ORIGINAL RESEARCH

Evaluating the efficacy of Jahezon's educational program on critical nursing care: A quasi-experimental study

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ABSTRACT

Objective: Competent and trained nurses are essential for critical care preparedness. This study assesses the impact of an educational training program (Jahezon) on the participants' critical care knowledge by comparing their pre- and post-knowledge outcomes.

Methods: This study used a quasi-experimental one-group pre-test-post-test design to examine the impact of 40 days of theoretical and practical training on 43 selected nurses from 16 hospitals located in the Hai'l Health cluster, situated in the city of Hai'l, Saudi Arabia. The training program started on November 2021, the curriculum covered a comprehensive range of critical care nursing concepts and was divided into four phases. The instrument used to assess knowledge was a 50-item multiple-choice questionnaire, which was administered as a pre-test, post-test, and a 6-month follow-up test format. The data were analyzed using SPSS v29.0.

Results: The mean total scores were the highest in the follow up test (M = 9.87, SD = 2.34), followed by the post-test (M = 7.57, SD = 0.98) and the pre-test (M = 5.91, SD = 1.06), showing a statistically significant difference ($F(2, 117) = 64.834$, $p < .001$). From the pre-test to the post-test, 93% of the total scores improved. The only demographic factor that affected the test scores was gender, with female nurses scoring higher.

Conclusions: The nurses' knowledge improved significantly after their participation in the critical care training program, but more research is needed to determine their actual performance in caring for critically ill patients during a pandemic.

Key Words: Critical care, Training, Nurses, Pandemic, COVID 19, Preparedness

1. INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic presented a significant public health challenge, with critical care settings in particular being placed in a vulnerable position. Critical care is a specialized field that addresses the needs of patients with potentially life-threatening conditions.[1] The provision of appropriate critical care during emergencies such as COVID-19 is essential for the continued operation of healthcare systems.[2] However, healthcare systems may be overwhelmed during such times due to a surge of critically ill patients and the potential challenges in maintaining standard staffing ratios.[3,4] The COVID-19 pandemic emphasized the need for a nursing workforce that is well-equipped with the necessary knowledge, skills, and abilities to effectively respond to a crisis.[1,5] This is particularly relevant in intensive care units (ICUs), where specialized training is required

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for physicians, nurses, and respiratory therapists, among others, making it more difficult to replace them in the event of shortages.[6]

The pandemic brought to the forefront the longstanding issue of nurse shortages globally.[6] With nurses working extended hours and under high levels of stress, there was further strain on an already limited workforce. The nurse shortage was exacerbated by the fact that many nurses were forced to self-isolate or even became ill themselves, leading to a decrease in the available workforce.[7] Additionally, the pandemic had a detrimental impact on the delivery of nursing education. With nursing education programs having to reduce class sizes or shift to virtual learning, clinical experiences were also limited as a measure to safeguard nursing students during the pandemic. The virtual learning approach was also subjected to various challenges, including issues with internet accessibility, affordability, and reliability.[8] Admissions were also often suspended, limiting the pipeline of newly graduated nurses.

Ensuring that patient needs are met by providing adequately trained critical care nurses and maintaining a safe patient-to-nurse ratio are essential for providing high-quality patient care.[9,10] In an effort to meet the increased demand for critical care during the COVID-19 pandemic, many countries took steps to enhance staffing levels.[11] However, in Saudi Arabia, only 19% of nurses are qualified to care for critically ill patients, according to the Ministry of Health's (MOH) statistics,[12] leading to shortages in the critical care nursing workforce and a lack of highly qualified nurses.[13] Access to high-quality nursing education is necessary to address this shortage. Previous research has demonstrated that nurses are more effective and confident in their work during a pandemic if they have greater knowledge and prior experience with infectious disease outbreaks.[14] In addition, studies have shown that education can improve nurses' knowledge and practices in the management of critically ill patients, leading to better patient outcomes.[15–17] Higher ratios of nurses with specialized critical care training have also been linked to better patient outcomes.[18]

