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Transitional care programs to improve outcomes in patients with traumatic brain injury and their caregivers: A systematic review and meta-analysis

Amelia Ganefianty¹, Praneed Songwathana², and Kittikorn Nilmanat²

Abstract

Background: Effective nursing interventions for caring for patients with moderate to severe traumatic brain injury are still challenging during a transition from hospital to home. Since traumatic brain injury has deep-rooted sequelae, patients and their caregivers require better arrangement and information on the condition to achieve improved outcomes after discharge.

Objective: This study aimed to assess transitional care programs to improve outcomes of patients with traumatic brain injury and their caregivers.

Methods: A systematic review and meta-analysis were performed on studies retrieved from ProQuest, PubMed, ScienceDirect, CINAHL, and Google Scholar from January 2010 to July 2021. RevMan 5.4.1 software was used for meta-analysis.

Results: Nine studies were systematically selected from 1,137 studies. The standard approaches of interventions used in patients with traumatic brain injury and their caregivers were education, mentored problem-solving, home- and community-based rehabilitation, counseling, skill-building, and psychological support. We observed that there was significant evidence indicating beneficial effects of intervention in increasing the physical functioning of patients with traumatic brain injury (SMD = -0.44, 95% CI -0.60 to -0.28, p <0.001), reducing the psychological symptoms among caregivers (SMD = -0.42, 95% CI -0.59 to -0.24, p <0.001), and increasing the satisfaction (SMD = -0.35, 95% CI -0.60 to -0.11, p = 0.005).

Conclusion: Education, skill-building, and psychological support should be the main components in transitional care nursing programs for patients with traumatic brain injury and their caregivers.

Keywords

hospitals; patient discharge; transitional care; traumatic brain injury; caregivers; nursing; meta-analysis

TBI patients in LMIC is the deferred time from being admitted to the emergency unit to accepting appropriate treatment (Gupta et al., 2020).

Patients with TBI can encounter a wide assortment of neurological deficiencies. The neurological shortfalls experienced by patients depend on the components of the injury, the seriousness of the injury, and the degree of brain damage brought about by the injury (Blennow et al., 2016). Patients can experience headaches, vision loss, loss of

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ability to walk, cognitive impairment, memory loss, and other conditions that result from damage to parts of the brain due to TBI. In addition, recent research focused on TBI suggests that a considerable number of patients have a long-term disabling physical function, neurocognitive and neurobehavioral sequelae (Pavlovic et al., 2019).

The first month home is a transitional and vulnerable period for patients and their caregivers. Previous studies have highlighted that shortly before discharge from the hospital, patients' quality of life is low because of physical limitation, pain, immobility, and anxiety (McAllister et al., 2018). These impacts continue after discharge from the hospital and are associated with significant limitations in daily living activities (Alghanam et al., 2017). Therefore, assistance from their caregivers with activities of daily living (ADLs), such as dressing, bathing, feeding, and managing medications, is required. However, the high demands of care after hospital discharge can affect caregivers' physical and psychosocial conditions because of the loss of time for their own activities such as travel, leisure, social activities, and retirement.

Caregivers of patients with TBI are required to understand the cost of treatment in managing TBI patients. However, in reality, they tend to experience difficulties managing and caring for TBI patients because of difficulty obtaining access to health services and treatment (Lefebvre & Levert, 2012). Consequently, hospital readmission is common among patients with TBI. Of the 15,277 patients with a listed diagnosis of TBI, 35% of them needed at least one-time readmission (Brito et al., 2019). Caring for someone with TBI has been shown to negatively impact caregivers in so many ways that they require interventions designed by health workers (Arango-Lasprilla et al., 2010). A previous study explained that caregivers described the resulting transitional experience as fraught with risks and distress because they felt inadequate, unwilling, or inadequately trained to carry out intervention plans on patients (Mitchell et al., 2018). On the other hand, life satisfaction is based on criteria most relevant to the individual. Still, it has been well documented that TBI-impacted caregivers have highlighted a diminished life satisfaction, high level of caregiver burden, anxiety, social isolation, depression, and emotional difficulties (Manskov et al., 2017). Hence, it is necessary to provide continuity of care to the patients with TBI and their caregivers after being discharged from the hospital (Caro, 2011).

The transitional care intervention is well recommended to ensure coordination and continuity, based on a comprehensive care plan as patients transfer between different locations (Naylor et al., 2011). Nurses have an essential role in caring for patients with TBI and their caregivers (Oyesanya et al., 2017). However, there are several recommendations for nurses in supporting TBI care after discharge but still insufficient information regarding nursing outcomes. Seeking best interventions in improving TBI nursing outcomes of both patients and caregivers during transition is challenging for nurses. This manuscript aimed to review, analyze, and synthesize the existing transitional care programs between hospital and home, systematically focusing on the improvement of the outcomes after discharge among patients with TBI and their caregivers. One paper that discussed the transition from hospital to home for patients with acquired brain injury was published in 2008 (Turner et al., 2008). That article used the literature review method to evaluate existing studies without systematic search methods. A systematic review in the current study is essential for nurses to have a useful and reliable resource with evidence-based nursing recommendations on nursing intervention to help achieve the best outcomes. Additionally, a meta-analysis was performed to assess the strength of evidence for the outcomes for the patients with TBI and their caregivers. Meta-analyses can assist in setting up statistical significance among studies that could seem to have conflicting results. That is crucial due to the fact that statistical importance increases the validity of any discovered differences and improves the reliability of the records.

Methods

Literature Search Strategies and Databases
We used “The framework for Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)” to report the findings (Shamseer et al., 2015). We searched electronic databases: Proquest, PubMed, Science Direct, CINAHL, and Google Scholar. This strategy comes from the PICO format (Table 1). Keyword and inclusion criteria used for searching in each database are shown in Table 2. We developed the search terms based on MESH terms: ‘transitional care,’ ‘hospital to home intervention,’ ‘traumatic brain injury,’ ‘nursing care,’ ‘patient outcome,’ ‘brain injury outcome,’ and ‘hospital discharge.’

<table>
<thead>
<tr>
<th>Table 1 PICO Format</th>
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<tr>
<td><strong>Population</strong></td>
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<td><strong>Intervention</strong></td>
</tr>
<tr>
<td><strong>Comparison</strong></td>
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<td><strong>Outcomes</strong></td>
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</table>

Eligibility Criteria
All interventions that focused on increasing favorite outcomes of patients with TBI and their caregivers were included. The inclusion criteria were: (1) types of participants: patients with moderate or severe TBI after discharge from the hospital ≥ 18 years old, while the caregivers were the person who cared for the patients after discharge at home; (2) types of outcome measures: physical functioning, psychological distress reduction, and satisfaction; (3) publication language and date of publication: published in English between January 2010–July 2021, to be current with the most recent literature; (4) study design: intervention study, including randomized...
controlled trials and (quasi) experimental research; (5) types of interventions: interventions (both caregiver and patients) relevant to transitional nursing care practice after discharge; and (6) timing: one to the three-month duration of intervention regarding intermediate care.

Table 2 Keywords and inclusion criteria used for searching in each database

<table>
<thead>
<tr>
<th>Databases</th>
<th>Main search</th>
<th>Limits</th>
<th>N (Total articles)</th>
<th>N (Articles after exclusion)</th>
<th>Reasons for exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>PubMed</td>
<td>('transitional care') AND ('traumatic brain injury patient' OR 'caregiver') AND 'intervention' AND 'discharge' AND ('outcome' OR 'patient' OR 'caregiver')</td>
<td>• English&lt;br&gt;• Full-text&lt;br&gt;• Year 2010-2021&lt;br&gt;• Human&lt;br&gt;</td>
<td>117</td>
<td>7</td>
<td>Not intervention studies, pediatric, long-term program, inpatient rehabilitation</td>
</tr>
<tr>
<td>ProQuest</td>
<td>('transitional care') AND ('traumatic brain injury patient' OR 'caregiver') AND 'nursing intervention' AND 'hospital discharge' AND ('outcome' OR 'patient' OR 'caregiver')</td>
<td>• English&lt;br&gt;• Full-text&lt;br&gt;• Year 2010-2020&lt;br&gt;• Nursing&amp; allied health database, scholarly journal, full text, peer-reviewed&lt;br&gt;• Exclude commentary, conference proceeding, undefined, and book&lt;br&gt;</td>
<td>336</td>
<td>17</td>
<td>Pediatric, not intervention studies, not TBI patient, systematic review article, a transition between ICU and ward, the population was health care, articles discuss patient perception, the population was spinal cord injury, hip fracture, long-term intervention</td>
</tr>
<tr>
<td>Science Direct</td>
<td>'transitional care' AND 'traumatic brain injury', 'nursing care' AND 'brain injury outcome'</td>
<td>• English&lt;br&gt;• Year 2010-2021&lt;br&gt;• Full-text&lt;br&gt;• Research article&lt;br&gt;</td>
<td>330</td>
<td>4</td>
<td>Not intervention studies, pediatric, long-term program, inpatient rehabilitation</td>
</tr>
<tr>
<td>Google Scholar</td>
<td>'transitional care', 'traumatic brain injury', 'nursing care', 'outcome', and 'hospital discharge'</td>
<td>Year 2010-2020</td>
<td>87</td>
<td>8</td>
<td>Not intervention studies, not in the adult population, discuss spinal cord injury and stroke patients</td>
</tr>
<tr>
<td>CINAHL</td>
<td>'transitional care' AND 'traumatic brain injury' OR 'brain injury' OR ('patient' OR 'caregiver') AND 'outcome'</td>
<td>English 2010-2020&lt;br&gt;Full-text Academic journal Major headings: brain injuries Age: all adults&lt;br&gt;</td>
<td>267</td>
<td>4</td>
<td>Population: nursing staff, discuss non-TBI patients, not intervention studies</td>
</tr>
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</table>

Study Selection
The studies obtained by searching were divided into two parts, with each having been carried out by a pair of authors (AG with PS and AF with KN, respectively). Each team conducted research selection separately and independently. A consensus meeting with a third author was arranged (PS or KN, respectively). The studies selected were initially assessed on the relevance of the topic to the title and abstract. Then a more in-depth search was conducted based on the inclusion criteria of the review. These studies were included if they met the inclusion criteria. The records of the rejected studies and the reasons for refusal were documented. We used Mendeley software to manage duplicate results.

Quality Appraisal of the Studies
The quality of the selected articles was critically analyzed using the Checklist for Randomized Controlled Trial Study (Joanna Briggs Institute (JBI), 2020). The possible score range was 0 to 13.

Data Extraction
Data were extracted from the nine articles following the PRISMA guidelines (Shamseer et al., 2015), including authors, year of publication, tools, provider of intervention, effect size, intervention method, duration of intervention, outcome measures, and study results. All the items were included in data extraction (Table 3).

Risk of Bias
We used the free software (RevMan version 5.4.1) to assess the risk of bias. High risk consisted of blinding participants and personnel (performance bias). However, the risk of bias in our review was similar and low in the majority of the studies. The results of bias were assessed and presented in Figure 1 and Figure 2.
Data Synthesis

We used a model of meta-analyses of similar outcomes reported by several studies (Schmidt et al., 2009). For this meta-analysis, the physical functioning of patients with TBI, the psychological distress symptoms of caregivers, and the satisfaction were used as indicators of follow-up received from the research. We analyzed the model of meta-analyses in RevMan V 5.4.1 software using the inverse variance method, a model of fixed effect, and continuous data. The heterogeneity taken into consideration to guarantee measurable investigation consistency was $I^2 < 50\%$ and $Chi^2 < 0.10$, with confidence intervals of 95% (Higgins et al., 2003).

Results

With the search strategies, we identified 1,137 articles. We removed one hundred and seventy-one duplicated articles and then selected 966 papers. After the title and abstract reading, we decided on 41 articles for full reading (Figure 3). Of those articles, nine studies fulfilled the inclusion standards in the analysis, while 32 were excluded. Keywords and inclusion criteria used for searching in each database and the reasons for excluding these articles are shown in Table 2. We categorized the intervention types, module items used in the intervention, strengths, and limitations of each study in Table 3.

![Figure 1 Risk of bias graph: review authors' decisions about each risk of bias item used RevMan 5.4.1](image1)

![Figure 2 Risk of bias summary used RevMan 5.4.1](image2)

![Figure 3 PRISMA Flow Diagram](image3)
Descriptive characteristics for nine included studies are presented in Table 3. Of the nine studies, eight studies were conducted in various places in the USA (Altman et al., 2010; Trexler et al., 2010; Bushnik et al., 2015; Gaines-Dillard, 2015; Caplan et al., 2016; Moriarty et al., 2016; Winter et al., 2016; Kreutzer et al., 2018) but only one study in Australia (Kelly et al., 2013). The studies varied in patients’ demography, duration of the intervention (from one to three months), type of procedures used, and the intervention sample size (23 to 489). One thousand three hundred seventy-two participants (both of intervention and control group) in the samples were included in the nine studies.

Intervention Characteristics

A wide range of interventions was used in improving the outcomes among patients with TBI and their caregivers. We categorized the transitional care program for patients with TBI, including primary interventions and the other components. The primary interventions were education (Trexler et al., 2010; Kelly et al., 2013; Bushnik et al., 2015; Gaines-Dillard, 2015; Caplan et al., 2016; Moriarty et al., 2016; Kreutzer et al., 2018) and home/community-based rehabilitation (Altman et al., 2010; Winter et al., 2016). Patient education was delivered after discharge by various personnel or methods: telephone, face-to-face visits, group-education, and in-person education (both patient and caregiver) education (Trexler et al., 2010; Kelly et al., 2013; Bushnik et al., 2015; Gaines-Dillard, 2015; Caplan et al., 2016; Moriarty et al., 2016; Kreutzer et al., 2018), while home/community-based rehabilitation refers to home visits by a healthcare provider, such as a nurse, doctor, or occupational therapist, who educated and gave the self-care instructions, undertook the physical examination, or provided other care rehabilitation (Altman et al., 2010; Winter et al., 2016).

In addition, there were the other components of transitional care program, including mentored problem solving (Kelly et al., 2013; Caplan et al., 2016), counseling (Moriarty et al., 2016; Winter et al., 2016), skill-building and psychological support (Bushnik et al., 2015; Kreutzer et al., 2018). The interventionist guided the patients and their caregivers in problem-solving such as physiological problems and memory difficulties (Caplan et al., 2016). Counseling was wider, taken at-home visits by a licensed healthcare provider and two telephone contacts with the patient and caregivers together to obtain their concerns and discuss intervention objectives (Moriarty et al., 2016). On the other hand, both programs were designed to resolve the most common problems identified by patients with TBI and included emotion and stress management and good communication (Bushnik et al., 2015; Kreutzer et al., 2018).

Materials used in delivering intervention included a booklet and handbook on various aspects of TBI patient and caregiver management. The duration of the transitional care program was between one and three months. We assessed the effect size of each study regarding Cohen’s guide categorization (Cohen, 1992). The effect is considered small if the effect size is <0.1, medium if between 0.3 and 0.5, and large if above 0.5. Three studies in this systematic review indicated a large effect of the intervention (Altman et al., 2010; Winter et al., 2016; Kreutzer et al., 2018).

Outcome Measures

Types of outcome measures in this article include the physical functioning, psychological distress reduction, and satisfaction of caregivers or patients with TBI. The decision to classify outcomes into three groups, namely physical functioning, psychological distress, and service satisfaction, made it easier for the authors to synthesize data through meta-analysis. Studies that contain physical functioning as outcomes include physical and cognitive abilities, physical problem severity, physical signs and symptoms in patients with TBI. Meanwhile, those with outcomes of anxiety, stress, burden, and depression are classified as studies with psychological distress as outcomes. Also, studies containing patient satisfaction with TBI and their caregivers are grouped as having satisfaction with the services as an outcome. Some studies assessed the improvement of caregiver outcomes, such as coping responses and emotional symptomatology (Trexler et al., 2010; Caplan et al., 2016; Moriarty et al., 2016). Other studies assessed the caregiver burden reduction and satisfaction improvement (Bushnik et al., 2015; Moriarty et al., 2016). For the patients’ outcomes, one study measured self-management improvement (Kelly et al., 2013), while other studies measured the increase in the physical functioning, reduction in psychological symptoms, and improvement in cognitive abilities (Altman et al., 2010; Gaines-Dillard, 2015; Winter et al., 2016), psychological well-being (Trexler et al., 2010; Kelly et al., 2013; Kreutzer et al., 2018), and community or work participation (Altman et al., 2010; Trexler et al., 2010; Winter et al., 2016). In summary, most studies in this systematic review measured the physical functioning among patients with TBI and the psychological symptoms of their caregivers.

Intervention Effects on Patients with TBI and Their Caregivers

From the nine eligible studies in this review, only five (Altman et al., 2010; Trexler et al., 2010; Caplan et al., 2016; Moriarty et al., 2016; Kreutzer et al., 2018) provided statistical data of standard deviation of physical functioning of patients with TBI, and six studies (Trexler et al., 2010; Bushnik et al., 2015; Caplan et al., 2016; Moriarty et al., 2016; Winter et al., 2016; Kreutzer et al., 2018) provided statistical data of standard deviation of psychological distress symptoms of caregivers to be included in this meta-analysis.

We did not find significant heterogeneity among studies that mentioned the physical functioning of patients with TBI as the outcomes (p = 0.24, I² 27%). Then, we used the fixed-effects model to conclude the mean effect size and found that transitional care program intervention can lead
to a significant increase in patient physical functioning (SMD (Standard Mean Difference) = -0.44, 95% CI -0.60 to -0.28, p < 0.00001) (Figure 4). Finally, we used sensitivity analysis using different pooled models and indicated a significant difference between the two groups (MD = -0.21 95% CI -0.49, p < 0.00001), indicating that the summary effect size is robust.

**Figure 4** Forest plot: Evaluation of physical functioning improvement after transitional care program in patients with TBI versus control group

We also found no significant heterogeneity between studies that mentioned the psychological symptoms of caregivers as the outcomes (p = 0.28, $I^2$ 21%). We used the fixed-effects model to calculate the mean effect size. We found that transitional care program intervention leads to a significant reduction in caregiver’s psychological distress symptoms (SMD= -0.42, 95% CI -0.59 to -0.24, p <0.00001) (Figure 5). In addition, we used sensitivity analysis using other pooled models and indicated a significant difference between the two groups (MD= -0.40, 95% CI -0.60, p <0.00001), meaning that the summary effect size is robust.

For the third outcome, we found no significant heterogeneity among those studies that measured satisfaction as the outcomes (p = 0.26, $F$ 26%). Then, we used the fixed-effects model to conclude the mean effect size and found that transitional care program intervention can significantly increase satisfaction (SMD= -0.35, 95% CI -0.60 to -0.11, p = 0.005) (Figure 6). According to the result of critical methodology appraisal, risk of bias assessment, effect size assessment, and meta-analysis, we assumed that education combined with skill-building and psychological support to be the best transitional care program between hospital and home, which can improve the outcomes of traumatic brain injury patients after discharge (Kreutzer et al., 2018).

**Figure 5** Forest plot: Evaluation of the psychological distress reduction after transitional care program in caregivers for patients with TBI versus control group

**Figure 6** Forest plot: Evaluation of the satisfaction after transitional care program versus control group

**Discussion**

The transition period from hospital to home is the crucial phase in patients with TBI and their caregivers. Patients with TBI are discharged home with several deficits, creating considerable difficulties for caregivers regarding readiness and preparation (Imanigoghary et al., 2017). Thus, during the transition between hospital and home, these patients’ outcomes and their caregivers need close attention. Based on the theory of Meleis (2010), nurses can
help patients, families, and networks adapt to advance care by envisioning reactions, giving expectant direction, reducing side effects, upgrading well-being and prosperity, and supporting the improvement of self-care activities (Meleis, 2010). Also, a systematic review mentioned that it requires magnificent correspondence during the transition to home and has suggestions for coordination and association of care across settings and nursing ability (Coffey et al., 2017). Using the systematic review and meta-analysis, the current study confirms the effect of transitional care programs and suggests a continuation of care coordination across settings and nursing capability.

This is the first systematic review of transitional care intervention in patients with TBI and their caregivers. The results of our study indicated that transitional care program between hospital and home compared with usual care was helpful regarding improvement of caregiver outcomes, such as coping responses, emotional symptomatology, and reducing the burden. Also, the intervention can improve caregiver satisfaction, patients’ self-management and functional status, psychological, cognitive, physiological well-being, and community or work participation. According to the meta-analysis result, there was a significant difference in psychological distress symptoms score in caregivers between the intervention and control groups. These positive post-discharge results are presumably connected to a superior progression of care, with correspondence between various medical care experts and caregivers being a remembered segment for some intercessions (Chen et al., 2020).

Education, mentored problem-solving, home-and community-based rehabilitation, counseling, skill-building, and psychological support can be applied in the transitional care program between hospital and home for caregivers and patients with TBI. A telephone-based intervention combining individualized education and mentored problem-solving can extend the interventions to people with transportation or other access hindrances. It could be more practical than giving face-to-face benefits (Caplan et al., 2016). In LMIC, because of distance and transportation troubles, follow-up and patient recovery measures experience challenges and encounter difficulties. This result is in line with the study in Indonesia as an LMIC showing that direct subsequent phone conferences and meetings with TBI patients after release from a neurosurgery ward at 1, 2, and 3 months were valued by patients (Sutiono et al., 2018).

On the other hand, skill-building and psychological support effectively improved the outcomes of traumatic brain injury patients after discharge (Bushnik et al., 2015; Kreutzer et al., 2018). Neurobehavioral sequelae of TBI are commonly shown, leaving numerous survivors jobless and dependent on relatives for help (Oyesanya et al., 2021). Psychological strategies were utilized to assist patients with TBI in perceiving their sentiments and improve their emotion or passionate prosperity. At the same time, the ability to manage care was fused to enhance correspondence, critical thinking, and enthusiastic control (Kreutzer et al., 2018). A couple of studies have shown that enhanced energetic prosperity is connected with better utilitarian outcomes post-injury, including social joining and return to work (Iverson, 2010; Hart et al., 2014; Fann et al., 2017).

A prospective cohort study led to quantifying rates of adverse mental events in caregivers of patients with TBI at post-discharge and three months after discharge. In addition, the results showed caregiver dissatisfaction at one-month post-discharge, and a further reduction after three months showed that injury time elapsed was inversely related to caregiver burden (Turner et al., 2010).

This meta-analysis aimed to improve understanding of how transitional care could help patients with TBI and their caregivers during discharge and transition from hospital to home, increase physical functioning and satisfaction, and reduce the caregivers’ psychological distress. It also showed that studies have homogeneity and found that transitional care program intervention led to a significant increase in physical functioning among patients with TBI (Altman et al., 2010; Trexler et al., 2010; Caplan et al., 2016; Moriarty et al., 2016; Kreutzer et al., 2018) and reduction in caregiver’s psychological distress symptoms (Trexler et al., 2010; Bushnik et al., 2015; Caplan et al., 2016; Moriarty et al., 2016; Winter et al., 2016; Kreutzer et al., 2018). This result is in line with the previous study that the most commonly utilized intervention component of the caregiver of the patients with TBI was illness education, including skills training, social support, and therapy (Shepherd-Banigan et al., 2018).

