Evaluating an educational program for enhancing neonatal intensive and special care nurses’ and midwives’ competence with neonatal pain management: A quasi-experimental study

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ABSTRACT

Competence in neonatal pain management is influenced by the clinician’s knowledge, attitudes, and skills. The impact of an educational program on enhancing competence among Thai neonatal nurses and midwives has never been explored. This study aims to evaluate the impact of an educational program to increase nurses’ and midwives’ competence in neonatal pain management in Thai neonatal intensive and special care units (NI/SCUs). A web-based learning package with pre-, post-, and follow-up online questionnaire was administered to 68 neonatal nurses and midwives. There was a substantial increase in the total mean scores of knowledge, attitudes, and perceived self-competence in the post- and follow-up phases compared to the pre-test phase ($p < 0.001$). The educational program had a significant impact on Thai NI/SCU nurse and midwife competence regarding neonatal pain management. Ongoing education is needed to sustain clinicians’ competence in this area.

1. Introduction

Neonates requiring advanced care are admitted to neonatal intensive and special care units (NI/SCUs), where they are often subjected to various painful procedures and noxious environmental stimuli. Neonatal pain is an emotive issue and is recognised as causing harm in both the short-term, causing behavioural and physiological distress, and the long-term to the developing brain (Field, 2017; Harrison and Wright, 2018). Although growing empirical research and guidelines about the prevention and management of pain in hospitalised neonates are being published worldwide, managing neonatal pain remains challenging (Abdel Razeq et al., 2016; Blomqvist et al., 2020; Committee on Fetus and Newborn & Section on Anesthesiology and Pain Medicine, 2016).

Nurses and midwives who provide 24-hour care to hospitalised neonates play a critical role in mitigating neonatal pain and must be competent in pain management. Previous studies suggest that nurses’ perceptions of well-managed pain in neonatal intensive care units (NICUs) were significantly correlated with adequate education (Cong et al., 2014; Mala et al., 2021). Despite this, research has indicated that education in neonatal care receives little attention, with several undergraduate nursing programs and in-service educational training having competing demands for actual content, resulting in a restricted focus on neonates (Al-Maaitah et al., 2023; Ismail et al., 2018; Kassab et al., 2016).

According to a recent qualitative Thai study, NI/SCU nurses and midwives emphasised the necessity of effective neonatal pain management but identified several barriers (Mala et al., 2023). These barriers included insufficient professional knowledge and lack of timely updated knowledge/practices. In addition, sociocultural factors, high workloads and staff shortages were also reported. This study proposed improvements at the individual, unit, and organisational levels to improve neonatal pain management and nurse and midwife competence (Mala et al., 2023). Improving neonatal pain knowledge and attitudes, for example, as well as enhancing clinical nurse leaders’ abilities to facilitate reform and mentor junior staff. Enhancing nurses’ and midwives’ confidence and assertive communication skills were also deemed necessary for better communication between nurses/midwives and physicians in order to provide appropriate pain management for...
neonates. The existing power differentials between nurses/midwives and physicians were considered to be a barrier to optimal neonatal pain management in Thai context. Organisationally, time should be set aside for flexible staff continuing education, which should include neonatal pain management. Parental visitation reform was also identified as beneficial for managing neonatal pain (Mala et al., 2023).

Competence in neonatal pain management among NI/SCU nurses and midwives in providing pain care is paramount for positive outcomes for these vulnerable neonates. Competence is a nebulous concept described in different ways by different disciplines. Yet, competence in nursing literature is often defined as an ability to perform a professional function effectively, which requires integration into four pillars, including knowledge, attitudes, behaviour, and perceptions of competence (Association of Women’s Health Obstetric and Neonatal Nurses [AWHONN], 2019; Desbiens et al., 2012; Gonczi, 1994; Gonczi et al., 1990). A recent systematic review also highlighted the need to enhance the competence of nurses and midwives who care for neonates in the NI/SCUs to accurately identify and manage pain (Mala et al., 2021). However, the extent to which integration of neonatal pain management education for the nursing/midwifery profession and an educational program has never been explored in Thai NI/SCUs. This paucity of research represents a gap in the available evidence.