Maintaining adequate staffing levels is essential when developing a workforce emergency plan.[5] The Saudi MOH has urged nursing administrations to carefully manage the available nursing workforce in order to meet the needs of both patients and nurses, particularly during the global nursing shortage.[13] In their pursuit to increase the availability of trained nursing personnel during emergencies, the Nursing Executive Administration in the Hai'l Health Cluster implemented an intensive training program called Jahezon. This program was delivered to 43 nurses from 16 hospitals in Hai'l City over a period of 40 days and included both theoretical and practical components. The goal of this program was to create a pool of competent and efficient critical care backup nurses who could support ICU nursing resources during emergencies, aiming to ensure adequate staffing levels and improve patient outcomes in line with the goals of Saudi Arabia's Vision 2030.[19] However, the effectiveness of the Jahezon training program in improving the critical care preparedness of the participating nurses has yet to be evaluated. This study thus aims to assess the impact of the program on the participants' critical care knowledge by comparing their pre and post-knowledge measurements. This can help to determine whether the training program has achieved its intended goals and whether it is worth continuing or modifying in the future.

2. METHODOLOGY

2.1 Study design

A quasi-experimental one-group pre-test-post-test design was used to assess the effectiveness of the critical care program (Jahezon). The effectiveness of the training was assessed by evaluating the degree of knowledge gained by participants. This method involved measuring the same group of participants at three different points in time.

2.2 Participants and settings

The study was conducted among 43 selected nurses from 16 hospitals located in the Hai'l Health cluster, situated in the city of Hai'l, Saudi Arabia. The training program was conducted in November 2021.

2.3 Sampling strategies

A non-randomized sampling method was utilized to recruit the study sample for this investigation. A total of 43 nursing staff members were nominated by the nursing office at each of the 16 city and peripheral hospitals in the Hai'l Health Cluster to participate in the Jahezon training program. The sample size was determined based on practical considerations, such as the available resources, time constraints. The nurses who were selected to join the program were chosen based on a set of predetermined inclusion criteria, including holding a bachelor's degree or diploma in nursing, being registered with the Saudi Commission for Health Specialties, being certified in basic life support, having at least one year of clinical experience. These inclusion criteria were used to ensure that the sample was composed of qualified and experienced nursing staff who were well-suited to participate in the training program.

2.4 Training program

The nurses selected to join the program were divided into 3 batches. Each batch received training that lasted for 40 days. The training program had integrated didactic components and a clinical practicum. The curriculum covered a comprehensive range of critical care nursing concepts, including the roles of nurses in international patient safety goals, infection prevention and control, respiratory care, management of mechanically ventilated patients, and ICU-specific competencies. The curriculum was divided into four (4) phases: (1) The preceptorship phase, which provided significant teaching and learning experience for the trainee. (2) The coaching phase, whereby to promote the achievement of the patient's safety goals, an ICU nurse intentionally provided each trainee with results-oriented and structured coaching sessions with patient interaction; this included one-on-one teaching. (3) The practical training phase, which was implemented to develop nursing competencies to deal with ICU patients. This involved the application of all nursing competencies discussed and focused on phases 1-2, and it was facilitated by assigning trainees to care for ICU patients under the preceptor's supervision. This included regular meetings with the trainee following teaching sessions to provide immediate feedback and evaluate training experience. (4) The evaluation phase, which included a set of multiple-choice questions (MCQ) which covered all the concepts.

2.5 Methods of data collection

The instrument utilized in this study to assess nurses' knowledge in the area of critical nursing care was purposefully developed by the creators of the Jahezon program. Rigorous steps were taken to ensure its reliability and validity. To establish content validity, the instrument's development involved close collaboration between program creators and experts in critical care nursing. These experts provided valuable insights and expertise to carefully select and construct the items, ensuring that they accurately represent the key concepts of critical nursing care.

The assessment process encompassed a pre-test and post-test design. Prior to participating in the Jahezon program, nurses completed a pre-test that served as a baseline assessment, measuring their initial level of knowledge across all relevant concepts. This pre-test provided a benchmark for comparison to evaluate the immediate effectiveness of the program in knowledge acquisition.

The test comprised 50 multiple-choice questions. The test blueprint was designed to ensure comprehensive coverage of essential topics such as ICU nursing procedures, critical care nursing, international patient safety goals, infection prevention and control, and respiratory care and the management of patients on mechanical ventilation.

Following program completion, the same test was administered as a post-test to assess the immediate impact of the Jahezon program on nurses' knowledge. Furthermore, a follow-up test was conducted six months later to evaluate the long-term retention of the material learned through the program. This approach allows for an assessment of the program's sustainability and durability in enhancing nurses' critical nursing care knowledge.