**Study Limitations**

This paper aims to synthesize the existing transitional care program between hospital and home, which can improve the outcomes of traumatic brain injury patients after discharge. Although the review presents strong evidence with study target tests, plan, and result estimation to advise future examination, some potential limitations in this review were found. These include small studies; searches were limited to articles published in English and various outcome measures. Also, we did not have sufficient studies to conduct robust assessments of publication bias. A common criticism of meta-analysis is that analysts join multiple types of study in a similar investigation so that the overall impact may disregard conceivably significant contrasts across studies. The publication bias of the study could be found when using various measurements and outcomes in the meta-analysis.
<table>
<thead>
<tr>
<th>Author (year), Location</th>
<th>Type of studies</th>
<th>Population &amp; Sample</th>
<th>Tools</th>
<th>Provider</th>
<th>Effect size</th>
<th>Intervention</th>
<th>Duration of Intervention</th>
<th>Outcome measures</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Caplan et al., 2016) Washington, USA</td>
<td>Randomized Controlled Trial</td>
<td>153 caregivers of persons with moderate to severe TBI and their caregivers</td>
<td>Brief Symptom Inventory (BSI-18)</td>
<td>A master's level social worker with experience and training and a medical neuropsychologist with clinical revel in brain injury rehabilitation</td>
<td>0.20 to 0.41 (small to medium)</td>
<td>Individualized training and mentor training to solve problems via up to ten phone calls at 2-week durations.</td>
<td>One month</td>
<td>Emotional symptomatology</td>
<td>Emotional symptomatology discharge of the patients with TBI resulted in better caregiver outcomes</td>
</tr>
<tr>
<td>(Kelly et al., 2013) Victoria, Australia</td>
<td>Pre-post-test design</td>
<td>41 adults with TBI</td>
<td>The Self-Concept Scale: Second Edition (TSCS: 2), the Family Assessment Device (FAD), the Rosenberg Self-Esteem Scale (RSE) and the Hospital Anxiety and Depression Scale (HADS)</td>
<td>A clinical psychologist with 15 years of experience and training and a medical neuropsychologist with clinical revel in brain injury rehabilitation</td>
<td>0.046 to 0.158 (small)</td>
<td>Family inclusive intervention on the multidimensional self-concept of individuals TBI</td>
<td>Three months</td>
<td>Self-concept, self-esteem, anxiety and depression, family functioning</td>
<td>Temper and circle of relatives functioning was not enhanced for the TBI pattern</td>
</tr>
<tr>
<td>(Altman et al., 2010) Indianapolis, USA</td>
<td>Retrospective analysis of program evaluation data for treatment</td>
<td>489 adults with TBI</td>
<td>Mayo-Portland Adaptability Inventory and Injury Severity</td>
<td>Licensed or certified clinicians and/or assistants</td>
<td>0.52 to 0.58 (large)</td>
<td>Home- and community-based post-acute brain injury rehabilitation (PABIR)</td>
<td>Three months</td>
<td>Physical and cognitive abilities, adjustment, and community participation</td>
<td>Results provided evidence of the effectiveness of home and community-based care</td>
</tr>
<tr>
<td>(Trexler et al., 2010) Midwest of the USA</td>
<td>Randomized Controlled Trial</td>
<td>23 people with TBI and their caregivers</td>
<td>O-Log, O-Log, the Participation Index of the Mayo-Portland Adaptability Inventory (M2PI), Patient Health Questionnaire-9 (PHQ-9) Resource facilitators</td>
<td>Resource facilitators to assist TBI patients in returning to work and community activities</td>
<td>0.04 to 0.05 (small)</td>
<td>Resource Facilitation (RF): resource facilitator to assist TBI patients in returning to work and community activities</td>
<td>Three months</td>
<td>Return to work, participation in home and community activities, and depression</td>
<td>Participation increased significantly for the intervention group</td>
</tr>
<tr>
<td>(Moriarty et al., 2016) Pennsylvania, USA</td>
<td>Randomized Controlled Trial</td>
<td>81 adults with TBI and their family member</td>
<td>The Center for Epidemiologic Studies Depression Scale, The Modified Caregiver Appraisal Scale (CAS), Caregiver A licensed occupational therapist with clinical experience</td>
<td>Veteran's In-Home Program (VIP) by phone: compensatory strategies to enhance cognitive functioning; emotion</td>
<td>0.01 to 0.311 (small to medium)</td>
<td>Depressive symptomatology, caregiver burden, and caregiver satisfaction</td>
<td>Three months</td>
<td>Own family caregivers in the VIP confirmed an appreciable decrease in depressive symptom</td>
<td></td>
</tr>
<tr>
<td>Author (year), Location</td>
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<tr>
<td>(Bushnik et al., 2015) Virginia, USA</td>
<td>Randomized Controlled Trial</td>
<td>108 family caregivers after TBI</td>
<td>Two groups</td>
<td>The Service Obstacles Scale (SOS), the Family Needs Questionnaire (FNQ), and Zarit Burden Inventory (ZBI)</td>
<td>Therapists included family therapists and clinical psychologists with doctoral degrees</td>
<td>0.3 to 0.37 (medium)</td>
<td>The Brain Injury Family Intervention: psychological support, addressing needs, skill-building, and emphasizing education</td>
<td>Three months</td>
<td>Family members' perceived needs, satisfaction, and quantified caregiving burden</td>
</tr>
<tr>
<td>(Kreutzer et al., 2018) Virginia, US</td>
<td>Randomized Controlled Trial</td>
<td>160 adults with TBI</td>
<td>Two groups</td>
<td>The Connor-Davidson Resilience Scale (CD-RISC), Brief Symptom Inventory-18 (BSI-18), Mayo-Portland Adaptability Inventory-4 (MPAI-4), and the 13 Item Stress Test</td>
<td>Doctoral-level psychologists who received training from the first author</td>
<td>-0.54 to 0.60 (small to large)</td>
<td>The Resilience and Adjustment Intervention (RAI) objectives adjustment demanding situations: emphasizes education, skill-building, and mental help.</td>
<td>Three months</td>
<td>Resilience measurement scales, problem severity, and stress symptoms</td>
</tr>
<tr>
<td>(Winter et al., 2016) Philadelphia, USA</td>
<td>Randomized Controlled Trial</td>
<td>81 veterans with TBI and a key family member</td>
<td>Two groups</td>
<td>The Centre for Epidemiologic Studies Depression Scale (CES-D), The Patient Competency Rating Scale, and The Community Re-integration for Service Members scale (CRIS).</td>
<td>Health professional</td>
<td>0.01 to 0.68 (small to large)</td>
<td>Veterans’ In-home Programme (VIP), applied in veterans’ houses, regarding a family member and focused on the environment, carried out in homes or by smartphone.</td>
<td>Three months</td>
<td>Community re-integration, mitigation of trouble with the maximum troubling TBI signs, and facilitation of day-by-day functioning</td>
</tr>
<tr>
<td>(Gaines-Dillard, 2015) Newark, USA</td>
<td>Pre-post-test design</td>
<td>93 adults with TBI</td>
<td>Two groups</td>
<td>Trauma Follow-up Tracking Tool (TFTT)</td>
<td>Nurses</td>
<td>0.34 to 0.37 (medium)</td>
<td>Education and follow-up by phone (TFU)</td>
<td>Three months</td>
<td>Patient satisfaction, communication, and knowledge deficit</td>
</tr>
</tbody>
</table>
Conclusion
This systematic review supports the transitional care programs for improving the outcomes, particularly in physical functioning, psychological distress reduction, and satisfaction among patients with TBI and their caregivers. Nurses’ role is highly prominent in transitional care as they are involved in education, mentored problem solving, supporting home and community-based rehabilitation, counseling, skill-building, and psychological support for patients with TBI and their caregivers. This review concludes that education combined with skill-building and psychological support is the main component in transitional care programs between hospitals and homes for improving the outcomes of traumatic brain injury patients and their caregivers. For the clinical implication, nurses should give efforts to education along with skill-building and psychological support to improve the physical functioning of patients with TBI, increase satisfaction and reduce the psychological distress of TBI caregivers. Future research is necessary to test its effectiveness in different contexts of care in LMIC.

Declaration of Conflicting Interest
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Authors’ Contributions
AG designed the study, wrote and revised the manuscript. AG and PS analyzed the data, wrote and revised the manuscript. KN designed the study, wrote and revised the manuscript. All authors agreed with the final version of the article to be published.

Data Availability Statement
The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

References


Correlates of evidence-based nursing practice among nurses in Saudi Arabia: A structural equation model

Mohammad H Abuadas*

Abstract

Background: Consideration needs to be given to variables that impact the application of evidence-based nursing practice.

Objective: This study aimed to generate and validate a structural model of factors predictive of evidence-based nursing practice.

Methods: A cross-sectional descriptive design was used, with 612 registered nurses in the southern area of Saudi Arabia selected using a convenience sampling procedure. Data were collected during the period from November 2019 to January 2020 using valid and reliable questionnaires, including the novel Registered Nurses’ Competencies, Beliefs, Facilitators, Barriers, and Implementation of the Evidence-based Practice Questionnaire. A structural equation modeling technique was used for data analysis.

Results: Evidence-based nursing practice was significantly influenced by nurses’ competency, beliefs, barriers, and facilitators. 38.75% of the variance was explained by all factors. Specifically, nurses’ beliefs partially mediated the relationship between nurses’ competency and the evidence-based application of nursing practice. In addition, the relationship between nurses’ beliefs and evidence-based application of nursing practice was partially mediated by organizational facilitators. Nurses’ competency and beliefs were significantly influenced by attending the workshop, education level, years of experience, and previous research work.

Conclusion: The current study highlights the significant effect of personal and organizational variables toward the application of evidence-based nursing practice.

Keywords

latent class analysis; evidence-based nursing; self-report; structural models; nurses; Saudi Arabia

Over the past three decades, evidence-based application of nursing practice has come into sight as a significant matter to clinical nursing practice and the health care system (Alqthañi et al., 2020; Pierce, 2020). Evidence-based nursing practice has been defined as an ideal problem-solving approach and practice of the best evidence derived from well-designed research projects concerning nursing inquires of the patients, their preferences, and values (Jolley, 2020). The importance and cost-effectiveness of evidence-based practice have been extensively discussed in the nursing literature since it has an immediate impact on patients, nurses, and the health care system (Squires et al., 2011; Williams et al., 2015; Cheng, Feng, et al., 2017). Evidence-based practice is necessary because it can reduce cost, save time and result in better patient outcomes (Cheng, Feng, et al., 2017; Jolley, 2020).

In today’s healthcare environment, the urgent call to provide high-quality nursing care has been growing worldwide. The profession of nursing is one of the major health professions that could significantly impact healthcare quality (Pierce, 2020). Therefore, governmental and private agencies in the Kingdom of Saudi Arabia (KSA) recommend improving evidence-based competencies for nurses.
nurses to guarantee superior nursing care (Hasheesh & AbuRuz, 2017). Evidence-based nursing competencies have been praised and mandated as the heart of evidence-based nursing (EBNP) (Pierce, 2020). The recent emphasis in the KSA is for a health care system that is up to date, trustworthy, and offers quality-guaranteed services (Hasheesh & AbuRuz, 2017). The dynamics for high-quality nursing care have begun to be increasingly substantial in the Saudi Health Care System (SHCS) (Hasheesh & AbuRuz, 2017; Mohammed Hamdan et al., 2020). Considering nursing paradigms shift to evidence-based care, Saudi nursing professionals have launched significant efforts to establish their own existence in the evidence-based world (Hasheesh & AbuRuz, 2017).

However, despite widespread demands to incorporate evidence-based principles in clinical practice, evidence-based implementation has been slow and inconsistent (Cheng, Feng, et al., 2017; Ellis, 2019; Alqahtani et al., 2020). Worldwide, several studies conducted in a variety of countries showed that the application of the evidence-based approach is a complex activity (Al-Momani et al., 2016; Ellis, 2019; Abuejheish et al., 2020; Alqahtani et al., 2020). Therefore, to understand the multifaceted evidence-based practice implementation process, it is necessary to investigate factors that enable successful evidence-based implementation (Ellis, 2019).

Previous studies have tackled the multitude of influencing personal and organizational factors on evidence-based practice implementation (Leung et al., 2016; Cheng, Broome, et al., 2017), Cheng, Broome, et al. (2017) and Leung et al. (2016) found that lack evidence-based knowledge and skills, such as the skills of clinical question identification and formulation, relevant evidence searching, critical literature appraisal, and evidence integration and implementation. However, other researchers found that knowledge and skills are not necessarily enough to engage nurses in the process of evidence-based nursing application (Hasheesh & AbuRuz, 2017; Alqahtani et al., 2020). Pierce (2020) highlighted the importance of attitudes in changing nursing practice.

Building on the work of previous researchers, there have been numerous studies conducted to examine the impact of personal factors such as evidence-based competencies, attitudes, and beliefs related to the evidence-based application (Farokhzadian et al., 2015; Leung et al., 2016; Cheng, Broome, et al., 2017).

Recently, literature has gradually shifted from personal factors to organizational factors (Williams et al., 2015; Ellis, 2019; Lizarondo et al., 2019; Boltz et al., 2020). The literature identified potential organizational barriers that impact nurses’ ability to promote and maintain evidence-based approach, that is, (a) lack of time, (b) lack of staff/administrative support, (c) resources deficiency, (d) absence of autonomy and power to change practice and (e) resistance to change (Williams et al., 2015; Al-Momani et al., 2016; Johnston et al., 2016; Cheng, Broome, et al., 2017).

On the other hand, Duncombe (2018) identified potential organizational facilitators that enhance nurses’ ability to promote and maintain evidence-based approach, that is, (a) managerial support, (b) accessibility to articles, (c) comprehension of scientific research, (d) availability of time to read and utilize research results, and (e) adequate authority over practice (Duncombe, 2018). Bearing in mind the sophisticated nature of the evidence-based nursing practice, manipulating only personal factors might not be adequate to promote the evidence-based application.

Hence, the assessment of personal and organizational factors on several levels simultaneously is essential to study their complex interactions (Cheng, Broome, et al., 2017). A large body of literature has discussed a wide range of factors that have a great influence on EBNP; these include as perceived by registered nurses: (a) evidence-based practice competencies (Connor et al., 2017; Hasheesh & AbuRuz, 2017), (b) evidence-based practice beliefs (Cruz et al., 2016; Laske & Kurz, 2019), and (c) evidence-based practice facilitators and barriers (Johnston et al., 2016; Spooner et al., 2018; Lizarondo et al., 2019). Although considerable literature examining factors influencing the implementation of EBNP in clinical practice is widely present internationally (Barako et al., 2012; Bostrom et al., 2013; Farokhzadian et al., 2015; Kim et al., 2015; Park et al., 2015; Cheng, Broome, et al., 2017; Connor et al., 2017), only a few studies had been conducted in Saudi Arabia to address those factors (Cruz et al., 2016; Hasheesh & AbuRuz, 2017; Alqahtani et al., 2020). In addition, the majority of these studies focused on either personal or organizational factors without considering their complex interaction (Cruz et al., 2016; Hasheesh & AbuRuz, 2017; Alqahtani et al., 2020).

Moreover, there is still a huge gap between nurses’ evidence-based knowledge and what is truly done in recent nursing practice (Cheng, Broome, et al., 2017). Therefore, it is essential to identify all potential factors that could interfere with evidence-based practice implementation (Johnston et al., 2016; Kang & Yang, 2016; Connor et al., 2017). To date, only one study has used a conceptual model to explain the predictive effect of a limited set of organizational and personal factors (De Pedro Gomez et al., 2012). Comprehensive assessment of these factors using a valid conceptual model can help develop appropriate interventions to promote evidence-based practice in clinical practice. To our best knowledge, a valid conceptual model that adequately explains a set of factors associated with the application of evidence-based practice has not been available. Therefore, the aims of the current study were to generate and validate a model of factors significant to and predictive of the application of evidence-based practice.

Conceptual Model Development

The current study used a hypothetical conceptual model that was derived from previous literature (Park et al., 2015; Al-Momani et al., 2016; Hellier & Cline, 2016; Cheng, Broome, et al., 2017) and a concept analysis study that...
investigated the hypothetical relationships between the antecedents, attributes, and the consequences of evidence-based practice implementation (Chiwaula et al., 2018).

According to the literature, five essential domains were recognized to influence the evidence-based implementation. The review identified nurses' competencies, beliefs, facilitators, barriers, and contextual attributes as important domains. These five domains create the conceptual model structure. In the Oxford dictionary, competence is described as "the ability to do something well"; beliefs as "a strong feeling that something is true"; facilitator is defined as "person or (factor) who (which) helps somebody do something more easily by discussing problems, giving advice, etc. rather than telling them what to do"; barrier is described as "problem, rule or situation that prevents somebody from doing something, or that makes something impossible"; and implementation as "the process of putting a decision or plan into effect; execution" (Stevenson, 2010).

These definitions relate to the conceptual model as follows: competence reveals a nurse’s cognitive ability to perform a task, incorporating attributes of knowledge and skill related to EBNP (Leung et al., 2016); beliefs as to endorse the idea that EBNP improves patient outcomes and being confident in one’s knowledge or skills about EBNP (Laske & Kurz, 2019); barriers, as all elements that inhibit the nurses’ ability to use research evidence in their practice (Johnston et al., 2016); facilitators, as all elements that help the nurses’ ability to use research evidence in their practice (Johnston et al., 2016); and implementation, as the application of evidence-based process steps (Connor et al., 2017). These factors are related to each other and may work together to affect the application of evidence-based practice (Hellier & Cline, 2016). In addition, some factors contain several interrelated sub-factors (contextual factors) that must be considered (Chiwaula et al., 2018). The current study used a researcher-constructed structural model (See Figure 1).

This model is composed of five domains (evidence-based practice barriers, facilitators, competence, beliefs, and contextual variables) that might impact the application of evidence-based practice. Contextual factors are presented in seven variables (age, gender, department, experience, education, previous training/workshop, and previous research work).

**Methods**

**Design**

A descriptive (cross-sectional) design was used in the current study. Structural equation modeling (SEM) is used to estimate causality and relationships of multiple independent and dependent variables simultaneously. This
method also aids in identifying direct, indirect, and total effects (Schermelleh-Engel et al., 2003).

Sample and Setting
Six hundred and twelve registered nurses were enrolled using a convenience sampling procedure from four hospitals. The author used an algorithm calculator invented by Westland (2010) to compute the required sample size; assuming ($\beta = .80, \alpha=.05$), medium effect size ($F = .3$), and five latent factors would require at least two hundred subjects to discover the effect (Westland, 2010). The study sample included registered nurses from the in-patient surgical, medical, and critical care units, having previous clinical experience of more than twelve months, and consenting to join. Contacting representatives with hospitals approached and screened the subjects for eligibility.

Instrument
A two-part self-report questionnaire was used to collect data. The first part of the questionnaire was used to gather information on contextual variables such as level of education, age, gender, experience, department, exposure to previous evidence-based practice training/workshop, and conducting or participating in any previous research project/activity.

Evidence-based competencies, beliefs, facilitators, and implementation were measured using Registered Nurses’ Competencies, Beliefs, Facilitators, Barriers, and Implementation of Evidence-based Practice Questionnaire (EBP-CBFRI Questionnaire) developed by Abuadas et al. (2021). The questionnaire is composed of 55-items distributed within five subscales; perceived competencies (14 items), beliefs (10 items), facilitators (9 items), barriers (10 items), and implementation (12 items). Each item was scored on a 5-point Likert-type format, ranging from 1 (strongly disagree) to 5 (strongly agree). The overall validity of the questionnaire was established based on the S-CVI score, which was .92. As well as, the I-CVI confirmed that all items were scored as acceptable (values ranged from .83-1.00). Cronbach's alpha was .87 for the overall questionnaire and ranged between .92 and .95 for all five subscales. All the corrected item-total correlations were found to be >.30 and ranged from .66 to .78. The EBP-CBFRI questionnaire had good internal reliability and validity since it showed satisfactory evidence of content, construct, convergent, and discriminant validity when used with registered nurses in Saudi Arabia (Abuadas et al., 2021).

Data Collection
Permission was obtained from hospital administrators prior to data collection. Data were collected between November 2019 and January 2020 in the inpatient medical-surgical units and critical care units. After receiving permission, data collectors approached the nurses in their wards. Nurses approved to take part were given the questionnaires enclosed with the consent form. Finally, the data collectors gathered the completed questionnaires after allowing adequate time for subjects. On average, it took about 25 minutes to complete the whole questionnaire.

Data Analysis
Participants’ demographic characteristics frequencies, percentages, means, and standard deviations were described using descriptive statistics. Structural equation modeling was used to find the direct, indirect, and total effects of the contributing factors and build a preliminary hypothetical model of evidence-based practice implementation among the nurses. Relationships between the variables/factors were estimated using Pearson’s correlation coefficients. Maximum likelihood estimation was used to estimate parameters and test the path validity. The current study used the thresholds of fit recommendations for Schermelleh-Engel et al. (2003) to assess the model fit as follow: (i) a critical ratio (CR) >1.96 of factor loadings, (ii) relative Chi-Square ($\chi^2$/df) <5, (iii) the normed fit index (NFI) and the comparative fit index (CFI) ≥.85, (iv) adjusted goodness of fit index (AGFI) and the goodness of fit index (GFI) ≥.85, (v) the standardized root mean square residual (RMR) and root mean square error of approximation (RMSEA) ≤.08 (Schermelleh-Engel et al., 2003). Prior to the model development, the author checked for normality, independence, and homoscedasticity. Random missing data were replaced using the case mean imputation approach.

Ethical Considerations
Approval from the Institutional Review Board (IRB) was attained prior to data collection (the approval no. HA-06-B-001 ECM#2019-44). At the beginning of the survey, detailed written information was provided, and the participants were informed that the participation was voluntary and anonymity was maintained. The consent form was enclosed with each questionnaire.

