



GRT JOURNAL OF EDUCATION, SCIENCE AND TECHNOLOGY

Published by GRT College of Education

ISSN: 2584-301X

Effectiveness of IEC on level of knowledge regarding bio-physic and pharmacological management among staff nurses working at intensive care units

J.Gracy

GRT College of Nursing, Tiruttani, Tamilnadu, India.

Article History:	Abstract
<p>Received on: 09 Sep 2024 Revised on: 11 Oct 2024 Accepted on: 25 Nov 2024</p> <p>Keywords: Information Education Communication, Biological, physiological, pharmacological management</p>	<p>The study employed a quasi-experimental design targeting 50 nurses aged 21–40, divided equally into control and experimental groups using purposive sampling. Self-structured questionnaires assessed knowledge levels. In the pre-test, 60% of the experimental group had moderate knowledge and 40% inadequate, while in the control group, 4% had adequate knowledge, 40% moderate, and 56% inadequate. Post-test results showed significant improvements, particularly in the experimental group, where 68% achieved adequate knowledge, compared to 24% in the control group. Additionally, 32% of the experimental group retained moderate knowledge, against 64% in the control group. The mean post-test knowledge was significantly higher in the experimental group (-10.08) compared to the control group (-3.56), with a T-value of -10.8 (p=0.001). These findings underscore the effectiveness of Information Education Communication (IEC) intervention in improving nurses' knowledge, emphasizing the importance of continuous education in preventing errors and enhancing patient care standards.</p>



*Corresponding Author

Name: Ms.J.Gracy

Phone: +91 7708751298

Email: gracyjaypal@gmail.com

Journal Home Page: www.grtjest.com
 <https://doi.org/10.26452/grtjest.v2i2.38>


Production and hosted by
GRT College of Education
© 2024 | All rights reserved

INTRODUCTION

Intensive Care Units (ICUs) are dedicated to patients facing severe and life-threatening conditions, necessitating vigilant monitoring and specialized intervention. Manned by expert doctors and nurses, ICUs boast a heightened staff-to-patient ratio and access to cutting-edge medical equipment and resources. These units provide crucial support for maintaining normal bodily functions, employing advanced medications and technology unavailable in standard hospital wards. ICU staff are extensively trained to

deliver intensive care, ensuring optimal outcomes for critically ill individuals.

Absolutely, nursing in critical care settings demands a commitment to continuous learning and updating knowledge. Given the critical nature of their patients' conditions, ICU nurses must stay abreast of advancements in medical treatments, technologies, and best practices in patient care. This includes proficiency in operating and interpreting data from specialized monitoring equipment, understanding the effects and administration of potent medications, and mastering techniques for managing patients on mechanical ventilators. Additionally, ongoing education ensures nurses can adapt to evolving patient needs, incorporate evidence-based practices, and collaborate effectively with interdisciplinary healthcare teams to optimize patient outcomes. Continuous learning is not just a professional obligation but a vital component of providing safe, effective, and compassionate care in critical care settings.

A ratio of 2 patients to 1 nurse is recommended for a medical ICU, which contrasts to the ratio of 4:1 or 5:1 typically seen on medical floors. This varies from country to country, though; e.g., in Australia and the United Kingdom most ICUs are staffed on a 2:1 basis (for high-dependency patients who require closer monitoring or more intensive treatment than a hospital ward can offer) or on a 1:1 basis for patients requiring very intensive support and monitoring.

Umar Zeb, Said Alam et.al (2021) conducted a study on "Effectiveness of the Instructional Module on Knowledge and Interpretation of ABGs Among Critical Care Nurses". The study result showed that the pretest knowledge score of the critical care nurses in the pre stage intervention was 53.3% which was poor on the grading scale. Overall mean score was

J.Gracy , GRT J. Edu. Sci. Tech. 2024; 2(2): 16-25 found as 51.9963+26.54 in the pre assessment phase while 74.6333+15.98 was reported in the post phase of giving the instructional module with a mean significant difference of 22.63+39.50. Statistically the instructional module was found effective in enhancing the nurse's knowledge with a p -value of 0.004. The findings of the study depict that instructional module has a positive and significant association with the level knowledge of nurses regarding ABGs interpretation [1].