In response to this, the study presented here developed, administered, and evaluated an educational program for nursing and midwifery staff to improve their competence in neonatal pain management. The quantitative component of a mixed methods study that evaluates nurses’ and midwives’ competence and the impact of a targeted educational program for nurses and midwives in the Thai NI/SCU context was reported.

2. Methods

2.1. Design

A single-group, quasi-experimental approach with repeated measures was used. The present study was part of a larger mixed-methods research project. This study was conducted during the COVID-19 pandemic, which prevented travel to Thailand from Australia to collect data. As a result, online questionnaires using ‘Google Forms’ was utilised.

2.2. Setting and sample

This study was conducted in three units of two tertiary care hospitals in Southern Thailand between January and March 2022 (two NICUs, and one neonatal special care unit [NSCU]). The NSCU is a clinical setting that provides specialised care to neonate with less acute health problems compared to those admitted to NICUs. The NICU admits 500-650 patients per year, which is approximately twice the NSCU’s average. These units receive neonates from all of Thailand’s Southern provinces and employ 86 full-time neonatal nurses and midwives.

Purposive sampling was used to recruit NI/SCU nurses and midwives. Participants were required to meet the following criteria as specified by the study’s aim (Liamputtong, 2019): a) nurses and midwives who take responsibility in providing care for critically ill neonates at all levels of working experience, and b) full-time employed in the NI/SCU settings. The G*Power Software (version 3.1) suggested that a minimum of 54 participants were required to detect a medium effect size of partial eta square ($\eta^2_p = 0.03$ ($f^2 = 0.18$), an alpha level of 0.05, and a power of 0.8 in a repeated measures Analysis of Variance (ANOVA) within-subjects (one-group, non-sphericity correction = 1, number of measurements = 3) (Bartlett, 2022).

<table>
<thead>
<tr>
<th>Table 1</th>
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<tbody>
<tr>
<td>Contents of the educational program.</td>
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<table>
<thead>
<tr>
<th>Modules</th>
<th>Contents</th>
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<tbody>
<tr>
<td><strong>Module 1:</strong> Introduction to neonatal pain</td>
<td>- The definition of pain</td>
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<td>- The neonatal experience of pain</td>
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<td></td>
<td>- Pain pathways</td>
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<tr>
<td><strong>Module 2:</strong> Effects of pain on neonates</td>
<td>- Painful procedures commonly performed in the neonatal care unit</td>
</tr>
<tr>
<td><strong>Module 3:</strong> Pain assessment</td>
<td>- Pain responses in neonates</td>
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<tr>
<td></td>
<td>- Pain assessment tools</td>
</tr>
<tr>
<td><strong>Module 4:</strong> Nurses’/midwives’ roles and overcoming barriers to effective pain management</td>
<td>- The Neonatal Infant Pain Scale (NIPS): commonly used in Thai context</td>
</tr>
<tr>
<td></td>
<td>- PowerPoint presentation with audio and descriptions about the barriers to effective pain management in Thai neonatal nurses and midwives</td>
</tr>
<tr>
<td></td>
<td>- A role-playing video of a pain management procedure in neonate using peripheral venepuncture as an exemplar</td>
</tr>
<tr>
<td></td>
<td>- Feedback on the role-playing video (can be given in Thai language)</td>
</tr>
<tr>
<td></td>
<td>- Principles of pain management in neonates</td>
</tr>
<tr>
<td></td>
<td>- Additional readings</td>
</tr>
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<td></td>
<td>- Case study</td>
</tr>
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<td></td>
<td>- Questionnaires</td>
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2.3. Data collection and instrumentation

2.3.1. Self-reported questionnaires

Participants were asked to respond to a four-section questionnaire. The first section – demographic data collected information such as participant age, unit, years of working experience in neonatal nursing care, level of education, and professional development training. The second to fourth section included a) the neonatal pain management knowledge test (NPM-KT), developed by Akuma and Jordan (2012), comprising nine true/false questions about neonatal pain, which were compared with the referenced model answers with a total possible score of 100, indicating a very high level of knowledge regarding neonatal pain, b) the nurses’ attitudes and perceptions test (N-APT) developed by Pöllki et al. (2010), which included 14 items combined in both positive and negative statements asking participants to rate their attitudes toward pain assessment and ability to manage neonatal pain in a five-point Likert scale with a total possible score of five, which indicates positive attitudes regarding neonatal pain, and c) the nurse professional competence scale – short form (NPC-SF) a validated instrument designed by Nilsson et al. (2018), comprising 35 items in a seven-point Likert scale where participants responded to items about perceived self-competence in managing neonatal pain with a total possible score of seven indicative of strongest perceived self-competence.