Results
Characteristics of Participants
The current study showed a response rate of (77%); a total of 612 nurses returned completed questionnaires. The mean age was 31.86 years and a standard deviation of 6.79 years. The standard deviation ranged between 24 and 45 years. In addition, the participants consisted of females (57%) and males (43%). Nurses’ experience mean was 6.73 years with a standard deviation of 2.39 years. The bulk of the sample underwent undergraduate education (84.5%). Being engaged in previous evidence-based workshops or training was reported in more than half of the participants (69.8%). Regarding the engagement in medical or nursing research studies, only a few participants (25.3%) were involved in medical or nursing-related studies throughout the past years (See Table 1).
Table 1 Participants’ characteristics (N = 612)

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>263</td>
<td>43%</td>
</tr>
<tr>
<td>Female</td>
<td>349</td>
<td>57%</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor level</td>
<td>517</td>
<td>84.5%</td>
</tr>
<tr>
<td>Master level</td>
<td>95</td>
<td>15.5%</td>
</tr>
<tr>
<td>Department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical floors</td>
<td>112</td>
<td>18%</td>
</tr>
<tr>
<td>Surgical floors</td>
<td>125</td>
<td>20%</td>
</tr>
<tr>
<td>Orthopedic floors</td>
<td>49</td>
<td>8%</td>
</tr>
<tr>
<td>Maternity floor</td>
<td>59</td>
<td>10%</td>
</tr>
<tr>
<td>Pediatric floors</td>
<td>65</td>
<td>11%</td>
</tr>
<tr>
<td>Critical care units</td>
<td>105</td>
<td>17%</td>
</tr>
<tr>
<td>Emergency units</td>
<td>97</td>
<td>16%</td>
</tr>
<tr>
<td>Engagement in previous EBNP training/workshop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>427</td>
<td>69.8%</td>
</tr>
<tr>
<td>No</td>
<td>185</td>
<td>30.2%</td>
</tr>
<tr>
<td>Engagement in previous nursing or health research</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>155</td>
<td>25.3%</td>
</tr>
<tr>
<td>No</td>
<td>457</td>
<td>74.7%</td>
</tr>
<tr>
<td>Age (years)</td>
<td>Mean ± SD (31.86 ± 6.79)</td>
<td></td>
</tr>
<tr>
<td>Years of experience</td>
<td>Mean ± SD (6.73 ± 2.39)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mean ± SD (31.86 ± 6.79)</th>
<th>Mean ± SD (6.73 ± 2.39)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 Main study variables correlation matrix (N = 612)

<table>
<thead>
<tr>
<th>No.</th>
<th>Variable/variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<td></td>
</tr>
<tr>
<td>2</td>
<td>Gender</td>
<td>.13</td>
<td>1</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Education</td>
<td>.16</td>
<td>-.02</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Experience</td>
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<td>.22</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Department</td>
<td>-.11</td>
<td>-.09</td>
<td>-.14</td>
<td>-.12</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6</td>
<td>Workshop</td>
<td>.04</td>
<td>-.12</td>
<td>.28</td>
<td>-.07</td>
<td>-.13</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Research</td>
<td>-.09</td>
<td>-.12</td>
<td>.13</td>
<td>-.07</td>
<td>-.09</td>
<td>.08</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Competency</td>
<td>-.04</td>
<td>.01</td>
<td>.22</td>
<td>.13</td>
<td>-.07</td>
<td>.23</td>
<td>.13</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Beliefs</td>
<td>.05</td>
<td>-.06</td>
<td>.18</td>
<td>-.15</td>
<td>-.01</td>
<td>.23</td>
<td>.13</td>
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<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Facilitators</td>
<td>-.04</td>
<td>-.05</td>
<td>.26</td>
<td>-.02</td>
<td>-.07</td>
<td>.24</td>
<td>.15</td>
<td>.48</td>
<td>.11</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Barriers</td>
<td>.02</td>
<td>-.04</td>
<td>.01</td>
<td>.03</td>
<td>.02</td>
<td>-.16</td>
<td>.03</td>
<td>-.35</td>
<td>-.17</td>
<td>-.39</td>
<td>1</td>
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<tr>
<td>12</td>
<td>Implementation</td>
<td>-.07</td>
<td>-.06</td>
<td>.15</td>
<td>-.07</td>
<td>-.04</td>
<td>.37</td>
<td>.32</td>
<td>.48</td>
<td>.38</td>
<td>.57</td>
<td>-.39</td>
<td>1</td>
</tr>
</tbody>
</table>

*p < .05; **p < .001

Evidence-based implementation showed moderate significant correlation with facilitators, barriers, and competencies variables; having the strongest correlation with facilitators (r = .57, p < .01), followed by competencies (r = .48, p < .01) and barriers (r = .39, p < .01). Weak significant correlations were found between belief variable and implementation (r = .38, p < .01) (See Table 2).

Testing the preliminarily hypothesized model
Preliminarily hypothesized model fit criteria (See Figure 2) showed a poor fit: (χ2/df = 2.892, p < .001, RMSEA = .063, GFI = .772, AGFI = .752, CFI = .871). After evaluating modification indices and parameter estimates, numerous paths were non-significant; subsequently, they were removed in order to make the measurement model more theoretically parsimonious. Likewise, age, gender, and department factors were removed.

Testing the modified stable model
The modified stable model presented in Figure 3 indicated improved fit indices than the preliminarily model: (χ2/df = 2.29, CFI = .94, RMSEA = .05, GFI = .90, AGFI = .88, CFI = .93).
Figure 2 The initial preliminarily model predicting implementation of evidence-based practice; † dotted lines denote insignificant paths. ‡ All regression estimates are standardized $\beta$ coefficients. * $p < .05$, ** $p < .001$.

Figure 3 The modified stable model predicting implementation of evidence-based practice; † All regression estimates are standardized $\beta$ coefficients. * $p < .05$, ** $p < .001$. 
Factors influencing implementation of evidence-based practice

The influencing factors on evidence-based practice implementation for nurses were specified (Table 3 and Figure 3). Explicitly, evidence-based practice implementation was significantly influenced by nurses’ competency (β = .29, p < .001), beliefs (β = .27, p < .001), EBNP barriers (β = -.24, p < .001), and facilitators (β = .18, p < .001). The nurses’ competency was most strongly related to evidence-based practice implementation. In total, the four factors explained 38.75% of the variance in evidence-based practice implementation.

The study findings show that nurses’ competency had a direct positive effect and indirect effect via nurses’ belief in evidence-based practice implementation. Similarly, beliefs had a direct positive effect and indirect effect via facilitators on evidence-based practice implementation. Greater barriers, in turn, predicted lower evidence-based practice implementation scores. In contrast, higher facilitators predicted higher evidence-based practice implementation scores. Both barriers and facilitators had only a direct effect on evidence-based practice implementation.

In addition, the influence of contextual factors (nurses’ educational level, years of experience, attending EBNP workshops, and research conduction) on both nurses’ competency and beliefs was examined. Nurses’ competency was significantly influenced by attending evidence-based workshop (β = .19, p < .001), education level (β = .18, p < .001), years of experience (β = .10, p < .05), and previous research work (β = .10, p < .05). Attending evidence-based workshop was most strongly related to competency. Altogether, the four factors explained 10.9% of the variance in competency. Likewise, beliefs of the nurses was significantly influenced by attending evidence-based workshop (β = .18, p < .001), competency (β = .12, p < .001), previous research work (β = .11, p < .001), education level (β = .09 p < .05), and years of experience (β = .08, p < .05). Attending evidence-based workshop was most strongly related to beliefs. In total, these five factors explained 10.1% of the variance in competency (See Table 3).

Table 3 Summary of the total, direct, and indirect effects of variables in the modified stable model (N = 612)

<table>
<thead>
<tr>
<th>Outcome variables</th>
<th>Independent variables</th>
<th>β</th>
<th>Standardized effects</th>
<th>Squared multiple correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Direct effect</td>
<td>Indirect effect</td>
<td>Total effect</td>
</tr>
<tr>
<td>Implementation</td>
<td>Competency</td>
<td>.29**</td>
<td>.14</td>
<td>.43**</td>
</tr>
<tr>
<td></td>
<td>Beliefs</td>
<td>.27**</td>
<td>.05</td>
<td>.33**</td>
</tr>
<tr>
<td></td>
<td>Barriers</td>
<td>-.24**</td>
<td>-.24**</td>
<td>.-24**</td>
</tr>
<tr>
<td></td>
<td>Facilitators</td>
<td>.18**</td>
<td>.18**</td>
<td>.18**</td>
</tr>
<tr>
<td>Barriers</td>
<td>Competency</td>
<td>-.31**</td>
<td>-.32**</td>
<td>-.33**</td>
</tr>
<tr>
<td></td>
<td>Beliefs</td>
<td>-.11**</td>
<td>-.11**</td>
<td>-.11**</td>
</tr>
<tr>
<td>Facilitators</td>
<td>Beliefs</td>
<td>.16**</td>
<td>.12**</td>
<td>.16**</td>
</tr>
<tr>
<td></td>
<td>Competency</td>
<td>.12**</td>
<td>.02</td>
<td>.14**</td>
</tr>
<tr>
<td>Beliefs</td>
<td>Workshop</td>
<td>.18**</td>
<td>.02</td>
<td>.20**</td>
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<tr>
<td></td>
<td>Competency</td>
<td>.12**</td>
<td>.12**</td>
<td>.12**</td>
</tr>
<tr>
<td></td>
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<td>Education</td>
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<tr>
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<td>Experience</td>
<td>.08**</td>
<td>.02</td>
<td>.10**</td>
</tr>
<tr>
<td>Competency</td>
<td>Workshop</td>
<td>.19**</td>
<td>.19**</td>
<td>.19**</td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td>.18**</td>
<td>.18**</td>
<td>.18**</td>
</tr>
<tr>
<td></td>
<td>Research</td>
<td>.10**</td>
<td>.10**</td>
<td>.10**</td>
</tr>
<tr>
<td></td>
<td>Experience</td>
<td>.10**</td>
<td>.10**</td>
<td>.10**</td>
</tr>
</tbody>
</table>

*p < .05; **p < .001

Discussion

The study aimed to generate and validate a structural prediction model with the outcome of nurses’ implementation of evidence-based practice. The sociodemographic and personal profiles of the participants in this study were similar to those in previous studies exploring nurses’ competencies and beliefs regarding implementing evidence-based nursing practice within health care organizations (Hasheesh & AbuRuz, 2017; Verloo et al., 2017). Developing and validating a new conceptual model to assess multiple essential factors related to evidence-based practice implementation arose from the fact that most previous literature studied single or combinations of two or three factors without considering the sophisticated nature of evidence-based practice implementation (Squires et al., 2011; Cheng, Broome, et al., 2017).

The final model accounted for 39% of the variance of evidence-based practice implementation, which represented a large effect size (Cohen, 1992). However, a significant portion of variance remains undetermined, suggesting there are additional factors unaccounted for. Results of the current study confirm that the proposed model could be appropriate for this extended set of factors, as nurses’ competency, beliefs, facilitators, and barriers have a significant impact on nurses’ evidence-based practice implementation (See Figure 3).

In the modified stable model, competencies and beliefs of the nurses were the main predictors for nurses’
implementation of evidence-based practice. In addition, both factors were influenced by contextual factors, mainly the evidence-based workshops and training programs. Similarly, several researchers found significant positive associations of nurses’ competencies and beliefs with evidence-based practice implementation (Barako et al., 2012; Bostrom et al., 2013; Park et al., 2015; Cheng, Broome, et al., 2017; Alqahtani et al., 2020). Moreover, the current study indicated that nurses’ beliefs partially mediated the relationship between nurses’ competency and evidence-based practice implementation. Similarly, this result was congruent with a recent study conducted in KSA that found the same mediation effect (Alqahtani et al., 2020).

Other investigators found that the contextual factors (educational level, experience EBNP workshops or training program, and conducting research) were positively and significantly associated with the uptake of evidence-based practice (Barako et al., 2012; De Pedro Gomez et al., 2012; Farokhzadian et al., 2015; Hellier & Cline, 2016; Pereira et al., 2018). In addition, Alqahtani et al. (2020) found that both receiving evidence-based training and participation in research activity can influence the nurses’ knowledge. Moreover, Heydari et al. (2014) examined nurses’ competencies, beliefs, and implementation of evidence-based practice and found a significant positive correlation between educational levels and knowledge levels about evidence-based practice. However, Alqahtani et al. (2020) found that academic level was not associated with evidence-based implementation for Saudi nurses. This finding highlights the need to foster positive competencies and beliefs throughout providing in-hospital evidence-based practice training programs and workshops. Instilling competencies and beliefs in the benefit of evidence-based practice can be strengthened through multifaceted in-hospital evidence-based practice educational programs (van der Goot et al., 2018), which enable nurses to apply evidence-based practice knowledge and skills in practice (van der Goot et al., 2018).

An exciting finding from this study was the non-significant predictive effect of age, gender, and department in the proposed predictive model. This result was consistent with a recent Saudi study (Alqahtani et al., 2020). However, other studies found that increasing age, being female, and magnet status were found to positively and significantly impact evidence-based practice implementation scores (Hellier & Cline, 2016; Kim et al., 2016). This could be attributed to the variations in sample characteristics and settings. Although evidence-based practice competencies and beliefs were the chief predictors for nurses’ evidence-based implementation, barriers and facilitators also had a significant and direct impact on the outcome, thus highlighting the importance of the external organizational factors. Consistently, most studies about evidence-based practice discussed the impact of facilitators and barriers on the implementation of evidence-based practice (Johnston et al., 2016; Duncombe, 2018; Spooner et al., 2018; Lizarondo et al., 2019).

The current study presents the following limitations: (i) the results were taken from a convenient sample from various nationalities; there was probably a bias due to cultural diversities. Hence, the generalization of the results must be made carefully. Replication of the study with a larger, randomized sample in various regions and nursing settings is a necessity to increase the generalizability of the findings. (ii) Additional limitation was the use of self-report questionnaires; thus, over-estimation of evidence-based competency, beliefs, and implementation is probable. Further research is recommended to include more factors like self-efficacy and confidence and their relation to nurses’ implementation of evidence-based practice.

**Implications for Nursing Practice**

The findings from the current study can lead the international efforts for nursing professionals to better comprehend the extent to which personal and organizational factors influence the implementation of evidence-based practice among registered nurses worldwide. The developed conceptual model may direct international future nursing research. Furthermore, this study implies that registered nurses need to improve their competencies, beliefs, and implementation of evidence-based practice. Also, the findings will help to lighten the hidden effects of organizational facilitators and barriers. Therefore, medical institutions, nursing front-runners, and policymakers might benefit from building up strategies and policies to promote registered nurses’ implementation of evidence-based practice through continuing education and mentoring programs about evidence-based practice.

In addition, national interventional programs should be developed and implemented to overcome the hidden organizational barriers and enhance evidence-based organizational facilitators. Decision-makers must place a high priority on the promotion of evidence-based practice if patients are to receive the best evidence-based care. This requires that evidence-based practice be tackled at the organizational as well as governmental levels if it is to be maintained.

**Conclusion**

The findings have highlighted the significant influence of nurses’ evidence-based competencies, beliefs, facilitators, barriers, and contextual factors toward nurses’ implementation of evidence-based practice. The developed model has the potential to support the transition of evidence-based practice competencies and beliefs to actual clinical behaviors; to meet professional necessities toward evidence-based practice; nevertheless, additional model validation is required. Further research is also advised to recognize other discipline-specific, personal, behavioral, and contextual factors that were not captured, as identified by the amount of model variance. Furthermore, this study presents the health authorities and nurses responsible for planning and providing evidence-
based health services with insights into how to enhance evidence-based practice in KSA strategically. Therefore, interventions to increase the nurse’s competencies in evidence-based practice are needed. Educatively training and in-hospital orientation programs that focus on the enhancement of competencies and health beliefs regarding evidence-based practice are required to promote the practice of evidence-based practice.

Declaration of Conflicting Interest
The author declares that they have no conflict of interests.

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The author declares that they have no funds received for this study.

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Author’s Contribution
The author solely contributed to every aspect of the study.

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Mohammad Hamdi Abuadas, PhD, RN is a Founding Member of Jordan Honor Society Charter/STTI and an Assistant Professor at the King Khalid University, Nursing College, Khamis-Mushait, Kingdom of Saudi Arabia.

Data Availability Statement
The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

References


Pierce, L. (2020). A study of implementing nursing practice change based on evidenced based practice. (Doctoral Dissertation), Graduate School of Creighton University, Omaha, USA. Retrieved from https://www.proquest.com/openview/f0f80c5f2d5c8f67187e7d4eaa83c8f4/1?


Perceptions of nurse managers and staff nurses regarding Technological Competency as Caring in Nursing theory in general hospitals in Japan

Youko Nakano¹, Tomoya Yokotani², Feni Betriana³, Chihiro Kawai³, Hirokazu Ito⁴, Yuko Yasuhara⁴, Tetsuya Tanioka⁵, Rozzano Locsin⁶, and Misao Miyagawa⁶

Abstract

Background: Nurses as primary healthcare providers demonstrate quality nursing care through competencies with healthcare technologies, while nurse managers assume the primacy of managing quality healthcare in their respective care settings. However, little is known about perceptions of the influence of care technologies on their nursing practice.

Objective: This study aimed to determine managers’ and staff nurses’ perceptions regarding the Technological Competency as Caring in Nursing (TCCN) theory in general hospitals in Japan.

Methods: This study employed a cross-sectional survey design, with 421 participants selected using a stratified sampling method. Technological Competency as Caring in Nursing Instrument—Revised (TCCNI-R) was used for online data collection using Survey Monkey©. Data were analyzed using Welch’s t-test and ANOVA.

Results: Nurses with years of experience within the range of 20 to less than 30 years showed the highest TCCNI-R scores among the two groups. Nurses who had received education on caring in nursing showed significant differences for Factor 2 (Technological Competency as Caring), that of expressing Technological Competency as Caring. Three other factors showed no significant difference, namely in Factor 1 (Nursing Expression as Caring), Factor 3 (Technology and Caring), and Factor 4 (Technological Knowing). However, the average scores of these factors were high, which reflect high professional ethics and occupational discipline and increased awareness of caring in nursing. It was also found that the nurse managers were more aware of the TCCN than were the staff nurses. The nurse managers were also more aware of providing care using technology, recognizing the need-to-know patient needs through technology and providing care to the ever-changing patient’s condition.

Conclusion: The study discovered that continuing education is needed regarding the practice of nursing based on theory, enabling appropriate and accurate understanding of practicing knowing persons as caring in nursing.

Keywords

advanced technologies; caring in nursing; in-service education; technological competency; nurse administrators; nursing staff; Japan

The rapid development of technology has affected hospitals to improve the quality of healthcare service (Juhana et al., 2015). The theory of Technological Competency as Caring in Nursing (TCCN) developed by Locsin (2005) illuminated the harmonious coexistence between technologies and caring in nursing through
technological knowing, mutual designing, and participative engaging (Locsin, 2017). The items of the TCCNI were developed through the TCCN theory. The theory of TCCN has been examined among different groups of nurses in several countries, for example, nursing professionals in Spain (Rincón-Alvarez & Chaparro-Diaz, 2017), ICU nurses in Japan (Kato et al., 2017), and ICU nurses in Bangladesh (Biswas, 2016). However, only a limited number of studies were found that specifically examine the extent to which TCCN is recognized by nurse managers (Kato et al., 2017). To measure the nurses’ technological competency, the Technological Competency as Caring in Nursing Instrument (TCCNI) was developed by Parcells and Locsin (2011).

The items in the Technological Competency as Caring in Nursing Instrument–Revised (TCCNI-R) were theoretically derived from the understanding of the TCCN theory formulated by Tanioka (2018). The TCCNI-R can be used in both the Japanese and English languages, and it has been confirmed for its reliability and validity (Yokotani et al., 2021). However, in that study, the population consisted of general nurses working in a limited area in Japan. Alternatively, technology-related studies conducted among nurse managers frequently discuss nursing informatics, such as electronic information systems (Lammintakanen et al., 2010) and utilizing informatics (Gunawan et al., 2020).

The coexistence of technology and caring is best exemplified in nursing. Recently, these technologies have become fundamental to the delivery of quality human healthcare now and in the future (Locsin, 2017; Nakano et al., 2019; Locsin, 2020). Complex health problems demand a highly skilled response that mobilizes teams of professionals from various disciplines.

When the engineering lens is expanded to include the practical perspective of nursing, opportunities emerge for greater technology-nurse interface and subsequent innovation. However, important patient care improvement opportunities are missed when nurses are not actively engaged in patient care device innovation and creation (Glasgow et al., 2018). In addition, the quality of nursing care can be valued based on how nurses practice their nursing as caring and on their technological competency in practicing their care (Croke, 2020).

As nurses are at the front liner of care providers in healthcare institutions, the quality of nursing care, including nursing competency in terms of technology, plays a significant role in influencing healthcare service. Nurse managers have an essential role in controlling the quality of nursing services (Tanioka et al., 2011). Also, managers’ time spent, engagement, and work can influence the quality and safety of clinical outcomes, processes, and performance (Parand et al., 2014). Excellence in nursing care will not occur without the development of genuine shared working partnerships and collaborations between nurse managers, leaders and educators, and their associated organizations (McSherry et al., 2012). Nurses work with various technologies; however, they may not be aware of them. In addition, as the experience of nurses increases, the experience of caring for patients and their families increases as well, and awareness of caring may increase. Furthermore, the nurse manager influences the staff nurse’s view of nursing. Therefore, there is a distinct possibility that nurse managers’ awareness of nursing as caring is high.

Caring is the basis of nursing, and in order to gain a deeper understanding of the TCCN among the technologies that are advancing day by day, it is important to educate stakeholders about the TCCN. However, little is known about the differences in terms of the years of nursing experience, the experience of receiving education on TCCN, and their position. Nurse managers’ perception of caring in nursing reflects promoting enhanced patient understanding, thereby fostering quality nursing care management focused on patient-centered care and improving quality nursing care services. Thus, their thinking and behavior are thought to influence the thinking and behavior of nursing staff.

This study aims to determine managers’ and staff nurses’ perceptions regarding the theory of TCCN in general hospitals in Japan.

Methods

Study Design
This is a cross-sectional study with a web-based questionnaire survey using the TCCNI-R.

Settings and Samples
The study settings were 11 general hospitals in Chugoku-Shikoku district, Japan. These hospitals have 200 or more in-patient beds. The sample of the study was selected based on the following inclusion criteria: a) currently employed as nurse managers and staff nurses; b) practicing in a private or public healthcare system or both; c) qualified and registered to practice nursing; d) agreed to participate in the survey; e) nurse managers included the director of nursing, vice director of nursing, head nurse, and chief nurse; and f) nursing staff was registered nurses (RNs) only. Excluded from the study were professionals who were ineligible to participate in the survey, such as nursing students who decided to quit the study at any stage and for any reason.

For sample size estimation, the researcher performed a statistical power analysis. The effect size in this study is considered large using Cohen’s criteria. With α = 0.05 and power = 0.80, the projected sample size needed with effect sizes (G*Power 3.1.9.7) (Faul et al., 2007) reflected values for the t-test (N = 128), for the one-way analysis of variance (N = 200) and for correlation coefficient (N = 82). Therefore, the sample size was adequate for the main objective of this study. The data were collected using a stratified sampling method in which 20% was allocated to each group who were within the age range of 20 to 60 years old.
**Instrument**

The TCCNI-R was used to evaluate the participants' perception of TCCN. TCCNI-R utilizes a 5-point Likert scale measurement with values ranging from 1 as "Strongly Disagree" to 5 as "Strongly Agree." Former TCCNI-R has 25 items. In this study, we used the 19 items version with the original numbers of items based on confirmatory factor analysis results of the study by Yokotani et al. (2021). This instrument is available in Japanese and English. The Japanese version was used in this study.

Exploratory factor analysis, confirmatory factor analysis, and Cronbach's alpha coefficient established validity and reliability. The root means square error of approximation (RMSEA) showed less than or equal to about 0.08, indicating the result as having a reasonable approximation error. The covariance structure analysis with a causal model revealed that the structural theory of TCCN had similar causal relationships to the model that has been hypothesized (Yokotani et al., 2021). The authors had obtained permission from its creator to use TCCNI-R in this study.

**Data Collection**

The 11 general hospitals in Chugoku-Shikoku Island, Japan, introduced a category of general care wards for advanced care, with a higher staffing standard, a patient-to-nurse ratio of 7:1. The "7:1" nursing placement standard is an accurate placement, with one nurse assigned to every seven patients on average over 24 hours. In addition, it is obligatory to display information on the number of nursing staff working during the day, evening, and night in each ward (Morioka et al., 2017; Japanese Nursing Association, n.d.). Those hospitals were contacted to obtain permission from their respective management administrators for their nurse managers and staff to participate in the survey. Survey Monkey® platform was used for this survey. The survey was conducted from October to December 2019. The researcher provided a letter of invitation to participate and disseminated information about the study together with the Survey Monkey URL to the Nurse Managers who agreed to distribute the document containing the URL for participants to access the survey instrument. After permission was obtained, a briefing document containing the URL of the questionnaire was distributed to nurse managers in each hospital. The document package included information for nurses' cooperation in this survey. The nurse managers at each hospital distributed the survey briefing documents to their respective staff.

**Data Analysis**

This study tested the following hypotheses: a) Nurses with years of nursing experience show a high perception of TCCN, b) Nurses with experience of receiving education on caring in the nursing show a high perception of TCCN, and c) Nurse managers show a high perception of TCCN.