Somayeh Hanafi, Hassan Torkamandi et.al (2012) conducted a study on "Knowledge, attitudes and practice of nurse regarding adverse drug reaction reporting". The study reveals that Knowledge and practice of participants were not satisfying; however, their attitude towards pharmacovigilance was at a high level. About 91% of the nurses had never reported an ADR. Most nurses liked to report the ADRs to the physicians (87.1%) and pharmacists in hospital's ADR center (1.8%) rather than the ADR National Center. The main cause of under-reporting of the suspected ADRs was unawareness about the existence of such a national center. Among nurses who had reported ADR for at least once, the majority preferred using phone (10 out of 50) or Yellow Cards (7 out of 50). Only 1 person out of 50 preferred using internet for submitting the reports. Since the nurses in this study had little knowledge and poor practice regarding the pharmacovigilance and spontaneous reporting system, interventions such as holding pharmacovigilance workshops in the hospitals focusing on the aims of pharmacovigilance, completing the Yellow Card and clarifying the reporting criteria are strongly recommended.

Continuous mechanical ventilation has become standard care for patients in critical care and general care units, presenting nurses with significant challenges in providing effective care. Nurses must possess

comprehensive knowledge of ventilator equipment, potential complications, and appropriate nursing management to ensure optimal patient outcomes. Studies suggest that educating staff nurses on ventilator management can reduce ventilator-associated complications and promote early recovery among patients. Drawing from the researcher's personal experience, discussions with experts, and advancements in ventilator technology, it becomes evident that there is a pressing need to educate staff nurses on ventilator usage to enhance patient care and safety.

Mechanical ventilation is a crucial nursing skill vital for managing patients with respiratory and cardiac arrests. Prompt and accurate treatment delivery relies on nurses possessing appropriate skills, particularly in emergencies where immediate interpretation and response are required. Insufficient knowledge in this area can limit treatment efficacy and impact clinical outcomes. A descriptive study was conducted on 100 staff nurses working in medical, surgical, and cardiac intensive care units at selected hospitals in Kolhapur. Improvement in knowledge scores was evaluated through a survey approach. Results indicated a statistically significant gain in knowledge scores ($t_{ab} = 7.38 > t_{ab} = 2.02$, $p < 0.05$), suggesting enhanced understanding post-intervention. Furthermore, significant associations were found between knowledge scores and socio-demographic variables such as gender, area of work, and attendance at in-service education sessions ($p < 0.05$). Overall, the study revealed that while the majority of staff nurses possessed average knowledge regarding mechanical ventilator, targeted educational interventions may further enhance their understanding and improve patient care outcomes (Husain K, 2021) [11].

In conclusion, the pivotal role of nurses in safeguarding patients' lives necessitates continuous learning and knowledge updates across all facets of patient care. Thus, the investigator's focus on educating and assessing the efficacy of Information Education Communication (IEC) regarding biological, physiological, and pharmacological management among staff nurses is both timely and critical. By equipping nurses with comprehensive understanding and proficiency in managing patients' biological, physiological, and pharmacological needs, this initiative not only enhances the quality of care but also contributes to better patient outcomes. Ultimately, investing in ongoing education and evaluating the effectiveness of such interventions underscores a commitment to providing optimal patient care and ensuring the well-being of both patients and healthcare professionals alike.

OBJECTIVES

1. Compare the level of knowledge of nurses on Bio-Physio and Pharmacological Management among ICU staff nurses in pre and post-test of both in experimental and the control group.
2. Evaluate the effectiveness of IEC on Bio-Physio and Pharmacological Management among staff nurses both in experimental and control group.
3. Associate the level of knowledge of nurses on Bio-Physio and Pharmacological management among ICU staff nurses with selected demographic variables

RESEARCH METHODOLOGY

The study employed a quasi-experimental design, targeting a sample of 50 nurses aged 21-40 years, with 25 participants assigned to

both the control and experimental groups. Purposive sampling was utilized for participant selection, and data collection was facilitated through self-structured questionnaires. The research was conducted across two distinct settings: the experimental group was drawn from Chennai Meenakshi Multispecialty Hospital in Mylapore, Chennai, while the control group was recruited from Sooriya Hospital in Saligramam, Vadapalani. The study population consisted of ICU staff nurses from these hospitals. Data collection tools included Tool I, which focused on demographic variables, and Tool II, a structured questionnaire assessing knowledge levels. The total score on the knowledge assessment ranged from 1 to 30, with classifications as follows: inadequate knowledge (1-10 score), moderately adequate knowledge (11-20 score), and adequate knowledge (21-30 score).

