICU workshops, indicating a strong engagement in continuing professional development.

In terms of knowledge, the majority of participants rate their understanding of mechanical ventilators, ventilator modes, and the care of intubated patients as good. However, there are areas such as ventilator troubleshooting and the principles of mechanical ventilation where knowledge gaps are apparent. Similarly, while most participants feel confident about their knowledge of respiratory syndrome and ETT procedures, there is room for improvement in

certain areas, particularly in extubation procedures.

Overall, the results highlight a well-informed group of nurses with substantial experience and training in neonatal mechanical ventilation, though they also underscore the need for ongoing education and training to address specific knowledge gaps and ensure the highest standards of care for neonatal patients.

Conclusion:

The assessment of 180 nurses' knowledge on mechanical ventilation and intubation care reveals a generally high level of proficiency among participants. Most nurses, aged predominantly between 24 and 29 years, and with a mix of educational backgrounds, demonstrate strong knowledge in key areas such as mechanical ventilators, ventilator modes, and intubated patient care. Notably, 79.3% rated their understanding of mechanical ventilators as good, with 81.1% expressing high confidence in intubation care and equipment knowledge.

Despite these strengths, there are notable areas for improvement. Gaps in knowledge are evident in ventilator troubleshooting and the principles of mechanical ventilation. Additionally, while a majority have good knowledge of ETT insertion, there is a noticeable variance in understanding extubation procedures. These gaps highlight the need for targeted continuing education and training, particularly in troubleshooting and extubation techniques, to enhance overall competency and patient care.

The data also underscores the importance of regular exposure to ventilator patients and formal ICU training, which correlate positively with higher knowledge scores. This suggests that ongoing professional development and hands-on experience are crucial for maintaining high standards of care. Overall, the study indicates that while the group of nurses is well-informed, continuous improvement and education are essential to address specific knowledge gaps and ensure optimal care for intubated patients.

SUGGESTION AND RECOMMENDATION

By evaluating all the result and the result of the study the following suggestion and recommendation will help the policy makers and hospitals administrator to enhance the nurses' knowledge which will improve the care of neonatal care on mechanical ventilators. The following area should improve Targeted Training Programs, Enhanced Workshops and Continuing Education, Mentorship and Peer Learning, Regular Competency Assessments, Development of Standardized Protocols, Strengthening Collaboration with Multidisciplinary Teams, Investment in Educational Resources, Recognition and Incentives for Professional Development, Evaluation of Training Effectiveness.

Regularly evaluate the effectiveness of training programs through feedback surveys, performance metrics, and patient outcomes. This evaluation will help in refining the programs and ensuring they meet the nurses' needs and improve patient care.

By implementing these suggestions and recommendations, healthcare institutions can support their nursing staff in maintaining and enhancing their knowledge and skills in neonatal mechanical ventilation and respiratory care, ultimately leading to better outcomes for neonatal patients.

Limitations:

The study assessing the level of knowledge among nurses caring for neonatal children on mechanical ventilators at tertiary care hospitals in Peshawar faced several limitations. The sample size was restricted to a few hospitals in Peshawar, limiting the generalizability of the findings to other regions or healthcare settings. Additionally, the reliance on self-reported data through questionnaires may have introduced response bias, with participants potentially overestimating or underestimating their knowledge. The study's cross-sectional design only captured knowledge at a single point in time, not accounting for changes over time or the impact of ongoing professional development. Furthermore, cultural and language barriers might have influenced the participants' understanding of the questions, especially given the diverse educational backgrounds of the nurses. Variability in access to resources and training across different hospitals could also have affected the results, as nurses in better-equipped facilities may have higher levels of knowledge. Finally, the absence of qualitative data limited the study's ability to explore the experiences and challenges faced by nurses in this

context, potentially overlooking important insights.

DECLARATION

I hereby declare that this thesis titled 'Assessment of Knowledge Levels Among Nurses Caring for Neonates on Mechanical Ventilators' is the result own research work of the students and has not been submitted for any other degree or diploma at any other university or institution. All sources of information and literature have been duly acknowledged."

Mr. Abbass Khan

DEDICATION

This thesis is dedicated to my family, whose unwavering support, encouragement, and love have been my guiding light throughout this journey.

To the nurses and healthcare professionals who work tirelessly to provide the best care for neonates, your dedication and compassion are truly inspiring.

To my mentor, whose leadership and proficiency irradiated the path of my research understandings and patient mentoring have been contributory in shaping this work.

To my mentors and professors, whose guidance, knowledge, and encouragement have been instrumental in my academic and professional growth.

And to all my friends and colleagues, thank you for your support and camaraderie.

Acknowledgments

First and foremost, I would like to express my deepest gratitude to my advisor, Sir Abbass Khan, and co-supervisor **Sir Ayaz ul Haq** for their unwavering support, guidance, and encouragement throughout this research. Your expertise and insights have been invaluable to the completion of this thesis.

I extend my sincere thanks to the faculty and staff of Farkhanda institute Nursing and public health, especially the Department of Nursing, for providing me with the resources and support needed to carry out this research.

I am profoundly grateful to all the nurses who participated in this study. Your willingness to share your experiences and knowledge has been crucial to this research, and your dedication to neonatal care is truly inspiring.

I would also like to thank my colleagues and friends for their encouragement and for making this journey enjoyable and fulfilling. Your support has been a source of strength for me.

To my family, thank you for your endless love, patience, and understanding. Your belief in me has been my motivation to persevere and complete this thesis.

Finally, I would like to acknowledge any funding sources, organizations, or individuals who provided assistance or resources. Your contributions have been essential to the success of this research.

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