From the Survey Monkey® data, only 421 responses could be used for the study. Excluded were questionnaire responses that had missing data. Statistical analysis was conducted using IBM SPSS Version 21 (IBM Institute, Chicago, USA) and R (version 3.6.2, R Foundation for Statistical Computing, Vienna, Austria).

The mean and standard deviation with a 95% confidence interval (95% CI) was calculated. The ceiling and floor effects for each question item were confirmed with the basic statistics. Descriptive statistics were used to describe the gender, age, the experience of receiving education on caring in nursing (respondents judged whether they experienced receiving education on caring in nursing based on their subjectivity), employment position, length of experience as an RN, and educational background.

The mean for each factor of the TCCNI-R was calculated. Welch's t-test was used to determine differences by the experience of receiving education on caring in nursing, and employment position (nurse manager or staff nurse); Welch's analysis of variance (ANOVA) with posthoc tests of Games-Howell was used to determine the differences by the length of experience as an RN. To identify significant differences between specific groups, a pairwise comparisons post hoc test was performed. Games-Howell's multiple comparison method is appropriate when using Welch's ANOVA. The level of statistical significance was set at p<0.001. Statistical analyses were conducted using IBM SPSS Version 24 (IBM Institute) and R (version 3.6.2, R Foundation for Statistical Computing). The level of statistical significance was set at p < .001.

**Ethical Consideration**

Ethical approval was obtained from the Ethics Review Committee of Tokushima University Hospital (Approval Number 2914-3). When participants accessed the URL, information was made available about this study. This information included the details of the research and a request for their agreement or permission to participate and collect personal data. Participation was voluntary, and no penalty would be imposed if they decided to quit the study at any time. Personal information was kept confidential. All respondents' data were secured in the researcher's computer that was also accessible only through a password known only by the main researcher.

**Results**

Demographic characteristics are presented in Table 1. Participants’ employment positions were nurse manager (22.8%) and staff nurse (77.2%). In the nurse managers’ group, the length of experience as RN was 1- less than 5 (Years) (0%), 5- less than 10 (2.1%), 10- less than 20 (13.5%), 20- less than 30 (46.9%), and more than 30 (37.5%). In the staff nurses’ group, length of experience as an RN was 1- less than 5 (18.5%), 5- less than 10 (24.6%), 10- less than 20 (29.8%), 20- less than 30 (17.2%), and more than 30 (9.8%). In the nurse managers, the educational background was Master of Science in Nursing (MSN) (0%), Bachelor of Science in Nursing (BSN) (6.2%),
Associate degree (7.3%), and Advanced Diploma (86.5%). In the staff nurses, MSN (0.9%), BSN (18.8%), Associate degree (8.9%), and Advanced Diploma (71.4%). In the nurse managers, the experience of receiving education on caring in nursing was 24%, and 24.3% in staff nurses.

Table 1 Demographic data of the participants

<table>
<thead>
<tr>
<th>Items (N = 421)</th>
<th>N (%)</th>
<th>Nurse managers</th>
<th>N (%)</th>
<th>Staff nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>96 (22.8)</td>
<td>6 (6.2)</td>
<td>31 (9.5)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>90 (23.8)</td>
<td>31 (30.8)</td>
<td>294 (77.2)</td>
<td></td>
</tr>
<tr>
<td>Age (Years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>105 (32.3)</td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>8 (3.8)</td>
<td>105 (32.3)</td>
<td>88 (27.1)</td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>36 (37.5)</td>
<td>72 (22.2)</td>
<td>246 (71.4)</td>
<td></td>
</tr>
<tr>
<td>more than 50</td>
<td>52 (54.2)</td>
<td>60 (18.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of experience as a registered nurse (Years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1- less than 5</td>
<td>0 (0)</td>
<td>0 (0.0)</td>
<td>60 (18.5)</td>
<td></td>
</tr>
<tr>
<td>5- less than 10</td>
<td>2 (2.1)</td>
<td>80 (24.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10- less than 20</td>
<td>13 (13.5)</td>
<td>97 (29.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20- less than 30</td>
<td>45 (46.9)</td>
<td>56 (17.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>more than 30</td>
<td>36 (37.5)</td>
<td>32 (9.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational background</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master of Science in Nursing</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>3 (0.9)</td>
<td></td>
</tr>
<tr>
<td>Bachelor of Science in Nursing</td>
<td>6 (6.2)</td>
<td>61 (18.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate degree</td>
<td>7 (7.3)</td>
<td>29 (8.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced diploma</td>
<td>83 (86.5)</td>
<td>232 (71.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience of receiving education on caring in nursing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Received</td>
<td>23 (24.0)</td>
<td>79 (24.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not received</td>
<td>73 (76.0)</td>
<td>246 (75.7)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows the mean, standard deviation, and 95% confidence interval of each item in the TCCNI-R. From those items, several items were identified to have a lower mean than other items. However, the means of those particular items are still in the range from 3 (neutral) to more than 4 (agree). Those items were Q25 (Nurses use technology and caring to facilitate patients' recovery with enhanced self-esteem), Q3 (Nurses must provide care for patients by using necessary technology), Q2 (Nurses are professionals who express caring utilizing technology from the perspective of compassion to patients), and one reverse item Q11 (Nurses must complete their nursing duties within the established timeframe without needing to know the patient’s feelings or needs).

Table 2 Mean, standard deviation, and 95% confidence interval of the TCCNI-R

<table>
<thead>
<tr>
<th>Question number and Items (N = 421)</th>
<th>Mean</th>
<th>SD</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1: Nursing Expressions as Caring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q17 Nurses must act by carefully listening to the patient’s voices and showing compassion for the patient.</td>
<td>4.38</td>
<td>0.74</td>
<td>4.31</td>
</tr>
<tr>
<td>Q16 Nurses must be devoted to meeting the patients' needs, hopes, wishes, and dreams.</td>
<td>4.09</td>
<td>0.85</td>
<td>4.01</td>
</tr>
<tr>
<td>Q14 Nurses must emphasize thoughtful consideration of patients’ feelings, giving encouragement and respect to patients.</td>
<td>4.45</td>
<td>0.72</td>
<td>4.38</td>
</tr>
<tr>
<td>Q13 Nursing is caring to maintain patients' lifestyles and allow them to regain their healthy lives.</td>
<td>4.13</td>
<td>0.85</td>
<td>4.05</td>
</tr>
<tr>
<td>Q18 Nurses must consider the patient’s stress and anxiety occurring in the nurse-patient relationship.</td>
<td>4.40</td>
<td>0.72</td>
<td>4.33</td>
</tr>
<tr>
<td>Factor 2: Technological Competency as Caring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q22 Caring is nurses’ involvement with patients and families in ways that allow others to grow together in the nursing situations shared.</td>
<td>4.20</td>
<td>0.74</td>
<td>4.13</td>
</tr>
<tr>
<td>Q23 Nurses use technological competency as an expression of caring in order to know patients and their families.</td>
<td>4.03</td>
<td>0.80</td>
<td>3.95</td>
</tr>
<tr>
<td>Q21 Knowing a patient is understanding the whole patient, always regarding the person as an irreplaceable human being.</td>
<td>4.33</td>
<td>0.73</td>
<td>4.26</td>
</tr>
<tr>
<td>Q25 Nurses use technology and caring to facilitate patients' recovery with enhanced self-esteem.</td>
<td>3.70</td>
<td>0.83</td>
<td>3.62</td>
</tr>
<tr>
<td>Q20 Nurses’ competence includes the use of medical technologies from the perspective of being a compassionate person.</td>
<td>4.16</td>
<td>0.75</td>
<td>4.09</td>
</tr>
<tr>
<td>Q19 Knowing a patient is not only focusing on the person’s physical aspects but also accurately understanding “who is this person?”</td>
<td>4.38</td>
<td>0.72</td>
<td>4.32</td>
</tr>
</tbody>
</table>
Table 2 (Cont.)

<table>
<thead>
<tr>
<th>Factor 3: Technology and Caring</th>
<th>Q3 Nurses must provide care for patients by using necessary technologies.</th>
<th>3.79</th>
<th>0.78</th>
<th>3.72</th>
<th>3.87</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2 Nurses are professionals who express caring utilizing technology from the perspective of compassion to patients.</td>
<td>3.73</td>
<td>0.82</td>
<td>3.65</td>
<td>3.81</td>
<td></td>
</tr>
<tr>
<td>Q4 Nurses must provide nursing care through the harmonious interactions between technology and caring.</td>
<td>4.05</td>
<td>0.78</td>
<td>3.97</td>
<td>4.12</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor 4: Technological Knowing</th>
<th>Q11 Nurses must complete their nursing duties within the established timeframe without needing to know the patient’s feelings or needs. (R)</th>
<th>3.88</th>
<th>1.20</th>
<th>3.77</th>
<th>4.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q15 Nurses do not need to provide nursing care that includes the patients’ physical and emotional conditions every moment. (R)</td>
<td>4.52</td>
<td>0.95</td>
<td>4.43</td>
<td>4.61</td>
<td></td>
</tr>
<tr>
<td>Q7 Nurses do not care for patients by knowing their health data. (R)</td>
<td>4.36</td>
<td>0.98</td>
<td>4.27</td>
<td>4.45</td>
<td></td>
</tr>
<tr>
<td>Q24 Technology is not useful for understanding patients’ health conditions. (R)</td>
<td>4.09</td>
<td>0.93</td>
<td>4.00</td>
<td>4.18</td>
<td></td>
</tr>
<tr>
<td>Q5 Nurses do not need to consider providing nursing care because each patient’s wishes always change. (R)</td>
<td>4.04</td>
<td>0.91</td>
<td>3.95</td>
<td>4.12</td>
<td></td>
</tr>
</tbody>
</table>

SD: Standard Deviation, CI: Confidence Interval, LL: Lower Limit, UL: Upper Limit. (R) reverse scoring; those are factors negatively worded items (Q5, Q7, Q11, Q15, and Q24) in the TCCNI-R. Likert scale measurement, with values ranging from 1 as Strongly Disagree; 2 Disagree; 3 Neutral; 4 Agree; to 5 as Strongly Agree.

Table 3 Differences in the TCCNI-R scores in the length of experience as RNs and nurse managers (N = 421)

<table>
<thead>
<tr>
<th>Length of experience as an RN (Years)</th>
<th>a: 1- less than 5 (N = 60)</th>
<th>b: 5- less than 10 (N = 82)</th>
<th>c: 10- less than 20 (N = 110)</th>
<th>d: 20- less than 30 (N = 101)</th>
<th>e: more than 30 (N = 68)</th>
<th>F</th>
<th>Posthoc</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCCNI-R average total score</td>
<td>4.11 (0.45)</td>
<td>4.01 (0.45)</td>
<td>4.11 (0.45)</td>
<td>4.20 (0.42)</td>
<td>4.20 (0.42)</td>
<td>4.67 ***</td>
<td>b&lt;d ***</td>
</tr>
</tbody>
</table>

Welsh’s Analysis of Variance. Abbreviations: TCCNI-R = Technological Competency as Caring in Nursing Instrument – Revised, SD = Standard Deviation.

Table 4 Differences in the average score of the TCCNI-R by the experience of receiving education on caring in nursing, and employment position (N = 421)

<table>
<thead>
<tr>
<th>Experience of receiving education on caring in nursing</th>
<th>Received (N = 102)</th>
<th>Not received (N = 319)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCCNI-R average total score</td>
<td>4.26 (0.41)</td>
<td>4.11 (0.44)</td>
<td>3.20</td>
<td>0.002</td>
</tr>
<tr>
<td>F1 Nursing Expressions as Caring</td>
<td>4.40 (0.59)</td>
<td>4.25 (0.57)</td>
<td>2.26</td>
<td>0.03</td>
</tr>
<tr>
<td>F2 Technological Competency as Caring</td>
<td>4.30 (0.50)</td>
<td>4.08 (0.55)</td>
<td>3.83</td>
<td>0.00</td>
</tr>
<tr>
<td>F3 Technology and Caring</td>
<td>4.01 (0.70)</td>
<td>3.81 (0.68)</td>
<td>2.55</td>
<td>0.01</td>
</tr>
<tr>
<td>F4 Technological Knowing</td>
<td>4.20 (0.79)</td>
<td>4.17 (0.62)</td>
<td>0.37</td>
<td>0.71</td>
</tr>
</tbody>
</table>

Employment position

<table>
<thead>
<tr>
<th>Nurse managers (N = 96)</th>
<th>Staff nurses (N = 325)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCCNI-R average total score</td>
<td>4.32 (0.36)</td>
<td>4.09 (0.44)</td>
<td>5.27</td>
</tr>
<tr>
<td>F1 Nursing Expressions as Caring</td>
<td>4.41 (0.48)</td>
<td>4.25 (0.60)</td>
<td>2.72</td>
</tr>
<tr>
<td>F2 Technological Competency as Caring</td>
<td>4.27 (0.47)</td>
<td>4.09 (0.56)</td>
<td>3.13</td>
</tr>
<tr>
<td>F3 Technology and Caring</td>
<td>4.04 (0.51)</td>
<td>3.80 (0.73)</td>
<td>3.64</td>
</tr>
<tr>
<td>F4 Technological Knowing</td>
<td>4.46 (0.48)</td>
<td>4.10 (0.69)</td>
<td>5.81</td>
</tr>
</tbody>
</table>

Welsh’s Test. Abbreviations: TCCNI-R = Technological Competency as Caring in Nursing Instrument – Revised, SD = Standard Deviation, F1 = Factor 1, F2 = Factor 2, F3 = Factor 3, F4 = Factor 4

Table 3 shows the differences in the TCCNI-R scores in the lengths of experiences as RNs and nurse managers. In the average total score, nurses with a length of experience of five to less than ten years showed significantly lower TCCNI-R scores than those with years of experience of 20 to less than 30 years.

Table 4 shows differences in the average score of the TCCNI-R by the experience of receiving education on caring in nursing and employment positions. Those who had been educated on caring in nursing had significantly higher scores in Factor 2 (Technological Competency as Caring). In addition, in the result comparing employment positions, nurse managers show significantly higher
perceptions than staff nurses, except for Factor 1 (Nursing Expressions as Caring) and 2 (Technological Competency as Caring).

Discussion

Nursing experience in years

When considering the length of experience as an RN, nurses with years of experience within the range of 20 to less than 30 years showed the highest TCCNI-R scores among the two groups. This indicated that nurses with a length of experience within 20 to less than 30 years were aware of the necessity of knowing patients as important to nursing. In explaining how years of experience can influence nurses’ thinking about caring in nursing, no related literature was found. However, some associated studies were found that examined the relationship between the periods of clinical experience and expressions of caring behavior. A study by Kato et al. (2017) revealed that nurses with ten or more years of clinical experience obtained a significantly higher score regarding the practice of nursing based on the theory of TCCN than nurses who had fewer years of clinical experience.

Jiang et al. (2015) found that nurses with a high-ranking job title had higher competency and feasibility. These results suggested that greater life experiences, years of work experience, and better competencies in practice enhance the promotion of more caring behavior among nurses. Lechleitner (2019) also found that nurses will be able to show more consideration for other people when they become older and gain new experiences.

In addition, a previous study (Takase, 2013) has reported that the relationships between the levels of nursing competence and the length of clinical experience were illustrated by a rapid increase in competence levels at the early stage of the nursing career. Therefore, length of experience as registered nurses in this study was classified into five groups of (a: 1- less than 5, b: 5- less than 10, c: 10- less than 20, d: 20- less than 30, e: more than 30), based on this idea, perception differences in TCCN theory were analyzed. As seen in these studies, support for the influence of years of experience in clinical practice is reflected well in the context of the TCCNI-R.

Experience of receiving education on TCCN theory

Caring in nursing is grounded on the fundamental concept that persons are caring and that nursing is a discipline and a profession (Boykin et al., 2001). In the nurse managers’ group, the experience of receiving education on caring in nursing was 24%, and 24.3% in staff nurses in this study. Nurses who had received education on caring in nursing showed significant differences for Factor 2 (Technological Competency as Caring).

Three other factors, other than Factor 2, showed no significant difference, namely in Factor 1 (Nursing Expression as Caring), Factor 3 (Technology and Caring), and Factor 4 (Technological Knowing). However, the average scores of these three factors were about four points, indicating high scores. These scores reflect the respondents’ observance of professional ethics and occupational discipline, supported by items of the TCCNI-R, and as a result, their awareness of caring in nursing was considered high for TCCN.

Alternatively, Factor 2 (Technological Competency as Caring) is a factor that shows the basic concept of caring, that is, to know the patient more fully as a person intentionally and to respect the patient as a person in providing caring in nursing. The practice of caring in nursing requires an understanding of the other person. To that end, it is important to truly know the persons as participants in their care rather than as objects of care.

Nurses themselves may be able to share their own personal experiences. Similarly, in gaining clinical experience involving various patient situations and including their own life experience, it becomes easier to share humanistic caring practices with patients and their families. Learning nursing from situations of caring can enhance better appreciation of a person’s lived experience.

The finding that the caring-educated group scored significantly higher in Factor 2 meant that nurses educated on caring in nursing were highly aware of the theory of “Nursing as Caring” by Boykin et al. (2001) and of “TCCN” theory by Locsin (2005).

Furthermore, the group of nurses who were educated on technological competency as an expression of caring in nursing had significantly higher scores about the TCCN compared with the group of nurses who had not received the educational intervention. Knowledge about caring has been valued most by nurses and nursing students regarding caring in their practice (Aupia et al., 2018). Still, in another study, it was found that nursing students had the lowest scores in caring behavior when compared to practicing nurses. These findings highlighted the importance of education on the concept of caring, particularly for nursing students, before they start engaging in their clinical nursing practice (Aupia et al., 2018).

A study of in-service education programs based on TCCN theory found that such programs resulted in promoting patient understanding, and quality care management with the focus on patient-centered care, hoping to improve quality patient care services. There is a need for education on the practice of theory to enable better understanding and eventual practice of human caring in nursing. Vujanic et al. (2020) declared that it is necessary to stress the significance of caring theories during initial nursing education as well as during their further education. This educational activity supports the view that nurses need lifelong education and training in order to uphold the essential nursing values and ensure that caring remains vital in their nursing practice. It is desirable to have an in-service education system that allows nurses to grow through reflection as well as through actual nursing practice.

Differences in their positions in nursing practice

Participants’ employment positions were nurse manager
(22.8%) and staff nurse (77.2%). It was found that nurse managers were more aware of the TCCN than were the staff nurses. Nurse managers were more aware of providing care using technology, as revealed in Factor 3 (Technology and Caring). Nurse managers also recognized the need-to-know patient needs through technology and provided care to the ever-changing patient’s condition as revealed in Factor 4 (Technological Knowing). Nurse managers use technology as an expression of caring from a compassionate perspective using multiple methods toward knowing persons, reflecting the use of nursing technology in order to know persons as caring. This finding shows that nurse managers were aware of the importance of using technology (Nakano et al., 2019) in order to know persons as caring. This study also showed that nurse managers were more aware of using technologies of care, as evidenced by their higher evaluation points when compared to the staff nurses.

About half of the nurse managers surveyed had participated in an in-service educational activity on TCCN. This experience was reflected in the nurse managers' responses to the TCCN-R. The nurse managers recognized that they could grow in their caring by learning about nursing, caring, and technology. It can be expected that these findings reflected the positive outcome of on-site education and human resource development as a staff management project for nurse managers. It is essential to underscore that nurse managers are responsible for improving the quality of nursing care throughout their assigned departments. Therefore, it is necessary that they show the direction of nursing for their staff and work together toward the same goal. In this situation, if it is only the nurse manager who will have an idea about caring in nursing, the goal of the department cannot be achieved. The staff that practice it must be engaged fully within the aims of the department. It has been documented that when nurse managers exemplify caring in nursing, the focus will lead to the development of the staff's caring competencies. Education focused on caring should be positioned as consolidating the basis of nursing as a practice of technological competency as an expression of caring with required ideals inculcated in the educational process.

Limitations
This study had several limitations. The results of the study are considered to be limited due to differences in perceptions regarding caring education, which may include “course, training, or formal education” among the target population, and the fact that the target facilities were limited to acute care hospitals and data were not collected in various nursing areas, such as chronic care. In addition, the length of experience as a nurse manager was not asked during the survey.

Conclusion
The study clarified perceptions of nurse managers and staff nurses regarding the theory of TCCN in general hospitals in Japan. Nurses who have practiced nursing within the range of 20 to less than 30 years showed the highest scores in their expression of technological competency as caring in nursing. These nurses were found to be highly aware of the necessity of knowing patients as a focus of their nursing. It was also found that nurses who had received education on TCCN showed significant differences in their perceptions considering Factor 2 (Technological Competency as Caring). This factor illustrates that essential caring in nursing focuses on knowing the patient intentionally and how to express respect for patients as persons through technological expressions of caring. Therefore, there is a need to educate nurses regarding the theory-based nursing practice, enabling a critical understanding of practicing caring in nursing. Nursing managers were more aware of TCCN than the staff nurses. Nurse managers were more aware of technological competency as an expression of caring in nursing than staff nurses, as revealed in Factor 3 (Technology and Caring). Furthermore, nurse managers recognized the need-to-know patient needs through technology more fully and provided care to patients within the ever-changing healthcare condition. This finding was supported by Factor 4 (Technological Knowing).

Declaration of Conflicting Interest
The authors declare that there is no conflict of interest.

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Authors’ Contributions
All authors contributed to the conception of this study, drafting and revising the work critically, approved for the final version, and agreed to be accountable for all aspects of the work.

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Data Availability Statement
The datasets generated during and/or analyzed during the current study are not publicly available due to ethical restrictions but are available from the corresponding author on reasonable request.

References


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Predictors of nurses’ caring practice for critically ill patients in critical technological environments: A cross-sectional survey study

Yinglan Li and Waraporn Kongsuwan*

Abstract

Background: Caring practice for critically ill patients refers to the actions/behaviors/performance of nurses while caring for critically ill adult patients in the intensive care unit (ICU). Although the caring practice is vital in ICUs and complex due to the multitude of available technologies, research on ICU nurses’ caring practice and its predictive factors are lacking.

Objective: This study aimed to explore the level of nurses’ caring practice for critically ill patients in critical technological environments in China and its predictors.

Methods: This was a cross-sectional online survey study with 218 ICU nurses in 29 tertiary hospitals of Guizhou province, China, from 1st to 30th April 2020. Data were collected by using e-questionnaires made in the Questionnaire Star program, including the Demographic Data Questionnaire (DDQ), Practice of Technological Competency as Caring in Nursing Instrument (P-TCCNI), Influence of Technology Questionnaire (ITQ), and Nurses’ Professional Value Scale (NPVS). The questionnaires were content validated by three experts. Cronbach’s alpha coefficient was 0.96 for the P-TCCNI, 0.70 for the ITQ, and 0.95 for the NPVS. Links to the questionnaires were distributed by research assistants to WeChat groups including target participants. Statistical Package for the Social Science (SPSS) program version 26 (IBM Corporation, Armonk, NY, USA) was used for data analysis. Descriptive and inferential statistics were used to analyze the data. Multiple linear regression analysis using stepwise solution analysis was performed to identify unique predictors of nurses’ caring practice.

Results: The level of nurses’ caring practice for critically ill patients was high (mean = 87.30, standard deviation = 13.73). The professional value was a significant predictor of nurses’ caring practice ($\beta = 0.41$, $p = 0.00$).

Conclusion: ICU nurses exhibited a high level of caring practice. Professional value was a significant predictor of ICU nurses’ caring practice. Nursing administrators should understand the current situation of caring practice in critical technological environments and design strategies to maintain and improve ICU nurses’ professional value to increase the level of caring practice.