All instruments were adapted with permission from the authors and were translated into Thai and then back-translated by two translators using Jones’ adaptation of Brislin’s model translation processes (Jones et al., 2001). Cronbach’s alpha reliability coefficients of greater than 0.7 were previously reported for the instruments used in this study (Akuma & Jordan, 2012; Nilsson et al., 2018; Pöllki et al., 2010). For this study, the NPM-KT reported an alpha of 0.63 by computing Kuder-Richardson formula 20 (KR-20). Cronbach’s alpha coefficient of the N-APT and the NPC-SF was 0.664 and 0.964, respectively.

2.3.2. Educational materials and intervention

The educational program in this study was a web-based learning approach designed to enhance aspects of competence in neonatal nurses and midwives regarding neonatal pain management. Topics addressed the most significant deficit areas identified in the larger mixed-methods study. The educational program was designed in accordance with Gonczi’s theoretical perspective, which states that the principle of active learning should be integrated into teaching strategies and that
participants must be active learners by demonstrating the application of knowledge, attitudes, and skills in context (Gonczi, 2003). It was also emphasised that the educational modules should include theoretical knowledge as a foundation that enables each participant to perform a task effectively in a variety of contexts (Gonczi, 1996).

The educational program’s final version was made available in January 2022. Each module included a PowerPoint presentation with audio and descriptions, neonatal pain videos, a case study to reinforce the written content as an active learning module, and a link to provide feedback. The primary author demonstrated a role-playing video on how to provide nursing pain management for neonates undergoing peripheral venepuncture, which was included to represent practice in Thai NI/SCUs (see Table 1).

2.4. Ethical considerations

The ethical approval was obtained from the institutional review board at the university (GU Ref No: 2021/267) and the hospital sites (REC.64-259-19-9 and REC.64-0047) where study was conducted. Participants were provided with a letter and a poster of invitation via email explaining the study’s purpose and access information using a link or QR code. Consent was implied by the completion of the online questionnaire. All participants’ confidentiality and anonymity were preserved throughout the study by employing unique participant numbers.

2.5. Recruitment and procedures

After obtaining permission from the hospital head nurses to approach potential participants, on-site research assistants (RAs) distributed an email letter and an invitation poster to all nursing/midwifery staff in the hospital units. The email contained details about ethics approval and access information for participants. Interested participants who consented through the link or scanned the QR code were then directed to an online questionnaire. Participants who completed the pre-test questionnaires (Time 1; T1) were encouraged to participate in the educational program, post-test (Time 2; T2) and six weeks later (Time 3; T3) via reminder emails.

The primary author sent the link of an educational program through the email address only for participants who had completed the pre-test. This link could be accessed by each user with their email address, and the modules and the post-test survey (T2) could be accessed between January 10 and February 6, 2022. After 6 weeks of self-paced learning in the educational program, the participants were sent an email reminder to complete an online survey (T3) between March 21 and April 17, 2022. The educational program was not available online during the post-testing period. The participants who completed all modules were awarded a Certificate of Participation and received a coffee voucher from the RAs upon completion of T3.

2.6. Data analysis

A quantitative, descriptive, inferential-based approach was employed. Descriptive statistics were conducted to describe the sample...
demographics and the research variables used in the analysis. For nominal variables, frequencies (f) and percentages were calculated; means (M) and standard deviations (SD) were calculated for continuous variables. Items with negative wording were reverse coded prior to calculation, as with the N-APT scale previously (Pöllki et al., 2010). One-way repeated measures ANOVA was used to determine the difference in the mean scores among participants’ knowledge, attitude, and perceived self-competence over time. All assumptions underlying this type of statistical analysis were met, including Shapiro Wilks’ testing for normal distribution and Levene’s test for homogeneity of variance (Singh et al., 2013). As these data violated Mauchly’s test of Sphericity assumption, the results presented in the row labelled Greenhouse-Geisser were interpreted to reduce type I error rate (Singh et al., 2013). p-values < 0.05 were considered significant. SPSS software (version 28.0) was used for all statistical analyses.