Table 1 depicts, regarding the distribution of age, nearly half of the sample 19(76.0%) were aged 21-25 Years in Control Group. In experimental group most of the sample 14 (56.0%) were aged 21-25 Years. Majority of the sample 23(92.0%) were female in control group and in experimental group 23(92.0%) were female. In marital status Most of the samples 19(76.0%) were married in Control Group and 16 (64.0%) were unmarried in Experimental Group. In total year of experience in nursing service, most of the samples 15(60.0%) were less than 1 year in Control Group. And 14(56.0%) were 1-2 years in experimental group.

Most after 23(92.0%) samples had undergone previous training in Control Group and 17(68.0%) were in Experimental Group. In years of experience at current working area 20(80.0%) below 2 Years in Control Group and 14(56.0%) were 2-5 Years in Experimental Group. In level qualification, most of the samples 14(56.0%) were bachelor's degree in

J. Gracy, GRT J. Edu. Sci. Tech. 2024; 2(2): 16-25

Control Group and 18(72.0%) were bachelor's degree in Experimental Group. In usual shift rotation 25(100%) rotation shift in Control Group. And 25(100%) were in rotation shift in Experimental Group. In identify which you are most experienced area 25(100%) were combined ICU in Control Group. And 25(100%) were combined ICU in Experimental Group.

Table 2 showed that the pre, post test scores of mean & standard deviation of level of knowledge were 11.88, 4.55 and 15.44, 4.45 respectively. The paired 't' value was -7.643 and found statistically significant

Table 3 revealed that the pre, post test scores of mean & standard deviation of low back pain were 11.80, 3.25 and 21.88, 4.54 respectively. In pretest 40% were inadequate knowledge and 60% were moderate knowledge and 0% were adequate knowledge. In post-test 0% were inadequate knowledge and 32% were moderate knowledge and 68% were adequate knowledge. The paired 't' value was -9.823 and found statistically significant.

Table 4 revealed that the post test scores of mean & standard deviation of level of knowledge control and experimental group were -3.56, 2.32 and -10.08, 5.13 respectively. The 'T' value was -10.8 and found to be statistically significant.

DISCUSSION

The present study was conducted to determine effectiveness of IEC on level of knowledge regarding Bio-Physio and Pharmacological Management among staff nurses working at Intensive Care Units in selected hospital. The data from the present study was structured to compare knowledge levels regarding the determination of bio-physio and pharmacological management among ICU staff nurses in both pre and post-tests within the experimental and control groups. The pre-test knowledge level in the

Table 1 Distribution of samples according to demographic variables N=25

S.No	Demographic Variables	Control Group		Experimental Group	
		Frequency (n)	(%)	Frequency (n)	(%)
1.	Age (in years)				
	a)21-25 Yrs	19	76.0	14	56.0
	b)26-30 Yrs	4	16.0	8	32.0
	c)31-35 Yrs	2	8.0	3	12
	d)36-40 Yrs	-	-	0	0
2.	Sex				
	a)Male	2	8.0	2	8.0
	b)Female	23	92.0	23	92.0
3.	Marital status				
	a)Single	6	24.0	16	64.0
	b)Unmarried	19	76.0	9	36.0
4.	Total years of experience in nursing service				
	a)less than 1 year	15	60.0	7	28.0
	b)1-2 Yrs	5	20.0	14	56.0
	c)3-5 yrs	3	12.0	4	16.0
	d) more than 10 Yrs	2	8.0	-	-
5.	Receiving previous training courses				
	a)Yes	2	8.0	8	32.0
	b)No	23	92.0	17	68.0
6.	Years of experience at current working area				
	a)Below 2 Yrs	20	80.0	8	32.0
	b)2-5 Yrs	3	12.0	14	56.0
	c)6-10 yrs	2	8.0	3	12.0
	d) Above 10 Yrs	-	-	-	-
7.	Level of qualification				
	a)ANM	-	-	-	-
	b)Diploma	11	44.0	7	28.0
	c)Bachelor	14	56.0	18	72.0
8.	Usual shift rotation				
	a)Days shift only	-	-	-	-
	b)Evening shift	-	-	-	-
	c)Rotation shift	25	100	25	100
9.	Identify the primary speciality of the critically ill patient care in which you are most experienced				
	a)Surgical	25	100	25	100
	b)Medical	-	-	-	-
	c)Combined ICU (Medical/Surgical/Trauma)	-	-	-	-
	d)emergency ward	-	-	-	-