Keywords

caring practice; critically ill patient; critical technological environments; ICU; nursing; China

Caring practice in critical technological environments such as ICUs is dynamic and complex due to the numerous technologies used to treat patients’ serious conditions. It is widely believed that technologies can reduce nurses’ workload and thereby provide nurses with more time to communicate with patients and meet their emotional needs (Sabzevari et al., 2015). However, in the real situation of caring practice, technologies can distract nurses from getting to know their patients and providing appropriate care (Locsin & Kongsuwan, 2018). It was found that nurses often use their time to manage and resolve problems with new and advanced technologies, and this increases nurses’ feelings of stress and uncertainty and decreases their attention on caring for patients (Kongsuwan & Locsin, 2018).

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To improve this situation, nurses are required to maintain excellent technological competency, cultivate a deep understanding of their patients, and provide the best caring practice for their patients (Despins, 2017; Locsin & Kongsuwan, 2018; Petersen et al., 2019).

Nursing researchers have consistently viewed caring as a vital constituent of nursing in their studies (Su et al., 2014; Wang et al., 2014; Cheng et al., 2017). However, the findings of these studies indicated caring for critically ill patients among ICU nurses was inadequate. Compared to general wards, ICUs are ‘closed’ units where patients are in round-the-clock care by intensivists, especially bedside nurses (Kisorio & Langley, 2019). Hence, ICU nurses’ caring practice plays an essential role in intensive care nursing. However, a study in Nepal showed that ICU nurses were short of technological competency in caring for critically ill patients (Limbu et al., 2019). Additionally, a study in Japan demonstrated that nurses’ recognition of caring for patients was higher than their actual practice (Kato, Miyagawa, et al., 2017).

Technology, caring, and competency are key aspects of caring practice in ICU nursing, which differs from caring practice in other medical areas (Locsin, 2005). Locsin developed the theory of Technological Competency as Caring in Nursing (TCCN), which focuses on caring in technological environments in ICUs (Locsin, 2005). In this theory, technology and caring are understood as co-existing in nursing practice, and caring is expressed through technological competency used by experts to know a patient as a whole at the moment (Locsin, 2005). To measure technological competency as caring in technological environments, the Technological Competency as Caring in Nursing Instrument (TCCNI) was developed (Parcells & Locsin, 2011). It was used by Biswas et al. (2016) in Bangladesh to survey the ICU nurses’ perception of caring. Later, it was modified by Kato, Miyagawa, et al. (2017) to the Perceived Inventory of Technological Competency as Caring in Nursing (PITCCN). When Kato et al. used the PITCCN to survey ICU nurses, they found ICU nurses’ recognition of caring was higher than their practice of caring ($p < 0.01$) (Kato, Tanioka, et al., 2017).

There are several factors proven to be related to nurses’ caring practice in ICUs, namely age (Enns & Sawatzky, 2016; Yau et al., 2019), work experience (Reid et al., 2018; Yau et al., 2019), education level (Yau et al., 2019), and professional value (Hu, 2017; Poorchangizi et al., 2019; Tehranineshat et al., 2020). In China, professional value is the key influencing factor of nursing practice that guides decision-making and nursing behaviors. It was defined as one conviction that makes people believe they can achieve the goal in their career, and it is the key to satisfying inner needs and unlocking the achievement in individuals’ activities (Fang et al., 2013). Several studies showed that older nurses had a higher level of caring ability and caring behaviors (Wu et al., 2019; Yau et al., 2019). In a study, Yau et al. (2019) reported that work experience was associated with nurses’ caring behaviors. Meanwhile, older nurses’ caring practice was higher than younger nurses (Kato, Miyagawa, et al., 2017). Moreover, nurses with a higher education level had a higher level of caring behaviors (Yau et al., 2019). Hu (2017) indicated that a significant association exists between caring ability and professional value.

However, these factors were proved to be associated with one aspect of caring practice, such as caring recognition, caring ability, caring perception, caring capacity, or caring behavior. Limited studies have explored predictors of caring practice for critically ill patients among ICU nurses. It is necessary to better understand the impact of influencing factors on ICU nurses’ caring practice and use this knowledge to improve nurses’ caring practice. Therefore, this study aimed to explore the level of nurses’ caring practice for critically ill patients in critical technological environments and its predictors.

**Theoretical Framework**

The conceptual framework of this study is developed based on the theory of TCCN and a literature review of factors associated with caring practice in ICUs. The theory of TCCN is a middle-range theory developed by Locsin (2005), which is grounded in Boykin and Schoenhofer (2001)’s theory of Nursing as Caring. The essential goal of this theory is knowing a patient as a whole by using technological competency as a process of knowing in nursing practice (Locsin, 2005). The theory of TCCN views technology and caring as coexisting in nursing practice. Five assumptions of this theory are described as follows: 1) Persons are caring by virtue of their humanness (Boykin & Schoenhofer, 2001); 2) The ideal of wholeness is a perspective of unity (Locsin, 2005); 3) Knowing persons is a multidimensional process (Locsin, 2005); 4) Technologies of health and nursing are elements for caring (Locsin, 2005); and 5) Nursing as a discipline and professional practice (Boykin & Schoenhofer, 2001).

By the literature review, some factors are known to be associated with the caring practice. Therefore, the selected factors for caring practice prediction in this study include nurses’ age, work experience, educational level, the influence of technology, and professional value.

**Methods**

**Study Design**

A cross-sectional online survey study was conducted from 1st to 30th April 2020.

**Sample and Setting**

This study was conducted among ICU nurses in 29 tertiary hospitals of Guizhou province China. In China, hospitals are divided into three grades based on ability and number of beds (Wang et al., 2016). Tertiary hospitals, the highest-level hospitals, have more than 500 beds and are responsible for providing more specialist health services,
education, and research. In addition, since tertiary hospitals have a larger number of and more categories of advanced technologies (Wang et al., 2016), nurses who work in tertiary hospitals face greater technology-based pressure than those who work in secondary hospitals. Hence, the data were collected from seven types of ICUs (respiratory, emergency, general, neurological, surgical, medical, and cardiological units) in tertiary hospitals.

The participants were nurses who worked in the ICUs of tertiary hospitals in Guizhou province, China. A convenient sampling technique was used for data collection. Several nurses were invited to assist with the study. If they accepted the invitation, they were enrolled in the study as research assistants responsible for distributing the link to the questionnaire to target ICU nurses’ WeChat groups. The inclusion criteria of participants were: 1) being a registered nurse, 2) working in an adult ICU, and 3) being willing to participate in the study. The exclusion criteria were ICU nurses who were not responsible for bedside nursing, such as chief nurses or administrative nurses.

The sample size was determined by power analysis (Polit & Beck, 2017). The significance level (α) of 0.05, power of 0.80, and average effect size of 0.20 were used to analyze the sample size. The required minimum sample size was 194. However, the response rate of the internet-based survey was about 33% (Lindemann, 2019). To overcome the anticipated low response rate, the sample size was increased by 67% to 588. The response rate in this study was 40.31%, meaning the number of participants who replied to questionnaires was 237. Finally, after deleting invalid questionnaires, a total of 218 participants were included.

Instruments

There were four parts in the questionnaire pack, including the Demographic Data Questionnaire (DDQ), Practice of Technological Competency as Caring in Nursing Instrument (P-TCCNI), Influence of Technology Questionnaire (ITQ), and Nurses’ Professional Values Scale (NPVS). The permissions for utilizing, modifying some items (if necessary), and translating the questionnaires were obtained from the original authors. The content validity of the scales was tested with three nursing experts, and the item-level content validity (I-CVI) indexes of P-TCCNI, ITQ, and NPVS were 1 (after a series of revisions), 0.94, and 0.95, respectively. A pilot study was used to examine the reliability of three instruments with 30 ICU nurses. A back translation technique was used to translate the P-TCCNI and ITQ from English to Chinese (Polit & Beck, 2012).

The DDQ was used to collect demographic data, including age, gender, religion, work experience, education level, work overload, continuing education and training, and unit.

The P-TCCNI was used to evaluate the level of nurses’ caring practice for critically ill patients in technological environments. It was modified from the TCCN, an instrument developed by Parcell and Locsin (2011) based on the theory of TCCN (Locsin, 2005). The P-TCCNI is a 5-point Likert scale questionnaire (ranging from 1 = never practice to 5 = always practice). There are 22 items categorized into five sub-scales based on the five assumptions of the theory of TCCN. The overall score range is 22–110. A higher mean score indicates a higher level of caring practice, and total mean scores are divided into three levels: low (22–51.33), moderate (51.34–80.66), and high (80.67–110) (Grove et al., 2013). The level of each item is interpreted into three levels: low (1.0–2.33), moderate (2.34–3.66), and high (3.67–5.00). Cronbach’s alpha coefficient of the P-TCCNI is 0.96.

The ITQ was designed to assess the influence of technology on nursing care according to the nurses’ beliefs (Bagherian et al., 2017). It is a 5-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree) developed by Sabzevari et al. (2015) and consisting of a total of 22 items, with both negative (13 items) and positive (9 items) subscales. The total score ranges from 22 to 110. After reversing the negative items, a higher score indicates a higher level of influence of technology. The Cronbach’s alpha coefficient is 0.70.

The NPVS, including 17 items in three dimensions (behavior value, personal value, and social value), was designed by Deng et al. (2012) to assess the degree of professional value in the Chinese context. The score ranges from 17 to 85, with a higher score indicating a higher level of professional value. Each item is measured on a 5-point Likert scale, where 1 = never meet and 5 = always meet. The Cronbach’s alpha coefficient is 0.95.

Data Collection

Data were collected from 1st to 30th April 2020. After consultation with three experts who each had the clinical experience of more than ten years (one chief nurse of RICU and two professors of Faculty of Nursing) and completion of a pilot study to test the revised instruments, the final questionnaires were used to collect data. The e-questionnaires were created in Questionnaire Star, an application program widely used by researchers to create and distribute six types of instruments.

Once the research assistants distributed the link to the questionnaire to participants via WeChat, participants could open the link in the WeChat group without registration. The survey took approximately 20–30 minutes, and participants could finish it at their convenience within one week. Data were collected from Questionnaire Star directly. A total of 351 participants did not complete the questionnaires. Of the 237 completed questionnaires, 19 were invalid because of obvious logic contradictions, providing the same answers to all questions or marking “0” for work experience. The remaining 218 questionnaires were included in the data analysis.

Data Analysis

Statistical Package for the Social Sciences (SPSS) program version 26 (IBM Corporation, Armonk, NY, USA)
was used for data analysis. The demographic data and the level of nurses’ caring practice were analyzed by descriptive statistics, including frequency, percentage, mean (M), range, and standard deviation (SD). To examine the predictors of nurses’ caring practice, multiple linear regression analysis was carried out. The stepwise selection was used to choose the final regression model. Prior to performing multiple linear regression analysis, the assumptions of normality, linearity, homoscedasticity, and multicollinearity were tested to ensure the accuracy of the findings and ensure no violation of statistical assumptions. The dependent variable was the total score of P-TCCNI. The independent variables were age, work experience, education level, the influence of technology, and professional value. The statistically significant level was set at $p < 0.05$.

**Ethical Consideration**

This study was approved by the Social and Behavioral Sciences Institutional Review Board (IRB), Prince of Songkla University, Thailand (IRB No. 2019-NSt 024). An implied informed consent form was provided to participants during data collection. Participants had the right to withdraw without prejudice at any time. The original data were kept confidential and maintained for five years after data analysis.

**Results**

**Participant Characteristics**

The demographic characteristics of participants are presented in Table 1. The age of participants ranged from 21 to 48 years, and the mean age was 29.58 (SD = 4.52). The majority of participants were female ($n = 164$, 75.2%), and 62.9% ($n = 139$) were married. More than 80% ($n = 175$) of respondents had no religion. Their work experience in the ICU and nursing (years) ranged from 0.1 to 17 and 0.5 to 28, respectively. Additionally, 27.7% of participants ($n = 62$) had a diploma degree, 69.6% ($n = 150$) had a bachelor’s degree, and 84.4% ($n = 184$) reported they had received continuing education and training on concepts related to caring for critically ill patients and technology. Furthermore, 64.7% of participants ($n = 141$) felt they had work overload in their shifts.

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Frequency ($n$)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Min = 21, Max = 48, M = 29.58, SD = 4.52)</td>
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<td></td>
</tr>
<tr>
<td>21–30</td>
<td>133</td>
<td>61.0</td>
</tr>
<tr>
<td>31–40</td>
<td>82</td>
<td>37.6</td>
</tr>
<tr>
<td>41–48</td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>164</td>
<td>75.2</td>
</tr>
<tr>
<td>Male</td>
<td>54</td>
<td>24.8</td>
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<tr>
<td>Unmarried</td>
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<td>Divorced</td>
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<tr>
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<tr>
<td>Buddhist</td>
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<tr>
<td><strong>Work experience in ICU (years)</strong></td>
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<td></td>
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<tr>
<td>≤5</td>
<td>135</td>
<td>61.9</td>
</tr>
<tr>
<td>6–10</td>
<td>67</td>
<td>30.7</td>
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<tr>
<td>11–15</td>
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<td>6.4</td>
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<tr>
<td>16–17</td>
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<tr>
<td><strong>Work experience in nursing (years)</strong></td>
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<tr>
<td>≤5</td>
<td>111</td>
<td>50.9</td>
</tr>
<tr>
<td>6–10</td>
<td>73</td>
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<tr>
<td>11–15</td>
<td>26</td>
<td>11.9</td>
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<tr>
<td>16–28</td>
<td>8</td>
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<td>184</td>
<td>84.4</td>
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<tr>
<td>No</td>
<td>34</td>
<td>15.6</td>
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</table>
Level of Caring Practice for Critically Ill Patients

Table 2 displays the descriptive statistics for caring practice for critically ill patients. There was a high level of caring practice for critically ill patients among 76.6% of participants ($n = 167$), a moderate level among 21.6% of participants ($n = 47$), and a low level among only 1.8% of participants ($n = 4$). The overall mean score of P-TCCNI was 87.30 (SD = 13.73), which falls into the high level of caring practice for critically ill patients.

The mean score overall for each item and for subscales of P-TCCNI to reflect the caring practice for critically ill patients are presented in Table 3. The overall mean score of caring practice for critically ill patients was at a high level (M = 3.96, SD = 0.04). The subscale with the highest mean score was “Knowing persons is a multidimensional process” (M = 4.04, SD = 0.05). The subscale with the second highest mean score was “Technologies of health and nursing are elements for caring” (M = 4.01, SD = 0.05). The subscale with the second-lowest mean score was “Nursing as a discipline and professional practice” (M = 3.99, SD = 0.05). The subscale with the lowest score was “Persons are caring by virtue of their humanness” (M = 3.75, SD = 0.04).

Multivariate Analysis

Predictors of caring practice were analyzed by multiple linear regression using stepwise solution analysis, and professional value accounted for 17% variance of caring practice ($R^2 = 0.17, p<0.001$) (Table 4). Professional value significantly predicted ICU nurses’ caring practice for critically ill patients ($\beta = 0.41, p < 0.01$).

Table 1 (Cont.)

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
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</thead>
<tbody>
<tr>
<td>Work overload</td>
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<tr>
<td>Yes</td>
<td>141</td>
<td>64.7</td>
</tr>
<tr>
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<td>77</td>
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<td>ICU</td>
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<td>77.5</td>
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<tr>
<td>SICU</td>
<td>13</td>
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<td>NICU</td>
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<td>MICU</td>
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<tr>
<td>RICU</td>
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</tr>
<tr>
<td>CCU</td>
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</tr>
<tr>
<td>EICU</td>
<td>1</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Note: ICU: general ICU; CCU: Cardiological Critical Unit; MICU: Medical ICU; NICU: Neurological ICU; EICU: Emergency ICU; RICU: Respiratory ICU; SICU: Surgical ICU

Table 2 Descriptive statistics and the level of caring practice for critically ill patients (N = 218)

<table>
<thead>
<tr>
<th>Level of Caring Practice</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min = 41, Max = 110, M = 87.30, SD = 13.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (22–51.33)</td>
<td>4</td>
<td>1.8</td>
</tr>
<tr>
<td>Moderate (51.34–80.66)</td>
<td>47</td>
<td>21.6</td>
</tr>
<tr>
<td>High (80.67–110)</td>
<td>167</td>
<td>76.6</td>
</tr>
</tbody>
</table>

*Min = Minimum, Max = Maximum, M = Mean, SD = Standard Deviation

Table 3 Mean, standard deviation, score range, and level of caring practice categorized by overall, each item, and subscales (N = 218)

<table>
<thead>
<tr>
<th>Caring Practice</th>
<th>M</th>
<th>SD</th>
<th>Score Range (Min–Max)</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>3.96</td>
<td>0.04</td>
<td>1.86–5.00</td>
<td>High</td>
</tr>
<tr>
<td>Persons are caring by virtue of their humanness</td>
<td>3.75</td>
<td>0.04</td>
<td>1.75–5.00</td>
<td>High</td>
</tr>
<tr>
<td>1. I use special techniques which are appropriate for each patient to care for them.</td>
<td>3.79</td>
<td>0.88</td>
<td>1.00–5.00</td>
<td></td>
</tr>
<tr>
<td>2. I know the patient’s physical self and emotional conditions in a particular moment.</td>
<td>3.90</td>
<td>0.79</td>
<td>1.00–5.00</td>
<td></td>
</tr>
<tr>
<td>3. I value patients that they know their own selves and their care routine well.</td>
<td>3.34</td>
<td>1.04</td>
<td>1.00–5.00</td>
<td></td>
</tr>
<tr>
<td>4. I assist my patients in creating a shared sense of safety and security.</td>
<td>4.00</td>
<td>0.76</td>
<td>2.00–5.00</td>
<td></td>
</tr>
<tr>
<td>The ideal of wholeness is a perspective of unity</td>
<td>4.00</td>
<td>0.05</td>
<td>2.00–5.00</td>
<td>High</td>
</tr>
<tr>
<td>5. I engage in compassion, physical presence, and comforting, and respect the whole person of my patients.</td>
<td>4.16</td>
<td>0.71</td>
<td>2.00–5.00</td>
<td></td>
</tr>
<tr>
<td>6. I use technology and unbiased caring to build a patient’s self-worth.</td>
<td>4.06</td>
<td>0.80</td>
<td>1.00–5.00</td>
<td></td>
</tr>
<tr>
<td>7. I am more concerned about the patient’s wholeness (e.g., background, belief, hope, and faith) than their physical parts.</td>
<td>4.00</td>
<td>0.86</td>
<td>1.00–5.00</td>
<td></td>
</tr>
<tr>
<td>8. I concern about patients’ personal hopes and dreams, which may change from one moment to the next.</td>
<td>3.81</td>
<td>0.87</td>
<td>1.00–5.00</td>
<td></td>
</tr>
</tbody>
</table>
Table 3 (Cont.)

<table>
<thead>
<tr>
<th>Caring Practice</th>
<th>M</th>
<th>SD</th>
<th>Score Range (Min–Max)</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing persons is a multidimensional process</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. I use technology to know who and what the patient is, such as the patient’s</td>
<td>4.04</td>
<td>0.05</td>
<td>1.40–5.00</td>
<td>High</td>
</tr>
<tr>
<td>symptoms, and needs.</td>
<td>4.10</td>
<td>0.75</td>
<td>2.00–5.00</td>
<td></td>
</tr>
<tr>
<td>10. I provide caring for patients via listening to, doing things with, and being</td>
<td>4.07</td>
<td>0.72</td>
<td>2.00–5.00</td>
<td></td>
</tr>
<tr>
<td>with the patient.</td>
<td>4.14</td>
<td>0.76</td>
<td>2.00–5.00</td>
<td></td>
</tr>
<tr>
<td>11. I balance the demands of using machine technologies competently with caring</td>
<td>4.00</td>
<td>0.83</td>
<td>1.00–5.00</td>
<td></td>
</tr>
<tr>
<td>in nursing.</td>
<td>3.91</td>
<td>0.80</td>
<td>1.00–5.00</td>
<td></td>
</tr>
<tr>
<td>12. I pay attention to each patient’s conditions and related data and include</td>
<td>4.01</td>
<td>0.05</td>
<td>1.00–5.00</td>
<td>High</td>
</tr>
<tr>
<td>them in designing care plans to ensure the accuracy and completeness of my care.</td>
<td>4.13</td>
<td>0.77</td>
<td>2.00–5.00</td>
<td></td>
</tr>
<tr>
<td>13. I use many ways of knowing to know the patient, such as communication,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>observation, reasoning, imagination, and sense-perception.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technologies of health and nursing are elements for caring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. I use the machines/devices proficiently, aiming to provide the best care to</td>
<td>3.96</td>
<td>0.77</td>
<td>1.00–5.00</td>
<td></td>
</tr>
<tr>
<td>my patients.</td>
<td>3.98</td>
<td>0.77</td>
<td>1.00–5.00</td>
<td></td>
</tr>
<tr>
<td>15. I practice and follow up on tasks and emotions and use creativity in meeting</td>
<td>3.97</td>
<td>0.79</td>
<td>2.00–5.00</td>
<td></td>
</tr>
<tr>
<td>exceeding patient needs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. I know the patient by involving and respecting the person as a whole person</td>
<td>3.97</td>
<td>0.79</td>
<td>2.00–5.00</td>
<td></td>
</tr>
<tr>
<td>and complete in each moment.</td>
<td>3.97</td>
<td>0.79</td>
<td>2.00–5.00</td>
<td></td>
</tr>
<tr>
<td>17. I use technology and human touch together in order to relate to patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with true presence and caring intentions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing as a discipline and professional practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. I practice nursing within a caring perspective in the assessment and</td>
<td>3.99</td>
<td>0.05</td>
<td>1.20–5.00</td>
<td>High</td>
</tr>
<tr>
<td>interpretation of healthcare data.</td>
<td>3.99</td>
<td>0.76</td>
<td>2.00–5.00</td>
<td></td>
</tr>
<tr>
<td>19. I acknowledge patient needs while respecting all belief systems and focusing</td>
<td>4.06</td>
<td>0.77</td>
<td>1.00–5.00</td>
<td></td>
</tr>
<tr>
<td>on patient healing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. I, my patients, and their family members share knowledge and experience.</td>
<td>3.91</td>
<td>0.82</td>
<td>1.00–5.00</td>
<td></td>
</tr>
<tr>
<td>21. I provide caring in nursing to reduce vulnerability and other stresses/anxiety</td>
<td>4.06</td>
<td>0.72</td>
<td>2.00–5.00</td>
<td></td>
</tr>
<tr>
<td>inherent in nurse-patient relationships.</td>
<td>3.97</td>
<td>0.79</td>
<td>1.00–5.00</td>
<td></td>
</tr>
<tr>
<td>22. I provide selfless commitment to patients’ needs, hopes, and dreams.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4 The predictive factors of caring practice (N = 218)

<table>
<thead>
<tr>
<th>Predictor variables *</th>
<th>Unstandardized coefficients β</th>
<th>SE</th>
<th>Standardized coefficients β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>−0.024</td>
<td>0.292</td>
<td>−0.008</td>
<td>−0.083</td>
<td>0.934</td>
</tr>
<tr>
<td>Work experience</td>
<td>0.212</td>
<td>0.340</td>
<td>0.058</td>
<td>0.625</td>
<td>0.533</td>
</tr>
<tr>
<td>Education level</td>
<td>−2.102</td>
<td>1.799</td>
<td>−0.079</td>
<td>−1.169</td>
<td>0.244</td>
</tr>
<tr>
<td>Influence of technology</td>
<td>−0.023</td>
<td>0.116</td>
<td>−0.013</td>
<td>−0.201</td>
<td>0.841</td>
</tr>
<tr>
<td>Professional value</td>
<td>0.527</td>
<td>0.082</td>
<td>0.412</td>
<td>6.388</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Full model: $R^2 = 0.17, p = 0.000$

a: Dependent variable: caring practice

Discussion

The Level of Caring Practice

This study examined the level of nurses’ caring practice for critically ill patients and its predictors. Little was known about the caring practice among ICU nurses in China. The results of this study showed that there was a high level of caring practice among ICU nurses (Table 2). The high level of caring practice was explored mainly because caring has been adopted as a core value in the nursing profession in China (Liu et al., 2019).