3. Results

3.1. Participant demographics

The current study involved 68 neonatal nurses and midwives from NI/SCUs working in tertiary hospitals, a 79.1% response rate with no missing data (see Fig. 1).

The mean age was 34.1 ± 5.7 years, and the mean years of nursing experience was 10.3 ± 5.7 years. The majority (95.6%) held a Bachelor’s degree as the highest level of education. More than half (55.9%) had no previous training in neonatal pain management, and 57.4% had not undertaken any routinely available professional development in the last 6-12 months (e.g., training in neonatal care and cardiopulmonary resuscitation [CPR], breastfeeding support for sick neonates) (see Table 2).

3.2. Knowledge analysis

The total mean difference of the knowledge scores in the follow up phase (T3) (M = 99.67, SD = 1.89) had increased compared to pre-test phase (T1) (M = 79.57, SD = 15.19) and immediately post intervention (T2) (M = 98.04, SD = 5.41) (see Fig. 2). The results of repeated measures ANOVA suggested significant differences between the knowledge test across three time points (F(1,19,79,47)) = 112.01, p < 0.001, η² = 0.63), indicating the educational program improved the NI/SCU nurses’ and midwives’ knowledge (see Table 3).

3.3. Attitudes analysis

The total mean difference of the attitudes scores in the follow up phase (T3) (M = 4.70, SD = 0.18) had increased compared to the pre-test phase (T1) (M = 4.03, SD = 0.30) and immediately post intervention (T2) (M = 4.56, SD = 0.23) (see Fig. 3). Repeated measures ANOVA were performed and demonstrated a significant difference of attitudes in the three time points (F(1,108,72.44) = 209.84, p < 0.001, η² = 0.76), indicating the educational program improved the NI/SCU nurses’ and midwives’ attitudes (see Table 3).

3.4. Perceived self-competence analysis

The side-by-side box plot in Fig. 4 displays that the total mean scores of the NPC-SF scale increased from T1 (M = 4.73, SD = 1.02), and T2 (M = 5.74, SD = 0.54), to T3 (M = 5.76, SD = 0.52), with statistically significant improvement in the repeated measures ANOVA (F(1,02,68.22) = 147.86, p < 0.001, η² = 0.69), indicating that the educational program improved the NI/SCU nurses’ and midwives’ self-competence (see Table 3).

Because the above analysis yielded a statistically significant result, pairwise comparisons were measured to determine whether there was a difference in each pair of time points. Table 4 demonstrates that the mean scores of knowledge, attitudes, and perceived self-competence in the time-groups comparison were statistically significant between T1 and T2, and T1 and T3 (p < 0.001), while there was some significance between T2 and T3 (p < 0.05).

4. Discussion

This is the first study focusing on the impact of an educational program aimed at increasing nurses’ and midwives’ competence in neonatal pain management in Thai NI/SCUs. The participants were allowed to
complete all modules at their convenience with the condition that they must complete the program within four weeks and respond to the questionnaires immediately and then at six weeks after completion of the program.

The participants’ characteristics in this study are similar to those published in previous Thai studies in terms of age range and years of working experience (Khangrang and Soekphukhiao, 2017; Prasopkittikun et al., 2020). Most participants had Bachelor’s degree as the highest