To ensure internal validity and eliminate potential confounding variables, the same test was consistently used for the pre-test, post-test, and follow-up test. This approach guarantees the reliability of the experiment by minimizing variability in the assessment process. Additionally, a washout period was introduced between the post-test and follow-up test to minimize any potential carry-over effects.

2.6 Data Analysis

The data were analysed using SPSS v29.0. Descriptive statistics were provided. ANOVA was used to examine the test score differences between the groups. Statistical significance was determined with a confidence interval of 95 percent, $p < .05$.

2.7 Ethical considerations

This research was approved by the Ethics Committee of Hai'l Region (Approval no 2022-70). Verbal consent was obtained from the respondents before the data collection.

3. RESULTS

3.1 Demographic Characteristics

There were a total of 43 participants in the Jahazon training program, of which 65.1% (n = 28) were female and 34.9% (n = 15) were male. The majority, 53.5% (n = 23) worked in a peripheral hospital, while 46.5% (n = 20) worked in a central hospital. The majority, 51.2% (n = 22) had worked in non-critical care before training and 48.8% (n = 21) had worked in critical care. After the training, 48.8% (n = 21) worked in non-critical care while 41.9% (n = 18) worked in critical care. In addition, 3 staff resigned and 1 was a non-functional nurse 9.3% (n = 4). Meanwhile, 87.2% (n = 34) did not change their area of work, while 7.7% (n = 3) changed from critical to non-critical, and 5.1% (n = 2) changed from non-critical to critical. Overall, the nurses had a mean of 6.56 (SD = 3.65) years of experience, ranging from 1 to 12 years.

3.2 Total Scores

The mean total scores were highest in the follow up test (M = 9.87, SD = 2.34), followed by the post-test (M = 7.57, SD

= 0.98) and the pre-test (M = 5.91, SD = 1.06), with a statistically significant difference (F(2, 117) = 64.834, $p < .001$). Tukey post hoc analysis revealed that the mean increase from pre-test to post-test (-1.67, 95% CI [-2.44, -0.89]) was statistically significant ($p < .001$) and the mean increase from post-test to the follow up test (-2.30, 95% CI [-3.12, -1.47]) was also statistically significant as shown in Figure 1.

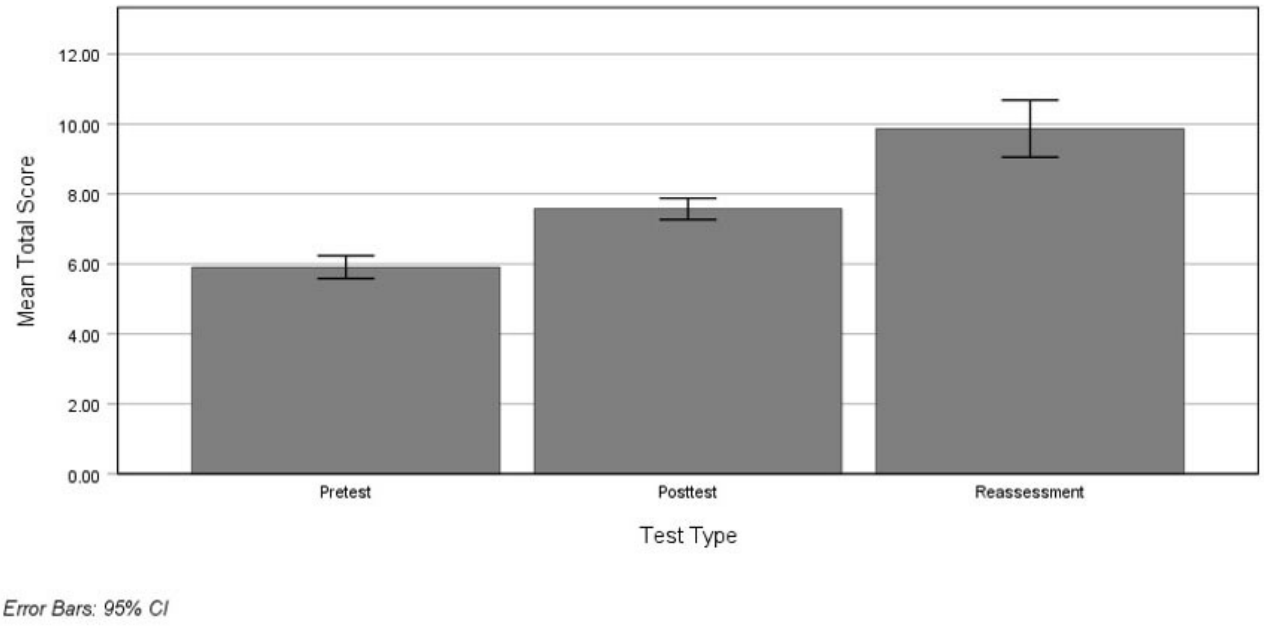

Figure 1. Mean total scores

3.3 Differences from the pre-test to the post-test

Overall, the scores improved from the pre-test to the post-test. From the pre-test to the post-test, 93% of the total scores improved, while 7% of the total scores decreased as shown in Figure 2.