Since the High-Quality Care Demonstration Project (HQCDP) was conducted nationwide, both perception and knowledge of caring have been improving (Wang et al., 2014). The main point of this project is combining nursing and caring in daily care. When providing basic nursing services and professional technical services to patients, nurses should strengthen communication with patients and provide personalized care to patients (Wang et al., 2016). Patient-centered care has taken priority in nursing care, and it has increased nurses’ awareness of the benefits of taking care of both the physical and mental health of patients. Thus, caring for patients has become a decisive element in nursing.

In the Chinese cultural context, caring is a complex concept including four categories: attitude, knowledge, ability, and perceptions of caring (Meng et al., 2011). Nurses should have the perception of respecting and loving patients. Nurses are responsible for patients’ physiological and psychological health. Nurses conduct caring practice according to patients’ needs. Therefore, nurses must always consider each patient’s perspective and view each
patient as a participant (Meng et al., 2011). The concepts of caring and patients in the Chinese cultural context are similar to the concepts reflected in the theory of TCCN. In the theory of TCCN, patients are participants who are considered whole persons in each moment in technological environments (Locsin & Kongsuwan, 2018). Hence, it is unsurprising that this study indicated a high level of caring practice among Chinese ICU nurses.

Predictors of Caring Practice

Using regression analyses, the professional value was identified as a significant predictor of caring practice ($\beta = 0.41, p = 0.00$), which accounted for 17% variance in caring practice. This was the first study to use the NPVS to examine the relationship between professional values and ICU nurses’ caring practice. Limited predictive studies were found in the literature review, but several correlational studies were identified. One correlational study conducted in a primary hospital indicated that professional value positively correlated with nurses’ caring ability ($r = 0.5, p < 0.01$) (Hu, 2017). According to many participants’ statements in the present study, it gives one a profound sense of achievement when patients are getting better, and this profoundly influences one’s job satisfaction.

However, age, work experience (in ICU), education level, and influence of technology did not contribute to ICU nurses’ caring practice. Similarly, in a prior study, a survey by Chen et al. (2016) showed that age was not associated with caring efficacy in a tertiary hospital. Conversely, Yau et al. (2019) indicated that there was a positive relationship between caring behaviors and age ($r = 0.23$, $p < 0.01$) in acute hospital settings. Moreover, Wu et al. (2019) reported that older ICU nurses had a higher level of caring ability ($p < 0.05$). In this study, interestingly, work experience (in ICU) was not significantly associated with nurses’ caring practice ($p > 0.05$). By comparison, Wu et al. (2019) revealed that work experience was correlated with the caring ability ($p < 0.05$). Similarly, findings from a study outside China showed nurses’ caring capacity increased with work experience (Simmons & Cavanaugh, 2000). So, further study is needed to explain this phenomenon.

Education level also did not significantly contribute to ICU nurses’ caring practice ($p > 0.05$). This finding contrasts with Su et al. (2014) finding that education level is positively related to caring capacity among ICU nurses ($F = 8.29$, $p < 0.01$). In the present study, education level was not significantly correlated with nurses’ caring practice based on the theory of TCCN. As Chen et al. (2016) mentioned, many curricula at universities and colleges in China lack courses on caring. This is one possible reason for the opposing results.

Meanwhile, this study indicated that the influence of technology was not a predictor of caring practice for critically ill patients ($p > 0.05$). As ICU nurses mentioned, there were two opinions on the influence of technology on nurses’ act of caring, similar to the opinions identified in some prior studies (Kongsuwan & Locsin, 2011; Petersen et al., 2019). Some nurses thought technology was a barrier to caring. They felt caring for patients was replaced by caring for technology in the ICU, especially for nurses unfamiliar with new and advanced technology. Other nurses thought that technology played the same important role as caring. They strongly believed that it was easier to get patients’ physical data from machines and devices, which enabled them to provide adequate care.

Limitations

One limitation of this study was sampling bias. This study was conducted in tertiary hospitals in Guizhou province, where there were high numbers of technologies of health and nursing used in caring for critically ill patients. However, there are many kinds of technologies in secondary hospitals too. Another limitation was the low response rate (40.31%), likely caused by collecting data during the COVID-19 pandemic since nurses were extremely busy with overloaded work schedules.

Implications for Clinical Practice

There are several implications of this study: 1) It is essential for nursing administrators and policymakers to understand the current situation of caring practice in ICUs in China; 2) ICU nurses’ professional value is a significant predictor of caring practice, which provides evidence for developing nursing programs for improving caring practice in ICUs; and 3) The P-TCCNI is a reliable and validated questionnaire to measure ICU nurses’ caring practice.

Conclusion

This cross-sectional study showed that the level of ICU nurses’ caring practice in tertiary hospitals in Guizhou province, China, was high. Professional value was found to be a predictor of caring practice, so it is recommended as a basic factor for improving the caring practice of ICU nurses. The P-TCCNI is recommended to be used as a tool to measure the ICU nurses’ caring practice in further studies, such as in secondary hospitals in China or other countries.

Declaration of Conflicting Interest

The authors declare that they have no conflict of interest.

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Authors’ Contributions

YL made significant contributions to the research proposal, the literature review, data collection, data analysis and interpretation,
and drafting of the article. WK made significant contributions to the research proposal, the literature review, study conception and design, data analysis and interpretation, drafted the article, and critical revision of the article.

Authors' Biographies
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Waraporn Kongsuwan, PhD, RN is an Associate Professor of Nursing, Faculty of Nursing, Prince of Songkla University, in Southern Thailand.

Data Availability Statement
The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

References


Evaluation of the integrated model of the rational drug use into the Bachelor of Nursing Science program in Thailand: A mixed-methods study

Kamolrat Turner1*, Kanoklekha Suwannapong2, Phawida Putthikhan3, Sukjai Charoensuk4, Matane Radabutr1, Naruemol Angsirisak5, Streerut Thadakant6, Laddawon Vaisurasingha7, and Suntharawadee Theinpichet8

Abstract
Background: Integration of rational drug use (RDU) into a nursing program to increase nurse graduates’ RDU competencies is essential to solving the problem of irrational drug use.

Objective: This study aimed to evaluate the integrated model of the RDU into the Bachelor of Nursing Science (BNS) program developed by the Thailand Nursing and Midwifery Council (TNMC).

Methods: A mixed-methods study was designed using a sequential explanatory design. The whole population of 3,848 nurse educators and 9,249 nurse graduates from 86 nursing education institutions across Thailand in Academic Year 2018 were recruited for quantitative data collection. Fifty nurse educators selected as representatives of the nursing education institutions were recruited for qualitative data collection. Online questionnaires were sent to collect information regarding the context, input, process, and product relating to the model, while structured focus group guidelines were developed to obtain more details in assessing the model. The data were analyzed using descriptive statistics and content analysis.

Results: The findings showed that the context and policy of utilizing the model to increase nurse graduates’ RDU competencies were well accepted. The nurse educators’ RDU competencies, the input of the model, were rated at a high level. The process of the model was implemented as guided at almost all nursing education institutions. The product of the model, the RDU competencies of the nurse graduates, was reported at a high level.

Conclusion: The model of integrating the RDU into the BNS program developed by the TNMC was well performed and resulted in high RDU competencies of the nurse graduates. This integration model should be published and applied in nursing schools worldwide to enhance RDU competencies of nurse graduates.

Keywords
rational drug use; Bachelor of Nursing Science program; RDU competency; nursing; Thailand

Rational drug use (RDU) is a significant issue that impacts the quality of health services. Ideally, drugs should be appropriately and effectively provided to individuals and communities based on verified benefits while minimizing...
risks and costs (Chongtrakul, 2015). Unfortunately, despite this, only about half of patients take their medications correctly (Melku et al., 2021).

The term irrational drug use includes any situation such as under-prescribing, over-prescribing, incorrect prescribing, extravagant prescribing, and multiple prescribing (Ofori-Asenso & Agyeman, 2016). These situations have created a problematic effect on treatments and care.

In Thailand, irrational drug use has been a major problem and is considered the main factor leading to patient harm. For instance, the irrational use of antibiotics is found in many community sectors—people lack knowledge of antibiotics and how to use them. They are also unaware of the consequences of irrational antibiotic use. Consequently, people are at risk of antimicrobial resistance (Pumtong et al., 2020). Importantly, irrational drug use is common in persons with chronic illnesses such as cancer (Seangrung et al., 2020) and diabetes mellitus (Yensabai et al., 2016). In addition, a high prevalence of potentially inappropriate medication use was found among older Thai persons (Jenghua et al., 2019; Vatcharavongvnan & Puttawanchai, 2019).

The irrational use of medicines is a major global health challenge with significant implications for patients, healthcare systems, and communities. The key factors contributing to the inappropriate use of drugs are likely to change over time, and policymakers need to stay up-to-date with current trends (Ofori-Asenso & Agyeman, 2016). In Thailand, promoting RDU competency of health care providers has been assigned as one strategic service plan (Health Systems Research Institute and Coordination and Integration Committee on Antimicrobial Resistance, 2017).

All healthcare personnel should be prepared to gain RDU competencies as they are all responsible for RDU. Nurses and midwives, in particular, should gain RDU competencies since they are frontline health care personnel. They are expected to be competent in prescribing medicines to patients and to monitor drug reactions. To some extent, nurses and midwives must have knowledge relevant to medicines, including pharmacology and potential side effects, and have a serious concern for drug administration and interactions between drugs and other medication, disease, and food (Asiret et al., 2017).

Based on the responsibility in relation to drug administration, registered nurses need to have RDU competencies. Therefore, the Thailand Nursing and Midwifery Council (TNMC) has developed the Model of Integrating the RDU into the Bachelor of Nursing Science (BNS) program to increase RDU competencies of nurses and midwives. The model was composed of 1) the context: the policy relating to utilizing the model to increase nurse graduates’ RDU competencies, 2) the input: the nurse educators’ RDU competencies, 3) the process: the integration of the RDU core contents into the BNS program and learning activity design, 4) the product: the RDU competencies of nurse graduates (Thailand Nursing and Midwifery Council, 2020). This model was implemented in all nursing education institutions across Thailand in the academic year: B.E. 2561 (Thailand Nursing and Midwifery Council, 2018; Turner, 2019).

This study was therefore conducted to evaluate the model developed by the TNMC in the academic year 2018. Stufflebeam’s CIPP (Context, Input, Process, and Product) model was used to guide the study. This model can be effectively used for evaluating the quality of education (Stufflebeam, D. L. in Aziz et al., 2018). The policy launched by the TNMC was assessed as the context. The RDU competencies of the nurse educators were clarified as the key input necessary for achieving the outcomes of the model. The process referred to the model implementation. The product was clarified as the nurse graduates’ RDU competencies. The results of this study can be used to provide information for further development of teaching and learning strategies in order to promote RDU competencies of nurse graduates.

Methods

Study Design

A mixed-methods research design was used with a primarily quantitative data collection approach followed by a qualitative component. The quantitative method was conducted first, followed by the qualitative method, to address the research questions more deeply and to gain a greater understanding of the quantitative findings.

Study Participants

The study population for quantitative data collection included 3,848 nurse educators and 9,249 nurse graduates from 86 nursing education institutions across Thailand in Academic Year 2018. Total population sampling was the sampling method used. The inclusion criteria were nurse educators or nursing graduates who were able to access an online questionnaire and were willing to participate in the study.

For qualitative data collection, 86 nursing education institutions were categorized into four groups under the Ministry of Education, Ministry of Public Health, Ministry of Defense, and Private institutions. Fifty nurse educators were selected from each group to be representatives of nurse educators. Purposive sampling was used to select 50 participants who satisfied the inclusion criteria, consisting of those who had experience utilizing the model and completed an informed consent form. The participants were separated into four groups for focus group discussions. The focus group discussions were continually conducted until data saturation was reached. The duration of the focus group discussions was about 60 minutes per group.

Instruments

The instruments used to collect the data in this study were developed by the researchers as follows:

1) A nurse educator questionnaire

A nurse educator questionnaire was developed to assess the context, input, and process of utilizing the
model. It was composed of four parts, including demographic data, a policy of the nursing school, competencies of nurse educators, and processes of model utilization. The first part asked for participants’ personal information. The second part consisted of eight questions based on the TNMC policy for integrating RDU into the BNS program. Seven multiple-choice questions were used to assess how nursing schools established policies for integrating RDU into their BNS program followed by an open-ended question asking about problems faced by nursing schools while integrating RDU into their BNS programs. The third part was a nurse educator’s competency questionnaire developed based on the Prescribing Competency Framework of the National Institute for Health Care Excellence and the Royal Pharmaceutical Society, United Kingdom (Royal Pharmaceutical Society, 2016) in the Thai language by the researchers. Forty-six questions were used to describe the levels of RDU knowledge, attitudes, and practice in proposed situations among nurse educators categorized into two core competencies, namely consultation and prescribing governance. The consultation competency comprised six sub-competencies (assess the patient, consider the options, reach a shared decision, prescribe, provide information, and monitor and review), while the prescribing governance comprised four sub-competencies (prescribe safely, prescribe professionally, improve prescribing practice, prescribe as part of a team). A five-point Likert scale was used for each question, ranging from 1 (very low) to 5 (very high). The mean score of the competency was categorized into five levels; a very high level (4.51-5.00), a high level (3.51-4.50), a moderate level (2.51-3.50), a low level (1.51-2.50), and a very low level (1.00-1.50). The fourth part consisted of 11 dichotomous questions asking about the process of the model implementation.

The questionnaire was tested for content validity by five experts. The sum score of the expert panel was used to calculate the Index of Item-Objective Congruence (IOC). The IOC values of parts 2, 3, and 4 of the questionnaires were equal to or greater than 0.80. All parts of the questionnaires had good internal consistency with Cronbach’s alpha coefficients of 0.88 and 0.92 for Part 2 and Part 3, while the KR 20 score of 0.92 was obtained for Part 4.

2) A nurse graduate’s RDU competency questionnaire
A nurse graduate’s RDU competency questionnaire was developed in the Thai language by the researchers, based on the Prescribing Competency Framework of the National Institute for Health Care Excellence and the Royal Pharmaceutical Society, United Kingdom (Royal Pharmaceutical Society, 2016) to evaluate the model utilization which was considered as the product of the CIPP model. It was composed of two parts; the first part consisted of four open-ended questions to gather personal data of nurse graduates; the second part consisted of 46 items asking about perceived RDU competencies based on the Prescribing Competency Framework, as mentioned in the part of nurse educators’ RDU competencies. The format and score interpretation of this second part of the questionnaire was the same as those of Part 3 on the nurse educator questionnaire.

The content validity of the questionnaire was examined by five experts involved in RDU policy at the national level, including one physician and four nurses. The IOC of each item was equal to or greater than 0.75. The reliability of the questionnaire was checked using Alpha Cronbach’s Coefficient, and it was 0.96.

3) A structured focus group guideline
A structured focus group guideline consisting of six questions was developed by the researchers to ask the nurse educators their opinions regarding the model utilization. The focus group discussions of the nurse educators were conducted to gain an in-depth understanding of the quantitative findings. The questions for focus group discussion were verified by five experts. Trustworthiness was obtained for conducting qualitative inquiries (Denzin & Lincoln, 2011), as follows: (i) Credibility: The researchers engaged in the focus group, shared the key results with participants, and asked them to check the accuracy of information obtained at the end of the focus group. The investigator triangulation was obtained by an agreement of research team members in data analysis; (ii) Transferability: The findings were described in detail for both behavior and context; and (iii) Confirmability and Dependability: Voice recordings of the focus group discussions provided sufficient repetition for other researchers to gain the information to demonstrate the confirmability of findings. The findings were also triangulated by a discussion between the researchers and experts to confirm the interpretation of data.

Data Collection
The quantitative data regarding the institutions’ policies, the nurse educators’ RDU competencies, the processes of model implementation, and the nurse graduates’ RDU competencies were collected using online questionnaires. The electronic questionnaires for nurse educators and nurse graduates were distributed to all nurse educators and nurse graduates in the academic year 2018 via their nursing schools. Focus group interviews were performed by the researchers and assistants to collect qualitative data.

Data Analysis
Quantitative Strand
The quantitative data were analyzed using the Statistical Package for Social Sciences Version 27 (SPSS 27) software package. Sample demographics were described using frequency (f) and percentage (%). The data regarding policies, RDU competencies of nurse educators and nurse graduates, and the processes of the model implementation were analyzed using mean (M) and standard deviation (SD).
Qualitative Strand
The qualitative data from focus groups were analyzed using content analysis by the Giorgi approach (Giorgi, 1985). The verbatim transcription of each focus group recording was conducted to code each transcript. The analysis started by reading the entire transcript of each participant to gain their experiences or perceptions. The protocol included re-reading to adjust the delineated units. In the second step, a description of the phenomena in each unit was provided. A systematic structure was organized to grasp the coherence of experience through the research syntheses. Finally, the essential generality was expressed as the general structure of experiences (Giorgi, 1985). The themes and findings regarding the model emerged after this analytical process. Moreover, direct quotes were expressed to reflect participants’ perceptions and to represent the clear phenomenon.

Ethical Consideration
This research project received ethics approval from the Institutional Review Board of the TNMC on 22 May 2019. The IRB approval number was TNMC-IRB 04/2019.04.09. The participants were informed of the details of the study, and they were able to withdraw from the study at any time. The participants were required to read and understand the content written in the informed consent document. The informed consent document had to be read or completed before online questionnaires and the focus groups were conducted. The data were kept confidentially in a computer with a secure code. Data will be destroyed two years after the publication date.

Results
The findings of the study are presented in two main parts, including the participants’ characteristics and the CIPP evaluation (context, input, process, and product).

Participants’ Characteristics
The participants consisted of 1,052 nurse educators who responded to the questionnaire. Most of them were female (91.92%), aged between 41 and 50 years (36.50%), graduated with a Master’s degree (71.67%), and had experience working as a nurse educator for more than five years (48.29%). For the 4,269 new graduate participants, the majority was female (93.70%), and their age ranged between 19 and 25 years (96.60%). Among the 50 nurse educators who participated in the focus group discussions at the RDU workshop, all of them were female (100%).

The CIPP Evaluation
Quantitative Results
1) The context evaluation (referred to the TNMC policy relating to the model utilization)
Almost all participants realized that their nursing education institutions (98.76%) established policies relating to the RDU policy issued by the TNMC and formally integrated its concepts into the BNS program. Approximately 75% of respondents indicated that RDU competency was integrated into the curriculum learning outcomes and objectives. More than half of the participants reported that the institutional policy relating to RDU was officially enacted and implemented. Nearly two-thirds (61.50%) of respondents claimed that they attended an RDU training course.

2) The result of the input evaluation (referred to the nurse educators’ RDU competencies)
The total mean score of nurse educators’ RDU competencies was rated at a high level (M = 4.25 SD = 0.82). All two core competencies, namely consultation and prescribing governance were rated at a high level (M = 4.27, SD = 0.81; and M = 4.21, SD = 0.80, respectively). All sub-categories under the two core competencies were also rated at a high level. The highest score was for the sub-category of patient assessment before giving them medicines (M = 4.40, SD = 0.73), followed by correct drug administration according to prescriptions, and ability to effectively give advice (M = 4.34, SD = 0.80). These three sub-categories were under the Consultation main category. The nurse instructors identified the lowest level of competency in collaboratively and appropriately selecting medicines as needed, which is a sub-category of prescribing governance (M = 4.11, SD = 0.83).

3) The result of process evaluation (the process of implementing the model)
It was found that almost all of the nursing education institutions (84%) implemented the policy of integrating RDU concepts and their principles into their nursing programs. About 77 percent of nurse-educators in these nursing education institutions were prepared for the implementation. This included arrangements of essential activities to enable them to understand how to use RDU learning modules (71.3%), integrate RDU competencies into the program learning objectives and learning outcomes (81.2%) and incorporate RDU topics and contents into the nursing courses (86.8%). Most institutions (81.8%) were informed how to design learning activities in response to RDU competencies. Various active learning methods, including group discussions, assignments, case-based learning, and simulations, were exemplified. More than half of the institutions (65.1%) annually evaluated the integration of the RDU contents in each course. Various methods of assessments were used in relevance to the RDU competencies.

4) The result of product evaluation (identified as graduate’s RDU competencies)
An evaluation of the product of the model was identified as the nurse graduates’ RDU competencies. The total mean score of the nurse graduates’ RDU competencies was at a high level (M = 4.31, SD= 0.48). The mean scores of the two core competencies, namely the consultation and prescribing governance, were also at a high level (M = 4.31, SD = 0.48; and M = 4.32, SD = 0.50, respectively). Among
ten sub-categories of the competencies, the highest score was in the prescribing as part of a team (\(M = 4.39, SD = 0.57\)), followed by prescribing professionally (\(M = 4.38, SD = 0.55\)), and the lowest score was reported on the issue of considering the options (\(M = 4.22, SD = 0.53\)).

Qualitative Results
The qualitative data was analyzed to complement quantitative data that facilitated the success of the model utilization. The four themes of qualitative data analysis emerged as follows:

Theme 1: Strong policy and participation-led actions
The policy and information from the TNMC that supported an indicative position of context had been introduced and converted into action at the educational institutions to integrate the RDU contents into the BNS program. As some of the participants who were nurse educators stated that:

P11, the head of academic affairs of a nursing school: “My university followed the RDU policy of the TNMC because my director foresaw the importance of RDU and introduced the policies to the faculty for adding the RDU in the pharmacology course.”

P17, a nurse educator: “I had joined an RDU workshop organized by the TNMC and understood the RDU policy. So that, I tried to convey this policy into my nursing course.”

Theme 2: Preparation of nurse educators as the key persons for the success of the model utilization
The experiences of a nurse educator in each course played a significant role as the input of the model. Nurse educator preparation was therefore essential for the success of the model utilization. The TNMC organized a workshop and provided guidelines for integrating the RDU contents to help nurse educators understand how to integrate RDU contents into their nursing courses. As some of the participants who were nurse educators stated that:

P22: “I have been informed about the significance of RDU competencies and the model. Therefore, I have added RDU contents in basic concepts and principles of the nursing subject and an adult nursing subject. I can integrate the RDU contents into my courses.”

P03: “I attended the workshop held by the TNMC about integrating RDU into a BNS program. It helped me understand how to do it.”

P13: “The guidelines of the model for integrating RDU into the BNS program were very useful. I used these guidelines to prepare appropriate teaching methods for both theory and clinical practice.”

P49: “The rational drug use of the pharmacology course in my college was created according to the guideline of the TNMC.”