Table 3
Within-subjects effects for the knowledge, attitudes, and perceived self-competence scale.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig. a</th>
<th>Partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Time</td>
<td>16940.97</td>
<td>1.19</td>
<td>14282.16</td>
<td>112.01</td>
<td>&lt;0.001</td>
<td>0.63</td>
</tr>
<tr>
<td></td>
<td>Error</td>
<td>10133.44</td>
<td>79.47</td>
<td>127.51</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitudes</td>
<td>Time</td>
<td>45.36</td>
<td>1.08</td>
<td>41.96</td>
<td>209.84</td>
<td>&lt;0.001</td>
<td>0.76</td>
</tr>
<tr>
<td></td>
<td>Error</td>
<td>14.48</td>
<td>72.44</td>
<td>0.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived self-competence</td>
<td>Time</td>
<td>92.37</td>
<td>1.02</td>
<td>90.72</td>
<td>147.86</td>
<td>&lt;0.001</td>
<td>0.69</td>
</tr>
<tr>
<td></td>
<td>Error</td>
<td>41.86</td>
<td>68.22</td>
<td>0.61</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes.
$SS =$ Type III Sum of Squares; $df =$ degree of freedom; $MS =$ Mean Square; Partial $\eta^2 =$ Partial eta square.

a Greenhouse-Geisser correction was used to reduce type I error.
obtain a nursing and midwifery licence in order to practise (Thailand intervention, and only attended professional development in neonatal Nursing and Midwifery Council, 2017). Additionally, the majority did nurse and midwife is a Bachelor

*management with more confidence. In accordance with this, Kusi gram (2015; Al-Maaitah et al., 2023; Khangrang and Soekphukhiao, 2017). Despite the participants’ mean years of nursing experience in this study indicating they had a relatively adequate clinical background (M = 10.3 ± 5.7), the educational program had a noticeable impact on all dimensions of competence against baseline scores. This can be explained by the fact that the program enabled them to absorb more information and upgrade their comprehension of neonatal pain principles (pain assessment, documentation, and management) in Thai NI/SCUs. Likewise, Germossa et al. (2018) study reported that there was no statistically significant difference in working experience before and after implementing the educational program (p = 0.40), whereas there was a significant improvement in scores following participation in the program (p < 0.001). This indicated that the program could assist nurses of all experience levels in carry out patient pain assessments and management with more confidence. In accordance with this, Kusi Amponsah, 2020 also reported that the educational program may help nurses with extensive expertise conceptualise their roles and augment a better understanding in a way that was regarded best practice based on how well-structured the program was.

The overall results of this study demonstrated that the total mean scores of knowledge, attitudes, and perceived self-competence in the post- and follow-up tests among NI/SCU nurses and midwives were statistically significantly higher after learning through the educational program compared to before the learning (p < 0.001). Specifically, the results in T1 and T2 as well as T1 and T3 revealed a considerable improvement in all aspects. This could be due to the program’s web-based design, which allowed participants to access the modules at any time, on any sort of electronic device, and from any location. This finding was consistent with recent studies from Brazil, Saudi Arabia, and Japan illustrated that neonatal nurses who completed all modules in a Web-based program considerably increased the total mean scores of knowledge, attitude, and practice in the post-test phase (p < 0.0001) (Costa et al., 2022; Issa et al., 2019; Ozawa et al., 2022). Furthermore, this study was undertaken during the COVID-19 pandemic, when educational interventions were restricted, and several face-to-face learning sessions were cancelled or postponed. Given this, most academic institutions transitioned to online platforms, resulting in increased value of online learning among students and clinicians, as well as their willingness to learn and foster professional development, findings that were similar to those found in South Korean and Japanese studies (Kim et al., 2021; Ozawa et al., 2022).