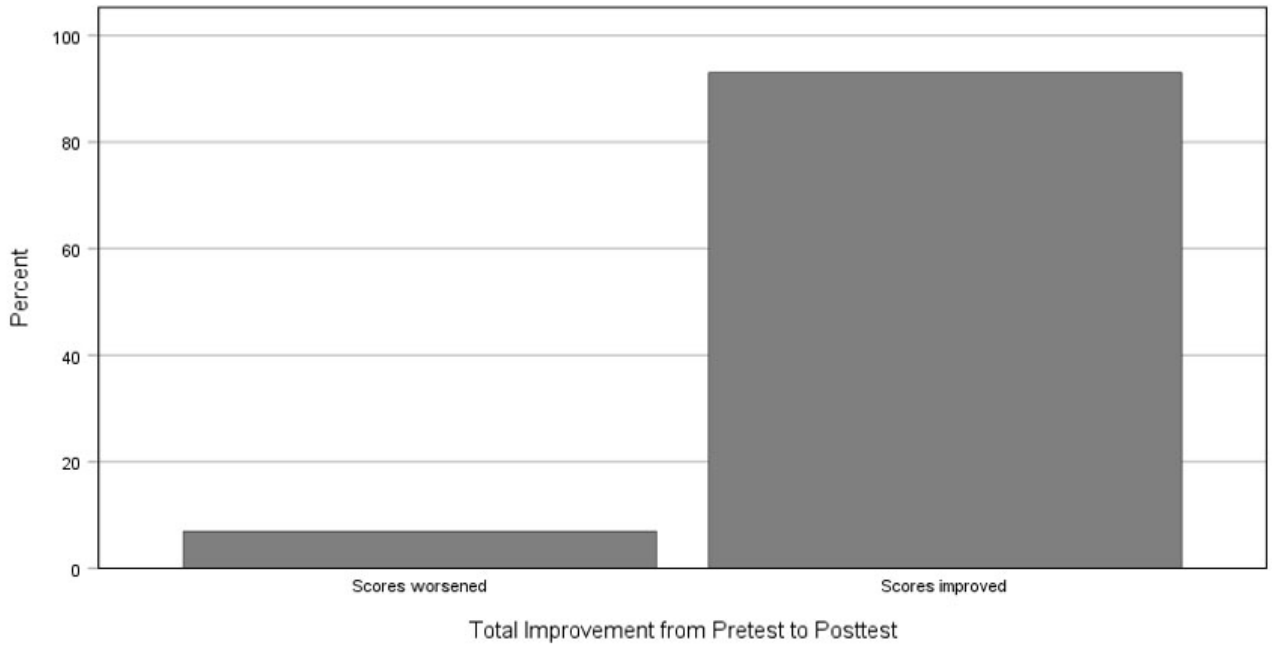

Figure 2. Pretest to posttest total scores

3.4 Score differences between varying demographic characteristics

Nurses in the peripheral hospitals (M = 5.97, SD = 0.99) scored higher on the pre-test than nurses in the central hospitals (M = 5.85, SD = 1.16). However, the nurses in the central hospitals scored higher on the post-test than the nurses in the peripheral hospitals. The differences were not statistically significant, however, at p = .728 and .549, respectively.

Female nurses (M = 6.09, SD = 1.16) scored higher on the pre-test than male nurses (M = 5.57, SD = 0.79), but the difference was not statistically significant (p = .129). Female nurses (M = 7.80, SD = 0.80) also scored higher on the post-test than male nurses (M = 7.15, SD = 1.16), with a statistically significant difference ($F(1, 41) = 4.702$, $p < .036$) as shown in Figure 3.