Table 2 Comparison of level of knowledge in Pre and post-test of control group N=25

Level of Knowledge	Pre test				Post test				't' value	'p' value
	N	%	Mean	S.D	N	%	Mean	S.D		
Adequate Knowledge	1	4.0			6	24.0				
Moderate Knowledge	10	40.0	11.88	4.55	16	64.0	15.44	4.45	-7.643	0.001 (S)
Inadequate Knowledge	14	56.0			3	12.0				

Table 3 Comparison of level of knowledge in pre and post-test of experimental group (Paired't' test) N=25

Level of knowledge	Pre test				Posttest				't' value	'p' value
	n	%	Mean	S.D	n	%	Mean	S.D		
Adequate knowledge	0	0			17	68.0				
Moderate knowledge	15	60.0	11.80	3.25	8	32.0	21.88	4.54	-9.823	0.001 (S)
Inadequate knowledge	10	40.0			0	0				

P>0.001, S: significant

Table 4 Comparisons of level of knowledge between control and experimental group N=25

Variable	Control group		Experimental group		'T' value	'p' value
	Mean	S.D	Mean	S.D		
Level of knowledge	-3.560	2.32	-10.08	5.13	-10.8	0.001 (S)

P>0.001, S: significant

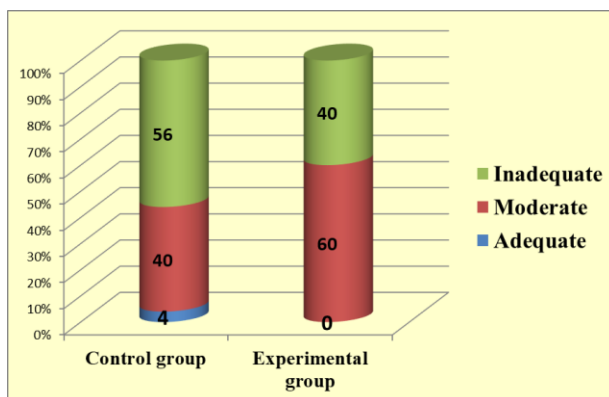


Figure 1 Comparison of level of knowledge between control and experimental group in pre test

control group was measured at 11.88 ± 4.55 (mean \pm SD), while in the experimental group, it was slightly lower at 11.80 ± 3.25 . Following the intervention, the post-test knowledge level among nurses in the control group increased significantly to 15.44 ± 4.54 , indicating a notable improvement. Conversely, the experimental group exhibited a substantial increase in their post-test knowledge score, reaching 21.88 ± 4.54 . This marked enhancement demonstrated a statistically significant ($p > 0.05$) increase in knowledge concerning bio-physio and

pharmacological management within the experimental group.

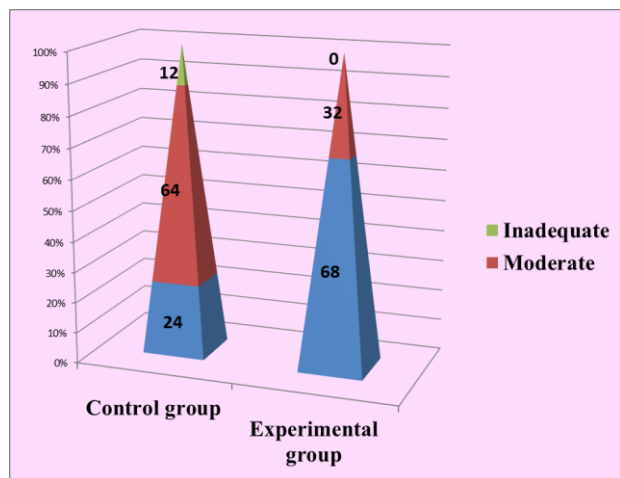


Figure 2 Comparison of level of knowledge between control and experimental group in post test

Ghi-Yin Hsaio, I-Ju Chen et.al (2009) conducted a study on "Nurses' knowledge of high-alert medications: instrument development and validation". The study result shows that a total of 305 nurses participated, giving a 79.2% response rate (305/385). The correct answer rate for section 1 was 56.5%, and nurses' working experience contributed to scores. Only 3.6% of nurses considered themselves to have sufficient knowledge about high-alert medications, 84.6% hoped to gain more training, and the leading obstacle reported was insufficient knowledge (75.4%). A total of 184 known administration errors were identified, including wrong drug (33.7%) and wrong dose (32.6%); 4.9% (nine cases; 9/184) resulted in serious consequences. Evidence-based results strongly suggest that nurses have insufficient knowledge about high-alert medications and could benefit from additional education, particularly associated with intravenous bolus administration of high-alert medications. Further research to validate the instrument is needed.