Theme 3: Good design leading to successful implementation
The participants revealed that the RDU contents were integrated into relevant courses, including professional nursing and foundation courses. Many processes were conducted in RDU courses based on a student-centered approach pedagogical design, including case study, group discussion, conference, and simulation that high RDU competencies of the graduates. Therefore, appropriate evaluation could enhance the competency of nursing students or valuable products regarding RDU. The proper assessment included formative evaluation, summative evaluation, and comprehensive evaluation of the Thailand Nursing and Midwifery Council Board. As some of the participants who were nurse educators stated that:

P36: “I will teach 2nd year nursing students focusing on RDU before practicing in the clinic. I will need to redesign my course and emphasize drug administration safety.”

P48: “We used many learning methods to get students to participate in learning activities, including conferences, case studies, and small group discussions.”

P18: “The RDU knowledge was integrated into a formative test by evaluating both before and after class.”

Theme 4: National compliance and collaboration resulting in expected product
It can be concluded from the points of view of the participants that the success of integrating RDU contents into the BNS program was from compliance and collaboration of the TNMC and all nursing schools in Thailand. The TNMC launched a clear policy, and all nursing schools participated. The schools carried out the implementation of the model with the participation of nurse educators, both at administrative and teaching levels. This nationwide compliance and collaboration among the professional organization and nursing schools across the country led to the success of the model utilization. Therefore, the nurse graduates’ RDU competencies of all schools that represented the product of the RDU program were high. As some of the participants stated that:

P47, the head of academic affairs of a nursing school: “The TNMC invited the heads of schools, chiefs of academic affairs, and representatives of nurse educators responsible for nursing courses to attend a 2-day workshop to be informed about the model as well as how to implement it.”

P12, a nurse educator: “We were informed about the model and tried to follow as much as we could.”

Discussion
Policies related to the integration of the RDU contents into the BNS program
As seen, almost all nursing education institutions identified their understandings and integrated the TNMC RDU policy into their BNS programs in the academic year 2018. This may be a result of the TNMC’s clearly defined RDU policies and their formal introduction to all nursing education institutions across the country. The TNMC also appointed a working group to develop the RDU integration model guidebook to facilitate implementation at the curriculum level and facilitate the development of learning activities. In addition to this, a workshop for brainstorming and developing a shared understanding among representatives
from all nursing education institutions was also arranged before having them implement the policies in practice. The representatives then provided information regarding the policies and what was gained from the workshop to the administrators and instructors of their institutions. Each institution could either define its own documented policies or make an inside agreement of integrating RDU contents into its nursing program. Learning outcomes of RDU competencies were defined along with learning activities and assessment methods of the theoretical and practical courses. Furthermore, nurse educators were prepared for their RDU competencies and their readiness to teach. These findings confirmed the statement of Kalilasa and Michelle (2019) that a learning policy plays a crucial role in educational institutions and can be a guideline for educators to develop an educational achievement plan.

**RDU competencies of nurse educators**

Identifying overall competencies at a high level simply means that the nurse educators had knowledge, skills, and a positive attitude towards the RDU concepts. It showed that the nurse educators who were directly responsible for conveying RDU related knowledge and for arranging teaching and learning methods had prepared themselves for the RDU competencies in order to be able to integrate RDU concepts into both theoretical and practical courses.

When each aspect was considered, it was found that the nurse educators identified the highest level of competency in **assessing patients prior to giving medicines**. A reasonable explanation for this may be that evaluating a patient’s health is the first step in nursing care (Sulosaari et al., 2012). This process includes assessing histories of medical use, health and illness, allergies to drugs, and side effects from medicines. Therefore, this competency is inevitably crucial for nursing administrators and nurse educators.

The second-highest level of the competencies indicated by these groups was **the correct medication administration according to prescriptions**. This drug administration competency, including giving advice to patients, is also an essential role of nurses (Zare et al., 2013). Nurse educators thus must cultivate and teach their students to practice correctly.

The sub-category of the competencies indicated at the high level but had the lowest score among the ten sub-categories was **collaboratively and appropriately selecting medicines as needed**. This is probably because, in real situations, nurse educators are not commonly involved with the process of prescription of medicines. They thus identified this competency at a lower level.

**The processes of integrating the RDU contents into the BNS program**

The processes of integrating the RDU contents into the BNS program in all nursing institutions were well implemented, starting from the initialization of the policy, assigning responsible persons, defining RDU competencies in the course/program objectives and learning outcomes, refining the course design, organizing instruction, and evaluating the results. These were consistent with the processes of curriculum implementation (Nnabuike et al., 2016). It can be claimed that the TNMC working committee had developed a well-designed RDU integrating model that can be easily implemented. Clear policies of the TNMC toward the development of RDU competencies in the undergraduate nursing program also ensured high compliance of the leaders and nurse educators of the nursing education institutions. A well-developed policy throughout the educational plan can encourage sustainable effort practices and improve strategies among the staff (Brown et al., 2013). Similarly, Samsul et al. (2019) claimed that the educational system policy identified in the curriculum is packaged to develop natural resources or potential areas in learning activities.

A clear guideline for curriculum implementation, starting from assigning responsible persons for integrating the RDU model, played an essential role in this process. Similarly, Lungu (2019) stated that educators are the key to supporting students in classrooms. Incorporating RDU competencies in the learning objectives and learning outcomes was a necessary implementation process, though Lungu (2019) argued that passion in the courses also needed to be mentioned. At the same time, determining the objectives and learning outcomes of content can help instructors be aware of the vision to enhance students with the educational knowledge and improve students’ skills in other areas (Prastwi, 2013). Identifying relevant topics and contents in the nursing courses was essential for successful implementation (Saputra, 2013). Samsul et al. (2019) mentioned that learning contents in a learning process were expected to explain the overall learning course of students’ performance. Various active didactic strategies and evaluation methods were significant aspects of the educational processes (Lungu, 2019). Moreover, Samsul et al. (2019) also agreed that it could be conducted as guided in the manual book.

**RDU competencies of nurse graduates as the product**

By identifying high levels of RDU competencies of the nurse graduates, it can be inferred that integrating the RDU contents into the BNS program enhanced the knowledge and skills related to the consultation and care associated with RDU. These findings are congruent with the study of the first and final years of nursing students’ medication competence by Sulosaari et al. (2012). They reported that the seniors had a higher level of knowledge and skill in pharmacology, drug administration, and care related to the provision of medicines. The lowest score of RDU competency in **considering the options** seems to show that **considering the options** was perceived as physicians’ role. In contrast, nurses perceived their roles as giving advice and consultation regarding drug use following physicians’ prescriptions (Intahphuak, 2014).

It can be claimed that integrating the RDU contents using the model developed by the TNMC was a reasonable measure to develop the RDU competencies of the nurse
graduates. This could be an example of scaling up RDU nurses’ competency for other countries interested and have a similar context. Furthermore, case analysis as a didactic method might enable the students to be more confident in administering drugs. It was also noted that drug-using skills were associated with medical competency.

Implications of the study
The findings suggest that the TNMC should continually enhance, monitor, and evaluate the operations for sustainable development of RDU competencies in both nurse educators and students, including 1) supporting the development of innovative didactic strategies and materials for RDU instructions; 2) continuously developing and evaluating the RDU competencies of nurse educators and nursing students; 3) organizing a platform for exchanging knowledge and experience among educational institutions. All nursing education institutions should continually play an important role in collaboration for RDU competency development for both nurse educators and nursing students, particularly in lower-scoring areas. RDU competencies and contents should be clearly incorporated within the BNS program. Nurse educators should be formally trained for effective instruction of RDU. Further research should be conducted to ensure the effectiveness and progress of integrating RDU into the BNS program. The success of the RDU competency-enhancing model developed by the TNMC could be an example for other nursing professional organizations globally. Future research should be conducted to explore the perception of nursing students to gain an understanding of the point of view of the students to develop appropriate activities for integrating the RDU contents.

Limitations
As this mixed-methods research study was conducted on a large scale with all nursing education institutions in Thailand, the response rate for quantitative data collection from each institution varied. In addition, this study did not include nursing students, and the qualitative strand did not include nurse graduates because of limited time. Therefore, the qualitative data might not be able to support all aspects of the quantitative findings. Several variables and groups of samples also made the study complicated to be carried out and to be presented.

Conclusion
In conclusion, the development of RDU competencies is an essential issue for all health professionals as irrational drug use has become a serious health problem worldwide. The TNMC played an important role in this by developing an integration of the RDU contents into the BNS program. This study used the CIPP model as a framework to evaluate the results of its implementation. Quantitative data were collected from nurse educators and nurse graduates of Academic Year 2018 from 86 nursing education institutions in Thailand. Supplementary qualitative data were collected from 50 nurse educators. The findings showed that the policy of integrating the RDU contents into the BNS introduced by the TNMC was well accepted and translated into action at most nursing education institutions. The nurse educators reported a high level of RDU competencies and carried out the model for implementation as guided. This resulted in a high level of RDU competencies of the nurse graduates.
Data Availability Statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

References


Malaysian nurses’ knowledge and attitudes regarding BRCA genetic testing

Kien Ting Liu¹,²*, Wan Rosilawati Wan Rosli³, Azlina Yusuf⁴, and Soon Lean Keng⁵

Abstract

Background: Breast cancer genetic (BRCA) testing for cancer susceptibility is an emerging technology in medicine. Objective: This study assessed the knowledge and attitude of nurses regarding BRCA genetic testing in a tertiary teaching hospital in Malaysia.

Methods: A descriptive cross-sectional study was conducted among 150 nurses using a simple random sampling technique in a tertiary teaching hospital in northeast peninsular Malaysia. Data were collected using a self-administered questionnaire consisting of socio-demographic data, assessing nurses’ knowledge and attitude regarding BRCA genetic testing. Fisher exact test analysis was used to determine the association between socio-demographic characteristics with knowledge and attitude level. In addition, the overall knowledge and attitude were analysed using the sum score of each outcome based on Bloom’s cut-off point.

Results: Of the 150 nurses, 66.7% had high knowledge level about BRCA genetic testing, and 58% were positive towards genetic testing. The participants’ mean age was 28.9 years (SD = 6.70). Years of working experience (p = 0.014) significantly influenced knowledge level on BRCA genetic testing, whereas specialty working experience (p <0.001) significantly influenced BRCA genetic testing attitudes.

Conclusions: The results show that most nurses have adequate knowledge of BRCA genetic testing. However, their attitude could be termed negative. Therefore, targeted education programs on BRCA genetic testing and risk are needed to improve the knowledge and attitude of nurses and, ultimately, can educate the women and increase health-seeking behaviour among eligible women.

Keywords: genetic testing; breast cancer; knowledge; attitudes; nurses; Malaysia

Breast cancer (BC) is widely recognised as a significant public health concern and the leading cause of cancer-related death globally. In 2020, 2.3 million women were diagnosed with BC, with 685,000 fatalities worldwide (World Health Organization, 2020a). Furthermore, there is an increasing trend of BC incidents (8.3%) and mortality (9.3%) between 2018 and 2020 among females worldwide (Ferlay et al., 2015; World Health Organization, 2020b). BC is also the most commonly diagnosed cancer in Malaysia, accounting for 7593 new cases reported among females in 2018 and 8418 in 2020 (World Health Organization, 2020a). Genetic testing expands across medical specialities and is increasingly ordered and managed by non-geneticists (Blazer et al., 2011). For example, the BRCA genetic testing is a blood test that uses DNA analysis to identify harmful changes (mutations) in either breast cancer susceptibility genes – Breast Cancer gene 1 (BRCA1) and Breast Cancer gene 2 (BRCA2). Linking breast and ovarian cancer were mutations in the BRCA1 and BRCA2 genes (Nelson et al., 2014).

Knowledge of an individual’s gene mutation status may allow for proactive medical management, including enhanced attitudes regarding screening and prophylactic surgical or medical interventions for cancer risk reduction.
and treatment (Bellcross et al., 2011; Blazer et al., 2011; Dhar et al., 2011). Understanding cancer risk can help healthy individuals make health care decisions, such as attending a regular screening or opting for surgery, to help reduce cancer risk. In addition, genetic testing for risk can help women make important decisions about prevention or early detection (Bellcross et al., 2011; Blazer et al., 2011; Dhar et al., 2011).

Nurses play a critical part in the multidisciplinary healthcare team that treats and manages patients with breast cancer. These nurses can help communities improve women's health by providing education and increased awareness of BRCA genetic testing and breast and ovarian cancer screening. As primary care providers, nurses are instrumental in identifying and referring women for BRCA genetic testing. Within the nursing profession, BC is a significant problem for health promotion and cancer prevention. Primary care providers, such as nurses, are vital parts of the healthcare team. Thus, they are responsible for identifying and referring women for testing (Smania, 2016). Several surveys assessed knowledge and attitudes towards BRCA genetic testing; however, these are on medical students and physicians (Keating et al., 2008; Pal et al., 2013; Cohn et al., 2015).

A literature search conducted using different combinations of keywords show no existing literature on the topic or the same research idea closely related topics on nurses’ knowledge and attitude regarding BRCA genetic testing for breast and ovarian cancer risk. In addition, it is unclear what knowledge nurses have during nursing training about BRCA gene testing for breast and ovarian cancer risk. Therefore, to decrease this gap, this survey aimed to assess the knowledge and attitude of Malaysian nurses regarding BRCA gene testing for breast and ovarian cancer risk.

Methods

Study Design
The study utilised a descriptive cross-sectional study at Hospital USM located in northeast peninsular Malaysia because it is a reference public and tertiary teaching hospital. Kelantan is one of Peninsular Malaysia’s rural states, with women accounting for half of the population (1.7 million) and Malays make about 95% of the population (Muhamad et al., 2012).

Participants
The study involved nurses from this tertiary teaching hospital’s medical and surgical wards and oncology, paediatric, obstetrics, and gynaecology departments. Nurses were excluded if they declined to participate in the study or could not be reached for various reasons, such as annual leave, vacation, maternity leave, or sick leave. The sample size was determined based on a study of Escher and Sappino (2000) using the G*Power 3.1.9.2 software (Faul et al., 2007) by considering 95% of confidence interval (CI), 5% margin of error, \( \alpha = 0.05 \), a study power of 80 and non-response rate 10%, the final sample size of the study becomes 160. After proportional allocation within the five working units, a simple random sampling technique was used to reach the study participants.

Measures
Data collection utilised a self-administered questionnaire. The questionnaires consisted of three parts. Part I consists of socio-demographic data such as age, gender, ethnicity, nursing education level, years of experience and speciality working area.

Part II consists of ten items ‘True-False’ scale based on the National Health Interview Survey (NHIS) (National Center for Health Statistics, 2010) to assess the participant’s knowledge on BRCA1 and BRCA2 genetic testing. For the knowledge section, every correct answer was assigned one point and incorrect response zero points. The expected knowledge score was between 0 to 10 points. The internal consistency coefficient (Cronbach’s \( \alpha \)) for knowledge for BRCA genetic testing was 0.78, considered a good reliability value. The scores for knowledge and attitude were transformed into percentage scores. Each outcome’s sum score was then assessed based on Bloom’s cut off point (Bloom, 1956). Those participants who obtained knowledge scores seven and above were considered high level, while scores between 4 to 6 were considered moderate level. The score three and below was considered as low level.

Part III comprises ten items on attitudes towards breast-ovarian cancer genetic testing. The researchers prepared the questionnaires based on literature and checked by a panel of experts (an oncologist, a breast and endocrine consultant, and a medical statistician). In this part, each item was scored on a 5-point Likert scale, ranging from ‘strongly agree’ to ‘strongly disagree’ and categorised into strongly positive to strongly negative. In medical education and research, Likert scales are commonly employed (Sullivan & Artino Jr, 2013). The results for attitude were divided into four categories: strongly positive (41-50), positive (31-40), negative (21-30), and strongly negative (10-20).

Data Collection
Data collection commenced from early January until the end of February 2016. A structured self-administered questionnaire in English was used to collect data. In determining questionnaires appropriateness and ethical soundness, pretesting the questionnaire was done with 5% of the sample size among nurses who did not form part of the study participants. The researchers distributed the questionnaire to participants individually after shift duty and checked all filled questionnaires for completeness. Permission to utilise the NHIS questionnaires are in the public domain, and no consent is required to use them.

Data Analysis
The data was entered into the Windows version 23 of the Statistical Package for Social Sciences (SPSS). In terms of
pertinent factors, descriptive statistics (means, standard deviations, frequencies, and percentages) defined the study population. The Kolmogorov Smirnov test was used to determine whether the data was suitable for normal distribution. The Fisher exact test was used to assess the association between socio-demographic variables (age group, gender, ethnicity, highest nursing degree, years of experience, specialised working area, and years of working experience) and knowledge and attitude level. In all variables, a p-value ≤ of 0.05 was considered as significantly associated with the outcome variable.

**Ethical Considerations**

The Human Research Ethics Committee USM (Reference No: USM/JEPeM/15100409) approved the study. The participants’ written informed consent was obtained following the Declaration of Helsinki and the institutional requirements. In maintaining anonymity and confidentiality, coded numbers were used during data collection.

**Results**

The study included 150 nurses, with a response rate of 93.8%. Nurses' mean age was 28.9 years (SD = 6.70). The majority of the participants were female (96%) and Malay (89.3%). The mean work experience was 7.05 (SD = 6.16) years, and more than three-quarters of the participants (88.0%) were diploma holders. Less than half of the participants (37.3%) worked in the oncology unit, while 28.7% worked in the medical unit. The remainder participants worked in surgical (17.3%), obstetrics and gynaecology (14.0%) and paediatric (2.7%) units (Table 1).

![Table 1 Participants’ socio-demographic characteristics (N = 150)](image)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean (SD)</th>
<th>n</th>
<th>p value*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge level, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>100 (66.7)</td>
<td>38 (25.3)</td>
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<tr>
<td>Moderate</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Low</td>
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<tr>
<td><strong>Age group, years</strong></td>
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<tr>
<td>20-30</td>
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<td>31-40</td>
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<td>3 (9.4)</td>
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<tr>
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</tr>
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*Fisher-exact test, *p* ≤0.05 was considered to be statistically significant

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Table 2 showed that the association of socio-demographic characteristics and knowledge level of nurses of BRCA genetic testing. The majority of the participants (66.7%) had high knowledge about BRCA gene testing, while 25.3 had a moderate level of knowledge. Only 8% of the participants had a low level of knowledge score. Years of experience and nurses’ knowledge of BRCA genetic testing were statistically significant ($p = 0.014$) when examined using the Fisher exact test. When compared to junior nurses, senior nurses with 21-30 years of experience had higher knowledge. No significant association was found between the following variables: age group ($p = 0.235$), gender ($p = 0.110$), ethnicity ($p > 0.950$), nursing education level ($p = 0.249$), and specialty of work area ($p = 0.123$).

The result in Table 3 indicated the association between socio-demographic characteristics and attitude level of nurses on BRCA gene testing. The result showed more than three-quarters of the participants have a positive attitude (30.0% strongly positive; 58.0% positive) on BRCA gene testing. Nonetheless, some participants are pessimistic concerning BRCA gene testing (5.3% strongly negative; 6.7% negative). Regarding the association between socio-demographic characteristics and the attitude of nurses towards BRCA gene testing, the specialty of the working area ($p < 0.001$) significantly influenced BRCA gene testing attitudes. Compared to nurses from other units, those in the oncology unit had the strongest positive attitudes concerning BRCA gene testing. Furthermore, there was no significant association between age group ($p = 0.436$), gender ($p = 0.066$), ethnicity ($p = 0.519$), nursing education level ($p = 0.477$), and years of working experience ($p = 0.887$).

### Table 3 Association between socio-demographic characteristics and attitude level

<table>
<thead>
<tr>
<th>Variables</th>
<th>Attribute level, n (%)</th>
<th>$p$ value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly positive</td>
<td>Positive</td>
</tr>
<tr>
<td><strong>Attitude level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age group, years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-30</td>
<td>45 (30.0)</td>
<td>87 (58.0)</td>
</tr>
<tr>
<td>21-30</td>
<td>33 (30.8)</td>
<td>61 (57.0)</td>
</tr>
<tr>
<td>31-40</td>
<td>7 (21.9)</td>
<td>21 (65.6)</td>
</tr>
<tr>
<td>41-50</td>
<td>5 (50.0)</td>
<td>4 (40.0)</td>
</tr>
<tr>
<td>51-60</td>
<td>0 (0.0)</td>
<td>1 (100.0)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
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<tr>
<td>Male</td>
<td>2 (33.3)</td>
<td>2 (33.3)</td>
</tr>
<tr>
<td>Female</td>
<td>43 (29.9)</td>
<td>85 (59.0)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
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<td></td>
</tr>
<tr>
<td>Malay</td>
<td>38 (28.4)</td>
<td>78 (58.2)</td>
</tr>
<tr>
<td>Non-Malay</td>
<td>7 (43.8)</td>
<td>9 (56.3)</td>
</tr>
<tr>
<td><strong>Nursing education level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>37 (28.0)</td>
<td>78 (59.1)</td>
</tr>
<tr>
<td>Diploma &amp; post basic</td>
<td>3 (33.3)</td>
<td>6 (66.7)</td>
</tr>
<tr>
<td>Diploma, post basic and degree</td>
<td>5 (55.6)</td>
<td>3 (33.3)</td>
</tr>
<tr>
<td><strong>Speciality of work area</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical</td>
<td>19 (44.2)</td>
<td>15 (34.9)</td>
</tr>
<tr>
<td>Surgical</td>
<td>3 (11.5)</td>
<td>22 (84.6)</td>
</tr>
<tr>
<td>Oncology</td>
<td>22 (39.3)</td>
<td>30 (53.6)</td>
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<tr>
<td>Obstetrics and gynaecology</td>
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<td>17 (81.0)</td>
</tr>
<tr>
<td>Paediatric</td>
<td>1 (25.0)</td>
<td>3 (75.0)</td>
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<tr>
<td><strong>Year of working experience</strong></td>
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</tr>
<tr>
<td>1-10</td>
<td>36 (31.3)</td>
<td>64 (55.7)</td>
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<td>11-20</td>
<td>8 (25.0)</td>
<td>21 (65.6)</td>
</tr>
<tr>
<td>21-30</td>
<td>1 (50.0)</td>
<td>1 (50.0)</td>
</tr>
<tr>
<td>31-40</td>
<td>0 (0.0)</td>
<td>1 (100.0)</td>
</tr>
</tbody>
</table>

*Fisher-exact test, *p* ≤ 0.05 was considered to be statistically significant

### Discussion

A literature search was carried out. We found no local or worldwide data on nurses’ knowledge and attitudes towards BRCA gene testing for breast and ovarian cancer risk. As a result, the information gathered in this survey and the discussion is still relevant in the current circumstances, particularly given the rising frequency of BC. This study showed Malaysian nurses’ knowledge and attitude regarding BRCA gene testing for breast and ovarian cancer risk. Examining nurses’ knowledge and attitudes on BRCA genetics is crucial to guide future training initiatives to encourage nurses to provide gene cancer care.

In this study, more than half of the nurses had a good understanding of BRCA genetic testing. However, because there is no existing literature, the study’s findings cannot be compared to those of other studies conducted locally, regionally, or internationally. In addition, there have been
no studies focusing on nurses, despite many studies having focused on physicians. The importance of genetic testing for breast-ovarian cancer (BRCA) and screening for the presence of the dangerous mutation in BRCA 1 or BRCA 2 increases potential benefits for prevention, early detection, and treatment, as well as barriers to better results (Wideroff et al., 2005; Huang et al., 2014). The findings could be explained by nurses who have been exposed to genetic testing have a higher level of knowledge that generally agrees (Wideroff et al., 2005). Nurses with a basic understanding of genetics can make a substantial impact (Canadian Nurses Association, 2005), and abilities in gathering and assessing risk in family history might potentially save lives (Calzone et al., 2012; Calzone et al., 2013). The ramifications of the remaining nurses’ lack of understanding of BRCA genetic testing could negatively impact sickness prevention, health promotion, health education, and patient care. Nurses who are well-versed in genetic testing are more likely to be aware of it. Knowledge of gene testing is essential, and nurses familiar with BRCA1/BRCA2 can give and contribute to good health promotion, care, and counselling for women undergoing genetic testing.