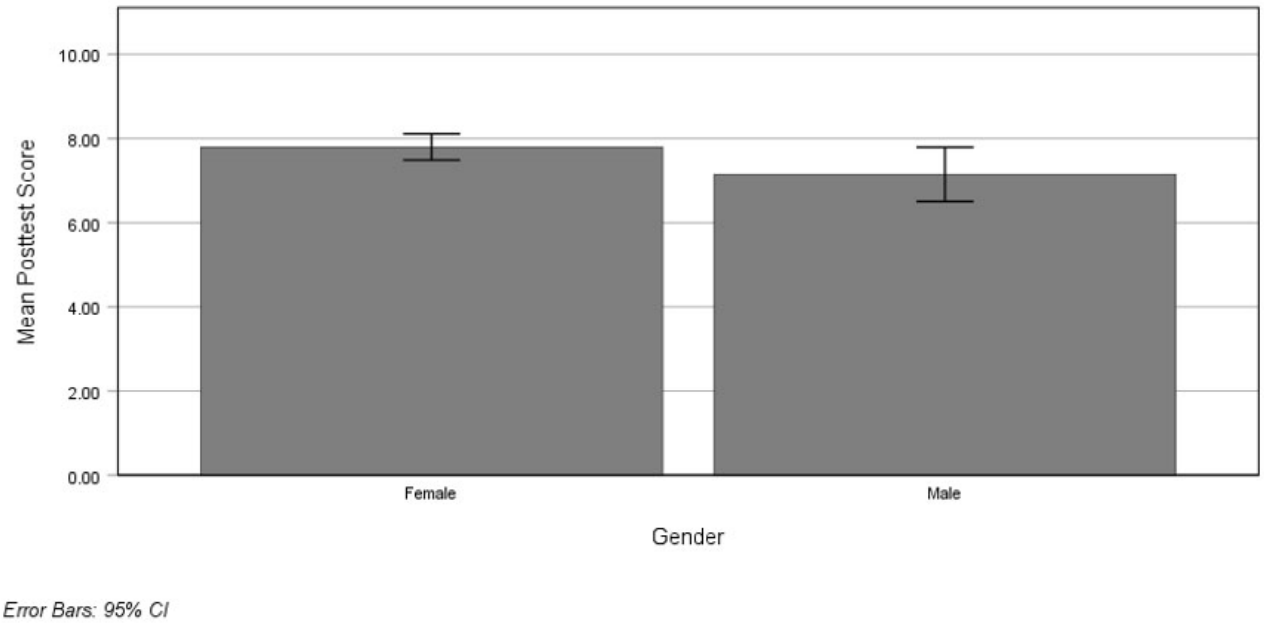

Figure 3. Post-test scores for female versus male nurses

Nurses in non-critical care (M = 6.03, SD = 1.06) scored higher on the pre-test than those in critical care (M = 5.79, SD = 1.08). Furthermore, nurses in non-critical care (M = 7.83, SD = 1.00) scored higher on the post-test than those in critical care (M = 7.30, SD = 0.91). However, none of the differences were statistically significant, at p = .473 and .081, respectively. In addition, nurses in non-critical care (M = 10.50, SD = 1.59) scored higher on the follow up test than nurses in critical care (M = 9.56, SD = 2.63). None of the differences were statistically significant, at p = .506, .218, and .226, respectively. There was no statistically significant correlation between years of experience, pre-test, and post-test scores, at $rs(41) = -.202$, p = .193 and .047, p = .764, respectively.

3.5 Significant Insights of the Participants

The majority of the participants (71%) said that the training increased their knowledge, confidence, or skills, whereby 12.9% said that it was helpful or beneficial or that it represented practical training and experience. All of the participants (100%) said that they would recommend the training program to their colleagues. When asked for suggestions and recommendations, 54.3% said nothing was needed to improve the training program, 14.3% said they needed more time to learn, 8.6% said that more topics should be included in critical areas, and 5.7% said that more remote courses were needed.