The study aimed to assess the effectiveness of Information, Education, and Communication

J.Gracy , GRT J. Edu. Sci. Tech. 2024; 2(2): 16-25

(IEC) in enhancing the understanding of Bio-Physio and Pharmacological Management among staff nurses in both experimental and control groups. Table 4 presented a post-test comparison of knowledge between these groups. In the control group, the mean \pm SD of knowledge level was -3.56 ± 2.32 , while in the experimental group, it significantly rose to -10.08 ± 5.13 . With a 'T' value of -10.8 , statistical analysis indicated a noteworthy increase in knowledge levels in both groups ($p > 0.05$). These findings suggest that the IEC intervention effectively improved participants' knowledge across both experimental and control groups.

H Perrie, S Schmollgruber et.al (2014) conducted a study on "Knowledge of intensive care nurses in selected care areas commonly guided by protocols". The study reveals that the knowledge of both the ICU-trained and non-ICU-trained nurses was found to be lacking. The overall mean score (standard deviation) obtained was 47.56% (11.61). The ICU-trained participants obtained 50.11% (11.96) and non-ICU-trained participants obtained 45.01% (10.75). This difference, although small, was statistically significant ($p = 0.0099$). A poor relationship was found between level of knowledge and years of ICU experience. Nurses lack knowledge in the three care areas tested. ICU nurses' experience cannot be relied upon as a source of knowledge for decision-making about protocol-directed care. It is suggested that on-going educational programmes be introduced into ICUs to address this shortfall in knowledge [8].

Base on the data analysis to investigate the relationship between levels of knowledge regarding the determination of Bio-Physio and Pharmacological management among ICU staff nurses and selected demographic variables. Results revealed a significant association between the level of knowledge

and sex in the post-test of the experimental group. However, in the control group post-test, no significant association was found between the level of knowledge and demographic variables. These findings suggest that while sex may influence knowledge levels among ICU staff nurses in the experimental group, other demographic factors may not significantly impact knowledge levels in the control group.

Alastalo, M, Salminen, L et.al, (2021) conducted a study on "Knowledge of patient observation among critical care nurses". The study conclude that the critical care nurses' knowledge level was considered to be suboptimal. There is a need for improving knowledge of patient observation among Finnish critical care nurses to ensure safe and good quality care. Finnish critical care nurses' knowledge of patient observation could be improved by providing specific continuing education for new nurses entering intensive care units and for experienced critical care nurses throughout their career [6].

CONCLUSION

ICU nurses require a substantial level of knowledge to make informed decisions regarding the care of critically ill patients. Without this knowledge, ensuring the safe implementation of nursing care becomes challenging. Holistic nursing care extends beyond following guidelines or protocols; it necessitates a sufficient knowledge base to make informed decisions about the appropriateness of interventions for individual patients in specific situations. This study suggests that nurses in both the control and experimental groups, working in ICUs within private hospitals, may lack adequate knowledge in certain areas of care.

Furthermore, the study revealed a disparity in knowledge levels between control and experimental group nurses. This finding was

J.Gracy , GRT J. Edu. Sci. Tech. 2024; 2(2): 16-25
unexpected, considering that ICU nurses are typically expected to possess greater knowledge compared to those without specialized area.

IMPLICATIONS

Implementing Information Education and Communication (IEC) practices among nurses can significantly enhance their knowledge levels and improve the quality of nursing care provided to patients. Nurses should strategically plan nursing interventions, utilizing available manpower effectively and seeking assistance when needed. Encouraging nurses to participate in continuing education programs can further enhance their knowledge base, thus improving patient care quality. Integrating IEC into the Nursing Curriculum ensures that nursing students gain adequate knowledge of Bio-Physio and Pharmacological Management. Nurse administrators play a crucial role in organizing regular continuing education programs focused on these areas, aiming to prevent medication errors, complications, and overall knowledge enhancement among nurses. Additionally, nurses can be encouraged to utilize educational devices to stay updated on trends and issues in nursing care. These strategies collectively contribute to fostering a culture of continuous learning and improving patient outcomes in healthcare settings.