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**Table 4**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Time-groups comparison</th>
<th>Mean Difference</th>
<th>Std. Error</th>
<th>Sig. a</th>
<th>95% CI for Difference b</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>Knowledge</td>
<td>T1 - T2</td>
<td>-18.46*</td>
<td>1.72</td>
<td>&lt;0.001</td>
<td>-22.69</td>
</tr>
<tr>
<td></td>
<td>T1 - T3</td>
<td>-20.10*</td>
<td>1.82</td>
<td>&lt;0.001</td>
<td>-24.57</td>
</tr>
<tr>
<td></td>
<td>T2 - T3</td>
<td>-1.63*</td>
<td>0.63</td>
<td>0.034</td>
<td>-3.17</td>
</tr>
<tr>
<td>Attitudes</td>
<td>T1 - T2</td>
<td>-0.92*</td>
<td>0.07</td>
<td>&lt;0.001</td>
<td>-1.09</td>
</tr>
<tr>
<td></td>
<td>T1 - T3</td>
<td>-1.06*</td>
<td>0.07</td>
<td>&lt;0.001</td>
<td>-1.23</td>
</tr>
<tr>
<td></td>
<td>T2 - T3</td>
<td>-0.14*</td>
<td>0.02</td>
<td>&lt;0.001</td>
<td>-0.18</td>
</tr>
<tr>
<td>Perceived self-competence</td>
<td>T1 - T2</td>
<td>-1.40*</td>
<td>0.12</td>
<td>&lt;0.001</td>
<td>-1.69</td>
</tr>
<tr>
<td></td>
<td>T1 - T3</td>
<td>-1.45*</td>
<td>0.12</td>
<td>&lt;0.001</td>
<td>-1.74</td>
</tr>
<tr>
<td></td>
<td>T2 - T3</td>
<td>-0.05*</td>
<td>0.01</td>
<td>0.004</td>
<td>-0.08</td>
</tr>
</tbody>
</table>

Based on estimated marginal means.

a = The mean difference is significant at the 0.05 level.

b Adjustment for multiple comparisons: Bonferroni.

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Fig. 4. The mean differences in the NPC-SF scale across the three time points.
Although the results of the perceived self-competence in T2 and T3 demonstrated only a marginal improvement, it is possible that the educational program enabled participants to understand aspects of neonatal pain management that they were unaware of previously. This may have prompted them to reflect on their perceived self-competence, having realised there was more to learn about neonatal pain management. Perceived self-competence is considered an important component of competence because it influences healthcare providers’ behaviours (Desbiens et al., 2012). It is thought that nurses or midwives with high perceived self-competence are more likely to demonstrate superior patient care (Desbiens et al., 2012). It is suggested that an ongoing commitment to neonatal pain management be established for continuing education for NI/SCU nurses and midwives in order to promote new evidence-based practices in this respect. As illustrated in earlier studies, nurses are expected to engage in continual professional development to maintain their competence in various aspects of nursing, including pain management (Association of Women’s Health Obstetric and Neonatal Nurses [AWHONN], 2019; Filipe et al., 2014; Kol et al., 2017). As a result, implementing educational programs are recommended to improve nurses and midwives’ competence in neonatal pain management in Thai NI/SCUs.

4.1. Strengths and limitations

The strengths of this study lie in the high response rate (79.1%) for questionnaire completion with no missing data, and the sample size was met for statistical power using repeated measures ANOVA. Forward and back translation of all research instruments was also used to ensure rigorous instrument translation. The limitations are the transferability, as the samples were from only the Southern context; thus, the results of this study may not be generalisable outside of this context. Regarding the perceived self-competence measure, it would be helpful to investigate whether these findings are consistent with clinicians’ performance. However, as the researcher could not travel to Thailand for data collection, observation of clinicians’ performance was not possible. Ultimately, this study assessed knowledge, attitudes, and perceived self-competence at the six-weeks timepoint post-intervention; it would be helpful to investigate further whether the impacts are sustained over time.

5. Conclusion

The dearth of neonatal educational preparation, both in undergraduate curricula and in post-registration contexts in Thailand points to the need for improved educational preparation and continuing professional learning for NI/SCU clinicians. The results of this study demonstrated that an online educational program positively impacted nurses’ and midwives’ competence regarding neonatal pain management. Such programs address this critical need for ongoing training and professional development to enhance knowledge, attitudes, and self-competence for effective pain management for vulnerable neonates in NI/SCUs.

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Conflicts of interest

The authors declare no conflict of interest.

Ethics approval statement

Ethics approval was obtained from the Human Research Ethics Committee of the Griffith University (GU Ref No: 2021/267), Songkla-nagarind Hospital (REC.64-259-19-9), and Surat-Thani Hospital (REC.64-0047).

Authorship statement

All authors (OM, VJK, and EMF) have made substantial contributions to the article and agree with the content. This includes contributions in terms of 1) the conception and design of the study, acquisition of data or analysis and interpretation of data, 2) drafting the article or revising critically for important intellectual content, and 3) final approval of the version to be submitted.

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References