4. Discussion

The study examined the impact of a 40-day educational training program (Jahezon) on 43 selected nurses from 16 Hai'l City hospitals, including theoretical and practical components. The training content was based on critical care knowledge, skills, and practices to be utilized during the pandemic. Competent and trained nurses are essential for critical care preparedness.[20] Critical care nurses must possess the knowledge, skills, and practices related to patient assessment, managing complex medical conditions, and using life-saving devices and procedures through completing critical care training programs.[21]

We found that the participants' knowledge improved signifi-

cantly from the pre-test to the post-test and subsequent follow up test. The significant increase of 93% in the participants' overall knowledge scores between the pre-test, post-test, and follow up test after the program implementation is consistent with the outcomes of other studies. For instance, Deshmukh et al.[22] found a similar trend, with a significant rise of 65% from the pre-test to the post-test following structured education. This finding is also supported by Atia et al.,[23] who mentioned that 70% of respondents had poor knowledge before the intervention, while 76% had good knowledge after the educational training program. The findings of the pre- and post-tests therefore reveal the impact of the educational training program on the trainees' knowledge. The substantial improvement in the follow up test, on the other hand, shows that the trainee retained the information.

Regarding the nurses' gender, the pre-and post-test data revealed that female nurses performed better than male nurses. This result supports the findings of Wan et al.,[24] who discovered that male respondents performed poorer academically than female respondents. However, it is important to note that regardless of their gender, all nurses need to have the necessary education, skills, and experience to perform their duties confidently and competently. Therefore, efforts should be made to identify and address any learning gaps or challenges, regardless of gender.

The current study also discovered that nurses' work experience, whether critical or non-critical, has no statistical relevance. However, there was nonetheless a remarkable consistency in the outcomes from the pre-test to the post-test and follow up test, with nurses with non-critical experience performing better. Hence, a further assessment can be done to ascertain the underlying reason for these findings.

Almost three-fourths of the participants gave positive feedback regarding an improvement in their knowledge, skills, and confidence to perform their duties and responsibilities. This positive feedback aligns with the current study's findings, which show a significant relationship between the pre-test and post-test outcomes ($p < .001$). This indicates that the participant's perception of their increased knowledge and skills is not merely a subjective insight but is supported by objective evidence that they could effectively absorb and apply the information provided by the training program.

Although the results of the present study significantly contributed to the participants' understanding of critical care nursing practice in the Hai'l region, it does not necessarily imply that good knowledge transforms into sound practice in critical care units. Therefore, more study is required to assess the nurse's practicum performance specifically relevant to managing critically ill patients during a pandemic.

Based on the suggestions and recommendations given by the participants, it is believed that the educational and training providers must consider re-aligning the program, training length, strategies of teaching and training language. Since the team-based learning approach was adopted, the instructional format or classic design of elements of TBL, its steps of implementation and the need for a well-organized facilitator in the area should be re-considered. Efforts should also be made to ensure and preserve the four S-design, referring to the significant problem, same problem, specific choice and simultaneous reporting.[25]

A small number of participants shared their perception that they needed more time to learn, although it should be noted every individual is different and has varying rates of learning. In light of this, the Individualized Instruction Model could also be helpful to fit the educational needs and skills of the learner and change the pace of training[26] in accordance with the ability of the staff to ensure quality learning outcomes by giving all the trainees the opportunity to gain the most from the experience.

Moreover, this study found a limitation in terms of the competency level gained by each trainee, including the most common problems encountered in the unit; addressing these could be a helpful way to enhance the training program. Nevertheless, a teaching/learning assessment strategy to use "reflection" facilitates a focus on a reflective, problem-solving approach with proper supervision from a qualified nurse educator because this will provide the opportunity for the learner to have a deeper insight and overview of the outcome of their actions, which is beneficial for their future plans and decisions.[27] This approach also helps the learner to improve their communication skills through reflective statements, which are equally important to behavior and technical proficiency.[28]

4.1 Implication for future practice

During the pandemic, healthcare facilities faced challenges coping with a surge in critically ill patients. This situation highlights the significant value of regularly implementing programs like Jahezon to address the issue of unpreparedness.

Programs like Jahezon provide structured and targeted training for nurses in critical care. They offer comprehensive education, practical training, and simulated scenarios mirroring real emergencies. Regular participation in such programs strengthens nurses' competencies and keeps them updated on advancements in critical care, ensuring preparedness for future crises.

Implementing Jahezon regularly has multiple advantages.

Firstly, it allows healthcare facilities to invest proactively in nursing staff preparedness, minimizing the need to react during emergencies. This approach ensures nurses have the necessary skills in advance, reducing response time during high-pressure situations.

Secondly, regular program implementation fosters a culture of continuous learning and improvement. Nurses staying engaged with educational programs remain current on best practices, new treatments, and evidence-based approaches. This enables them to provide top-quality care to critically ill patients, even in unprecedented circumstances.