RECOMMENDATION FOR NURSING EDUCATION

Assessing knowledge levels and the impact of IEC interventions across these diverse settings can provide valuable insights into tailored educational strategies. Understanding the gap between knowledge and practice can inform targeted interventions aimed at improving patient care outcomes. Conduct a longitudinal study to track changes in knowledge levels over time among nurses exposed to IEC

interventions. Long-term follow-up can provide insights into the sustainability of knowledge improvement and the potential need for ongoing educational support.

Replicate the current study with a larger sample size to validate the findings and ensure reliability. A larger sample can also allow for subgroup analyses based on factors such as years of experience, educational background, and type of healthcare facility.

Ethical Approval

No ethical approval was necessary for this study.

Author Contribution

All authors made substantial contributions to the conception, design, acquisition, analysis, or interpretation of data for the work. They were involved in drafting the manuscript or revising it critically for important intellectual content. All authors gave final approval of the version to be published and agreed to be accountable for all aspects of the work, ensuring its accuracy and integrity.

Funding Support: The Author declares that there is no funding.

Conflict of Interest: The Author declares that there is no conflict of interest.

REFERENCES

- [1] Umar Zeb, Said Alam, Farman Ali, Mohammad Hanif, Sardar Ali. Effectiveness of the Instructional Module on Knowledge and Interpretation of ABGs Among Critical Care Nurses. *American Journal of Nursing and Health Sciences*. Vol.10, No.5, 2021, pp.216-221. doi: 10.11648/j.ajns.20211005.11
- [2] Hsaio GY, Chen IJ, Yu S, Wei IL, Fang YY, Tang FI. Nurses' knowledge of high-alert medications: instrument development and validation. *J Adv*

- Nurs. 2010 Jan; 66(1):177-90. doi: 10.1111/j.1365-2648.2009.05164.x. PMID: 20423443.
- [3] Hanafi S, Torkamandi H, Hayatshahi A, Gholami K, Javadi M. Knowledge, attitudes and practice of nurse regarding adverse drug reaction reporting. *Iran J Nurs Midwifery Res*. 2012 Jan;17(1):21-5. PMID: 23492864; PMCID: PMC3590690.
- [4] Zhang H, Hsu LL. The effectiveness of an education program on nurses' knowledge of electrocardiogram interpretation. *Int Emerg Nurs*. 2013 Oct;21(4):247-51. doi: 10.1016/j.ienj.2012.11.001. Epub 2012 Dec 21. PMID: 23266113.
- [5] Toth JC. Comparing basic knowledge in critical care nursing between nurses from the United States and nurses from other countries. *Am J Crit Care* 2003;12(1):41-46.
- [6] Alastalo, M.; Salminen, L.; Vahlberg, T.; Leino-Kilpi, H. Knowledge of patient observation among critical care nurses, *Nursing in Critical Care* 26(5): 341-351. 2021
- [7] Bruce, J. (2014). Knowledge of intensive care nurses in selected care areas commonly guided by protocols. *Southern African Journal of Critical Care*.
- [8] Perrie H, Schmolgruber S. Knowledge of ICU nurses regarding selected care areas commonly guided by protocols. *Crit Care*. 2010;14(Suppl 1):P446. doi: 10.1186/cc8678. Epub 2010 Mar 1. PMCID: PMC2934390.
- [9] Ceena Albin, A Study to Assess the Effectiveness of Planned Teaching Programme on selected

- Neurological Assessment in terms of Knowledge and Practice among staff nurses working in selected units of selected hospitals of Ahmedabad city, Gujarat state, International Journal of Advances in Nursing Management, 8(2), 118 - 2020
- [10] Albin, C. (2020). A Study to Assess the Effectiveness of Planned Teaching Programme on selected Neurological Assessment in terms of Knowledge and Practice among staff nurses working in selected units of selected hospitals of Ahmedabad city, Gujarat state. International Journal of Advances in Nursing Management, 8(2), 118-122.
- [11] Husain K. Nadaf, Omkar Savairam (2021)Asses the Knowledge of Staff Nurses regarding Knowledge of Mechanical Ventilator, Volume 10 Issue 10, October 2021,ISSN: 2319-7064 ,SJIF (2020): 7.803.

Copyright: This is an open access article distributed under the terms of the Creative Commons Attribution-Noncommercial- Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.



**GRT JOURNAL OF EDUCATION,
SCIENCE AND TECHNOLOGY**

© 2024 GRT College of Education