Moreover, regular participation in programs like Jahezon cultivates confidence and preparedness among nursing staff, especially those without critical care backgrounds. Confidence is crucial for the effective management of critical care scenarios. When nurses feel adequately equipped, they can make critical decisions efficiently, leading to improved patient outcomes.

4.2 Limitations

The limitations of the study's quasi-experimental design raise concerns about the internal validity of the results, as it lacks a comparison group to assess the true effects of the critical care program. Additionally, the reliability of the assessment instrument has not been thoroughly established, which may impact the validity of the results. While the results do provide insight into cognitive improvement, they do not address the level of performance demonstrated by staff nurses in the care of critically ill patients in the given area. Hence, it is imperative to conduct further research to establish these important factors.

5. Conclusion

The current study results allow us to conclude that the nurses who participated in the training program had higher knowledge levels at the time of the post-intervention evaluation than at the time of the pre-intervention evaluation. Additionally, they demonstrated better knowledge at the 6-month follow-up test, with a statistically significant improvement. However, good knowledge does not necessarily reflect how well a nurse performs in the field. Hence, further research is required to determine the nurses' practicum performance related explicitly to handling critically ill patients during a pandemic.

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Conflicts of Interest Disclosure

Authors declare no conflict of interests.

References

[1] Marshall JC, Bosco L, Adhikari NK, et al. What is an intensive care unit? A report of the task force of the World Federation of Societies of Intensive and Critical Care Medicine. Journal of Critical Care. 2017 Feb 1; 37: 270-6. PMid:27612678 https://doi.org/10.1016/j.jcrc.2016.07.015

[2] Mer M, Aryal D, Nielsen ND, et al. Critical Care Pandemic Preparation: Considerations and Lessons Learned from COVID-19. Critical Care Clinics. 2022 Oct 1; 38(4): 761-74. PMid:36162909 https://doi.org/10.1016/j.ccc.2022.07.002

[3] Aziz S, Arabi YM, Alhazzani W, et al. Managing ICU surge during the COVID-19 crisis: rapid guidelines. Intensive Care Medicine. 2020 Jul; 46: 1303-25. PMid:32514598 https://doi.org/10.1007/s00134-020-06092-5

[4] Gabriel LE, Webb SA. Preparing ICUs for pandemics. Current Opinion in Critical Care. 2013 Oct 1; 19(5): 467-73. PMid:23995125 https://doi.org/10.1097/MCC.0b013e328364d645

[5] Flaubert JL, Le Menestrel S, Williams DR, et al. Nurses in Disaster Preparedness and Public Health Emergency Response. InThe Future of Nursing 2020-2030: Charting a Path to Achieve Health Equity 2021 May 11. National Academies Press (US).

[6] Mascha EJ, Schober P, Schefold JC, et al. Staffing with disease-based epidemiologic indices may reduce shortage of intensive care unit staff during the COVID-19 pandemic. Anesthesia and Analgesia. 2020 Jul; 131(1): 24. PMid:32343514 https://doi.org/10.1213/ANE.0000000000004849

[7] Linton NM, Kobayashi T, Yang Y, et al. Incubation period and other epidemiological characteristics of 2019 novel coronavirus infections with right truncation: a statistical analysis of publicly available case data. Journal of Clinical Medicine. 2020 Feb 17; 9(2): 538. PMid:32079150 https://doi.org/10.3390/jcm9020538

[8] Agu CF, Stewart J, McFarlane-Stewart N, et al. COVID-19 pandemic effects on nursing education: looking through the lens of a developing country. International Nursing Review. 2021 Jun; 68(2): 153-8. PMid:33513283 https://doi.org/10.1111/inr.12663

[9] Al Mutair A, Amr A, Ambani Z, et al. Nursing surge capacity strategies for management of critically ill adults with COVID-19. Nursing Reports. 2020 Sep 8; 10(1): 23-32. PMid:34968261 https://doi.org/10.3390/nursrep10010004

[10] González-Gil MT, González-Blázquez C, Parro-Moreno AI, et al. Nurses' perceptions and demands regarding COVID-19 care delivery in critical care units and hospital emergency services. Intensive and

Critical Care Nursing. 2021 Feb 1; 62: 102966. PMid:33172732 https://doi.org/10.1016/j.iccn.2020.102966

[11] Saudi Patient Safety Center. COVID-19 Safety Guide for Healthcare Professionals (No. Version 3). Saudi Patient Safety Center. 2020. Available from: https://spsc.gov.sa/English/Pages/covid-19.aspx

[12] Ministry Of Health. Statistical Yearbook.pdf Ministry Of Health. (2021). Available from: https://www.moh.gov.sa/en/Ministry/Statistics/book/Documents/Statistical-pdf

[13] Ministry Of Health. ICU Nurse Staffing (INS) Model COVID-19 Surge Capacity Building. Ministry Of Health. (2020). Available from: https://www.moh.gov.sa/en/Ministry/MediaCenter/Publications/Documents/ICU-pdf

[14] Koh Y, Hegney D, Drury V. Nurses' perceptions of risk from emerging respiratory infectious diseases: a Singapore study. International Journal of Nursing Practice. 2012 Apr; 18(2): 195-204. PMid:22435984 https://doi.org/10.1111/j.1440-172X.2012.02018.x

[15] Almarhabi M, Cornish J, Lee G. The effectiveness of educational interventions on trauma intensive care unit nurses' competence: A systematic review and meta-analysis. Intensive and Critical Care Nursing. 2021 Jun 1; 64: 102931. PMid:32950377 https://doi.org/10.1016/j.iccn.2020.102931

[16] Gundo R, Gundo B, Chirwa E, et al. Effect of an educational programme on critical care nurses' competence at two tertiary hospitals in Malawi. Malawi Medical Journal. 2021 Dec 22; 33(4): 236-41. PMid:35291390 https://doi.org/10.4314/mmj.v33i4.3

[17] Mpasa F, van Rooyen DR, Venter D, et al. Improving nurses' knowledge of managing endotracheal tube cuff pressure in intensive care units: A quasi-experimental study. Health SA Gesondheid. 2020; 25. PMid:33391829 https://doi.org/10.4102/hsag.v25i0.1479

[18] Blake N. Appropriate staffing for a healthy work environment. AACN Advanced Critical Care. 2013 Jul; 24(3): 245-8. PMid:23880746 https://doi.org/10.1097/NCI.0b013e31829937f5

[19] Saudi Vision 2030. Quality of Life Program 2020: Delivery Plan. Saudi Vision 2030. (2018) Available from: https://tinyurl.com/2dr3e5zc

[20] Maves RC, Jamros CM, Smith AG. Intensive care unit preparedness during pandemics and other biological threats. Critical Care Clinics. 2019 Oct 1; 35(4): 609-18. PMid:31445608 https://doi.org/10.1016/j.ccc.2019.06.001

[21] Brickman D, Greenway A, Sobocinski K, et al. Rapid critical care training of nurses in the surge response to the coronavirus pandemic. American Journal of Critical Care. 2020 Sep 1; 29(5): e104-7. PMid:32666088 https://doi.org/10.4037/ajcc2020142

[22] Deshmukh M, Shinde M. Impact of structured education on knowledge and practice regarding venous access device care among nurses. Int J Sci Res. 2014 May 3; 3(5): 895e901.

[23] Atia Elasrag GA, Elsabagh NE, Abdelmonem AF, et al. Impact of educational intervention on nurses' knowledge, practice and attitude related prevention measures of COVID 19. Indian Journal of Forensic Medicine & Toxicology. 2021 May 17; 15(3): 2939-48.

[24] Wan Chik WZ, Salamonson Y, Everett B, et al. Gender difference in academic performance of nursing students in a Malaysian university college. International Nursing Review. 2012 Sep; 59(3): 387-93. PMid:22897191 https://doi.org/10.1111/j.1466-7657.2012.00989.x

[25] Burgess A, van Diggele C, Roberts C, et al. Team-based learning: design, facilitation and participation. BMC Medical education. 2020 Dec; 20(2): 1-7. PMid:33272267 https://doi.org/10.1186/s12909-020-02287-y

[26] Pappas C. Instructional design models and theories: The discovery learning model. eLearning Industry. Repéré à: https://elearningindustry. com/discovery-learning-model. 2014.

[27] Thu N. Communication skills and reflection practice in smart english teaching and learning environment: a case study. International Journal of Emerging Technologies in Learning (iJET). 2020 Sep 11; 15(17): 221-37. https://doi.org/10.3991/ijet.v15i17.15235

[28] Boyle DA, Anderson WG. Enhancing the communication skills of critical care nurses: focus on prognosis and goals of care discussions. J Clin Outcomes Manage. 2015 Dec; 22(12): 543.