The current research discovered that the number of years could substantially impact their knowledge level. Junior nurses have less awareness about BRCA gene testing than senior nurses with more than ten years of experience. As the largest professional group within the healthcare system, nurses are expected to be well-versed in genetic and genomics since they have been taught about the topic (Hu et al., 2018). According to the findings, nurses knowledgeable about BRCA genetic testing were better equipped to provide genetic education to patients in nursing practice. Furthermore, Twomey (2011) discovered that well-informed nurses could deliver accurate information and advocate for patients facing genetic cancer risk assessment decisions. As a result, nurses can help patients receive genetic services.

BRCA genetic testing was positive in more than half of the subjects. Thus, a positive attitude on the part of the nurse as an advocate could positively impact genetic testing and urge individuals to do the test indirectly. This finding aligns with Chin and Tham (2020) findings on the necessity of genetic testing. Genetic testing is strongly recommended since the speciality working area increases the nurses’ chances of acquiring up-to-date knowledge on the impact of a person developing breast cancer and understanding that everyone has both the BRCA1 and BRCA2 genes. Consequently, nurses with high knowledge of BRCA gene testing have a more positive attitude about genetic testing. Consistent with a study by Peters et al. (2005) that subjects with high knowledge were more likely to obtain a BRCA1/2 test or were more likely to express intentions about getting a test.

Furthermore, this study discovered a link between a nurse’s speciality and their perspectives. Because of the nurses’ specialised work environment, BRCA genetic testing was likely recommended. Nurses with a specialty background are more likely to have a favourable impact on their patients’ perceptions. Nurses with a good attitude and the required information may help women deal with an internal problem, such as emotional agony caused by a sickness or a test result, and maybe better equipped to assist with patient care and healthcare optimisation. The study’s findings matched those of Seven et al. (2017) study, which discovered that oncology nurses have an excellent understanding of cancer genetics. Oncology nurses who are enthusiastic about genomics have a better understanding of genetics and give their patients better health recommendations. As a result, oncology nurses can help cancer patients with early detection, therapy, genetic care, and counselling (Lopez, 2018).

Given the numerous potential limitations, the findings of this study should be taken into account. There is no current literature on the topic or subject area. Therefore, comparisons are impossible. One of the study’s drawbacks is that the cross-sectional nature of the study design does not demonstrate the cause and effect of the association. Furthermore, the study was conducted at a single hospital in Malaysia’s northeast peninsula, and the findings may be limited to that context. Therefore, the results and conclusions of this study cannot be applied to other domains, especially in different circumstances.

**Conclusion**

Two essential variables influencing successful health care delivery are nurses’ knowledge and attitude in recommending BRCA genetic testing for hereditary cancer. According to the findings, more than half of the nurses had a solid awareness of BRCA genetic testing. Despite this, several nurses have reservations about BRCA genetic testing. Nurses’ attitudes toward BRCA genetic testing, on the other hand, were found to be substantially associated with speciality working areas. Therefore, to maximise nurses’ effect on genetics and genomics, tailored education programmes on BRCA genetic testing and risk are required to improve nurses’ knowledge and attitudes, which will, in turn, educate women and promote health-seeking behaviour.

**Declaration of Conflicting Interest**

The authors have no conflict of interest to disclose.

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**Acknowledgement**

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**Authors’ Contributions**

All the authors contributed equally to the conception and design of the study; approved the final version of the article. KTL conducted...
the study and data analysis. KTL and SLK contributed to drafting the article. SLK and WRWR supervised all research activities. SLK and AY involved the critical revision of the article.

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**Data Availability Statement**

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

**References**


Selected factors related to physical activity among persons with heart failure in a university-affiliated hospital, Bangkok, Thailand

Sittigorn Saiwutthikul1, Apinya Siripitayakunkit2*, and Sumolchat Duangbubpha2

Abstract

Background: Heart failure is a complex clinical syndrome that disturbs physical and psychological health and the quality of life of persons with heart failure and their families. Physical activity is one of the essential self-care in persons with heart failure, which can decrease the exacerbation of the heart failure symptoms, increase activity tolerance, ability to accomplish daily activities, and improve quality of life.

Objectives: This research aimed to determine the physical activity level among persons with heart failure and explore the relationship between physical activity and its related factors based on the self- and family management framework, including motivation, functional ability, family support, and perceived quality of patient-provider relationships.

Methods: A correlational cross-sectional study was conducted with a total of 70 participants who visited the Multidisciplinary Heart Failure Clinic of a university-affiliated hospital, Bangkok, Thailand, from December 2020 to May 2021. Participants were asked to complete five questionnaires that explored their physical activity and its related factors. Data were analyzed and reported using descriptive statistics and correlation coefficient, and the p-value of .05 was considered to be statistically significant.

Results: The results showed most participants (78.50%) had a high physical activity level, and the other participants (21.50%) had a moderate physical activity level. Regarding the relationship between physical activity and its related factors, a total physical activity had a significant positive correlation with a functional ability (r = .309, p < .05), and family support (r = .210, p < .05). While the physical activity had a positively non-significant correlation with motivation (r = .050, p > .05), and a negatively non-significant correlation with perceived quality of patient-provider relationships (r = -.049, p > .05).

Conclusion: The research can be used to gain more understanding of physical activity among persons with heart failure. Nurses play an accountable role in promoting and providing appropriate interventions to constantly maintain and enhance physical activity as secondary prevention in persons with heart failure. Additionally, measuring physical activity using an objective measurement with the self-report should be considered for the favorable outcome.

Keywords

physical activity; self- and family management; heart failure; nursing; Thailand

Heart failure (HF) is a complex clinical syndrome with a potential increase in prevalence and incidence annually. It disturbs physical and psychological health together with the quality of life (QOL) in both persons with HF and their families. The standard guidelines purpose to control HF symptoms, delay the progression of the disease, and improve self-care and the QOL using both guideline-directed medication therapy (GDMT) and various lifestyle

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modification, especially to constantly do a physical activity (PA) (Ponikowski et al., 2016). PA is one of the essential self-care and is a class IA recommendation as it can decrease the exacerbation of HF symptoms, enhance the ability to accomplish daily activities, and promote QOL (Zores et al., 2019). Regarding the mechanisms of PA in persons with HF, PA can improve ventricular diastolic function by post-translational modification of protein titin, a critical protein cause of HF. Moreover, PA can increase the restoration of a healthy neurohormonal balance, increase respiratory muscle strength, enhance distensibility of pulmonary circulation (Nayor & Vasan, 2015). In Thailand, PA has been studied and well documented in healthy adolescents, adults, and older populations (Liangruenrom et al., 2019). However, lack of evidence to study PA in persons with cardiovascular disease, particularly in persons with HF.

PA is defined as the movement of the body by skeletal muscles as a result of energy expenditure, including household activities, occupational-related PA, recreational activities, sports, and交通运输 (Caspersen et al., 1985). There are several methods to measure PA, both direct and indirect methods. The direct methods including by accelerometers, pedometers, and fitness trackers, while the indirect methods include using a questionnaire and direct observation (Dowd et al., 2018). Furthermore, PA has been associated with many factors, even in healthy populations and persons with HF. The systematic reviews conducted abroad and in Thailand concluded that the variables, including personal factors, psychological factors, and environmental factors, were associated with PA. However, in Thailand, there is a lack of evidence to measure PA and its related factors in persons with HF, particularly the health status and health care system factors (Liangruenrom et al., 2019).

Nurses play an important role in promoting and increasing the level of PA in healthy populations across the lifespan and persons with complex chronic conditions. Nurses frequently contact, assess, recommend, and help motivate them to keep physically active (Vishnubala et al., 2020). Even though there is moderate evidence in promoting PA in persons with HF delivered by physiotherapists. However, lack of study focusing on promoting PA in persons with HF delivered by nurses (Amirova et al., 2021). Consequently, to study the relationship between PA and its related factors in persons with HF is necessary for nurses and health care providers (HCPs) to gain more understanding of PA and many factors, resulting in planning and providing appropriate interventions and recommendations in persons with HF.

Interestingly, the factors related to PA are based on the self-and family management framework, which is usually defined as the ability of individuals to incorporate with families, communities, and health care professionals. The framework is a dynamic, interactive, and daily process that individuals and families manage their chronic conditions (Grey et al., 2015). Factors based on the framework include motivation, functional ability, family support, and perceived quality of patient-provider relationships. The motivation was selected in this study to represent the personal factor since it is an essential factor associated with PA in persons with HF, especially in the initiation and maintenance of PA (Ha et al., 2018). Functional ability was selected to reflect the health status of persons with HF. Functional ability is described as the ability of a person to accomplish daily self-care activities. The persons with a higher ability to do activities in daily living potentially stay physically active in the long term (Tharp et al., 2019). In persons with HF, family resource factors, particularly better family support, have been linked to better self-care adherence and maintenance of PA (Dunbar et al., 2008; Shahriari et al., 2016). Additionally, a good relationship between patients and HCPs is highly related to maintaining PA in persons with HF (Currie et al., 2015; Tongtiam et al., 2016).

Consequently, the study aimed to determine the PA level among persons with HF and explore the relationship between PA and its related factors based on self-and family management framework in various dimensions, including motivation, functional ability, family support, and perceived quality of patient-provider relationships. The findings may help the persons with HF and HCPs understand the PA level and promote suitable recommendations for persons with HF.

Methods

Study Design

This research was a correlational cross-sectional study aimed to determine the PA level among persons with HF and explore the relationship between PA and its related factors based on self-and family management framework, including motivation, functional ability, family support, and perceived quality of patient-provider relationships.

Sample and Setting

The Multidisciplinary Heart Failure Clinic, an outpatient department of Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand, was selected as the research setting. The clinic has been managing persons with HF using the multidisciplinary approach. These persons with HF received the diary and HF booklet and information needed for self-care, including adherence to medication recommendations, PA and appropriate exercise, consumption of a low-salt diet, restriction of fluid intake, cessation of tobacco and alcohol use, daily monitoring of body weight, and signs and symptoms of worsening HF from nurses and other HCPs. These participants were selected and included in the study using purposive sampling from December 2020 to May 2021. Inclusion criteria were 1) 18 years of age and older of persons with HF; 2) functionally classified as NYHA class I to III; 3) literate and able to speak and understand the Thai language; 4) willing to participate in this study, and 5) living with a family member. Exclusion criteria were 1) participants who have an activity limitation and
immobilization; and 2) participants who have an acute and critical illness during participation in this study. To compute the required sample size by the G-power, given α as .05, 80% of the power. The effect size from related studies ranged from .30 to .80 (Duncan et al., 2010; Tongtiam et al., 2016; Okunrintemi et al., 2017). A one-tailed hypothesis was considered because the relationship between PA and its related factors showed the same direction in literature reviews from abroad and in Thailand. Moreover, the number of study samples who received multidisciplinary care in Thailand was limited, and multicenter settings might affect the relationship between PA and the perceived quality of patient-provider relationships. Consequently, the researchers considerably set a one-tailed hypothesis for this study. Thus, the sample size may range from nine to at least 67 participants. Finally, the sample size of the study was 70 participants, which was considered adequate.

Instruments
The research instruments in this study were divided into two categories. The first category was the screening instruments which was the Thai version of Mini-Cog for screening the cognitive impairment in persons aged 60 years old and older. It is a short, concise, and valid cognitive screening test, and it was shown good interrater reliability (K = .80, p < .001, 95% CI. .50–1.00) (Trongsakul et al., 2015). For this study, 34 potential participants had been assessed by the Mini-Cog. However, only 29 participants had passed the test, and five participants were excluded.

The second category was the data collection instruments, including:
1. The patient data record form comprises the demographic and health information developed by researchers was used to collect demographic and health information of persons with HF.
2. The Self-report Physical Activity Questionnaire (SPAQ-Thai version) to assess the level of PA. The SPAQ showed a good predictive validity with the six-minute walk test (r = .75, p < .05), a good concurrent validity with Actigraph (r = .31, p < .01), test-retest reliability was .93, and the content validity index was .89. The total hours of PA were calculated into MET-Hr/week to divide PA into three levels of intensity; low PA (<10 MET-Hr/week); moderate PA (10-49 MET-Hr/week); and high PA (≥50 MET-Hr/week) (Visuthipanich et al., 2009).
3. The Exercise Motivation Index (EMI-Thai version) was an adapted questionnaire from 23 items to 15 related items for assessing exercise motivation in persons with HF by Klompstra (2016). The Cronbach’s alpha was .89-92, with possible scores of the instrument ranging from 0 to 60, and with higher scores meaning higher motivation in PA (Klopmstra, 2016).
4. The Modified Barthel Activities of Daily Index (MBAI-Thai version) was developed for assessing functional ability in older people with the Kappa coefficients of inter-rater reliability, and repeatability tests were .79 and .68, respectively (Jitapunkul et al., 1994).
5. The Social Support and Exercise Survey (SSE-Thai version) was developed to assess perceived family support to exercise behaviors. The test-retest reliability estimates for the family was .77, and Cronbach’s alpha was .91, possible scores of the instrument ranging from 12 to 60, with higher scores meaning higher perception of family support in PA (Kaewthummanukul et al., 2006).
6. The Modified Patient Reactions Assessment (MPRA-Thai version) was an instrument to assess the perception of the quality of patient-provider relationships. The coefficient alpha of the Thai version was .79, with possible total scores ranging from 15 to 105, and a higher overall score reflecting the greater relationship between persons and HCPs (Siripitayakunkit et al., 2008).

All instruments were permitted by the original authors and assessed to ensure face validity, content validity, and reliability by two nursing instructors and an advanced nurse practitioner with a Content Validity Index equal to 1. Only the EMI was translated from English into Thai version by two bilingual experts in Thai and English compared with the original version in conceptual, content, and construct equivalences across the two languages and cultures. The EMI has been tested its reliability in persons with HF who received multidisciplinary management and were already discharged from the HF clinic. The results showed that the Cronbach’s alpha of EMI was .883. In this study, the Cronbach’s alpha of the EMI, the SSE, and the MPRA were .918, .921, and .827, respectively. Thus, reflecting it is acceptable in the reliability of these research instruments.

Data Collection
The data collection can be seen in Figure 1.

Figure 1 The flow chart for data collection

- The persons with HF who visited the HF clinic, Ramathibodi hospital, indicated their willingness to participate in the study by completing the consent form.
- In-person contact, participants were asked to complete the patient data record form and the questionnaires. The Thai version of Mini-Cog was used in participants aged 60 years old and older.
- In case of telemedicine, if the participants were willing to participate in the study, they would receive the participant information sheet with the questionnaires via LINE application or direct mail.
- *After collecting demographic data and health information, and screening a cognition with the Mini-Cog, the participants were asked to complete the questionnaires (e.g., SPAQ, EMI, MBAI, SSE, and MPRA).
- *In case of telemedicine, participants were asked to complete data by interviewing.
- The persons with HF received the results of the measurements and evaluations regarding the level of PA and its related factors by telephone or LINE application in a few days.
Data Analysis
The demographic data, health information, and the scores of the study variables were analyzed by use of descriptive statistics, including frequency, percentage, mean, range, and standard deviation. The PA data were analyzed using descriptive statistics and were calculated to identify MET-Hr/week. In the end, three levels of PA were classified: low, moderate, and high PA. The factors related to PA in persons with HF were analyzed using correlation coefficient statistics, and the magnitude of the correlation coefficient was stratified and applied from the related study (Schober et al., 2018).

The Pearson’s correlation coefficient was used, and it requires the following assumptions; firstly, the study variables were continuous variables. Secondly, all variables have a linear relationship with each other. Lastly, all variables have a bivariate normal distribution. The researchers have to use Spearman’s rank correlation coefficient if the data does not meet the above assumptions (Schober et al., 2018).

Ethical Consideration
The research was submitted to and approved by the Institutional Review Board, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand, with the approval number COA. MURA2020/1705. The potential participants were identified for the study and voluntarily consented to participate in this study. All of the data were kept confidential and anonymous using identification numbers. The confidentiality and freedom to withdraw from the study at any time were assured, and the participants were assured that their decisions would not affect the treatment and care.

Results

Participants’ Socio-Demographic Characteristics
A total of 82 potential participants were recruited from the Heart Failure Clinic, five participants might have a cognitive impairment, and seven participants could not be reached out. Therefore, 70 participants participated in the study. Regarding the socio-demographic data, most participants were male (70.00%), the mean age of participants was 54.21 (SD = 15.89) years. More than half of the participants (68.60%) were married, and all participants lived with their family members. When considering PA and exercise, most participants (84.30%) had space to do activities and exercises, and 40.00% had their exercise buddy (Table 1).

Clinical Characteristics of the Participants
A total of 70 participants were diagnosed with HF range from 1 to 65 months (Mean = 18.01, SD = 14.92). The majority of the participants were recently classified as NYHA class II, and they had comorbidities with hypertension, dyslipidemia, and diabetes mellitus. Ischemic heart disease and cardiac arrhythmia were facilitating factors inducing the progression of HF. More than half of the participants (55.70%) had heart failure with reduced ejection fraction (LVEF <40%). In addition, 81.40% had no cardiac device, 42.90% met the GDMT, and 61.40% had no hospitalization history (Table 2).

Physical Activity of the Participants
The PA level of the participants (N = 70) was calculated into total metabolism hour per week (MET-Hr/week), 78.50% had a high PA level, and 21.50% had a moderate PA level. In addition, all participants met the PA recommendation. Regarding the average subscale of PA, most participants had high activity in recreational PA, followed by household PA and exercise (Table 3).

Table 1 Socio-demographic characteristics of the study participants (N = 70)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
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<td></td>
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<tr>
<td>Male</td>
<td>49</td>
<td>70.00</td>
</tr>
<tr>
<td>Female</td>
<td>21</td>
<td>30.00</td>
</tr>
<tr>
<td>Age (years)</td>
<td>Mean = 54.21 SD = 15.89 Range 19-83 years</td>
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</tr>
<tr>
<td>Marital status</td>
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<td>Divorced/Separated</td>
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<td>Widowed</td>
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<td>2.90</td>
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<tr>
<td>Living with family members</td>
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<tr>
<td>Other relatives</td>
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<td>Area for exercise (at home)</td>
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<td>Yes</td>
<td>59</td>
<td>84.30</td>
</tr>
<tr>
<td>No</td>
<td>11</td>
<td>15.70</td>
</tr>
<tr>
<td>Exercise equipment (at home)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>33</td>
<td>47.10</td>
</tr>
<tr>
<td>No</td>
<td>37</td>
<td>52.90</td>
</tr>
<tr>
<td>Exercise place</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (in village/community)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>57</td>
<td>81.40</td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>18.60</td>
</tr>
<tr>
<td>Exercise buddy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>28</td>
<td>40.00</td>
</tr>
<tr>
<td>No</td>
<td>42</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Table 2 Physical activity characteristics of the participants (N = 70)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High PA</td>
<td>55.70</td>
<td>78.50</td>
</tr>
<tr>
<td>Moderate PA</td>
<td>21.50</td>
<td></td>
</tr>
<tr>
<td>Low PA</td>
<td>12.80</td>
<td></td>
</tr>
<tr>
<td>PA level range</td>
<td>1 to 84</td>
<td></td>
</tr>
<tr>
<td>MET-Hr/week</td>
<td>1 to 200</td>
<td></td>
</tr>
<tr>
<td>GDMT</td>
<td>42.90</td>
<td></td>
</tr>
<tr>
<td>Hospitalization</td>
<td>61.40</td>
<td></td>
</tr>
</tbody>
</table>
The Correlation Between Physical Activity and Its Related Factors

All study variables, including the PA, motivation, family support, and perceived quality of patient-provider relationships, were examined and passed the general statistical assumptions of Pearson’s correlation coefficient. Functional ability was examined but not passed the general assumptions; therefore, the functional ability was used Spearman rank-order correlation coefficient. The parametric statistic can provide trustworthy results, and the non-parametric statistic was valid when our number of the study sample had a limitation. However, the number of study samples was limited. Therefore, to be especially careful in conclusion and generalizability.

The findings showed that a total PA had a significant positive correlation with a functional ability ($r = .309, p < .05$), and family support ($r = .210, p < .05$). While the results showed PA had a non-significant positive correlation with motivation ($r = .050, p > .05$), and a non-significant negative correlation with perceived quality of patient-provider relationships ($r = -.049, p > .05$). The magnitude of the correlation coefficient was stratified and applied from the related study (Schober et al., 2018) (Table 5).

### Table 2 The clinical characteristics of the study participants ($N = 70$)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of diagnosis HF (months)</td>
<td>Range 1-65 months, Mean = 18.01, SD = 14.92</td>
<td></td>
</tr>
<tr>
<td>NYHA classification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class I</td>
<td>21</td>
<td>30.00</td>
</tr>
<tr>
<td>Class II</td>
<td>47</td>
<td>67.10</td>
</tr>
<tr>
<td>Class III</td>
<td>2</td>
<td>2.90</td>
</tr>
<tr>
<td>Comorbidity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>31</td>
<td>44.30</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>21</td>
<td>30.00</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>22</td>
<td>31.40</td>
</tr>
<tr>
<td>Facilitating factor-induced HF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>32</td>
<td>45.70</td>
</tr>
<tr>
<td>Cardiac arrhythmia</td>
<td>24</td>
<td>34.30</td>
</tr>
<tr>
<td>Valvular heart disease</td>
<td>8</td>
<td>11.40</td>
</tr>
<tr>
<td>The latest LVEF (%)</td>
<td>Range 18-82%, Mean = 39.55, SD = 16.21</td>
<td></td>
</tr>
<tr>
<td>LVEF &lt; 40%</td>
<td>39</td>
<td>55.70</td>
</tr>
<tr>
<td>LVEF 40-49%</td>
<td>11</td>
<td>15.70</td>
</tr>
<tr>
<td>LVEF ≥ 50%</td>
<td>20</td>
<td>28.60</td>
</tr>
<tr>
<td>Cardiac device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>13</td>
<td>18.60</td>
</tr>
<tr>
<td>No</td>
<td>57</td>
<td>81.40</td>
</tr>
<tr>
<td>Meet guideline-directed medication therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>30</td>
<td>42.90</td>
</tr>
<tr>
<td>No</td>
<td>40</td>
<td>57.10</td>
</tr>
<tr>
<td>Previous admission within a year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No admission</td>
<td>43</td>
<td>61.40</td>
</tr>
<tr>
<td>Admission with a cardiac cause</td>
<td>15</td>
<td>21.40</td>
</tr>
<tr>
<td>Admission with non-cardiac cause</td>
<td>12</td>
<td>17.10</td>
</tr>
</tbody>
</table>

Note: HF = Heart failure, NYHA = New York heart association, LVEF = Left ventricular ejection fraction

### Table 3 Physical activity of the study participants ($N = 70$)

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Min-Max</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of PA (MET-Hr/week)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low PA (&lt;10 MET-Hr/Wk)</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Moderate PA (10-49 MET-Hr/Wk)</td>
<td>21.13-46.40</td>
<td>15</td>
<td>21.50</td>
</tr>
<tr>
<td>High PA (≥ 50 MET-Hr/Wk)</td>
<td>50.78-309.85</td>
<td>55</td>
<td>78.50</td>
</tr>
<tr>
<td>Recommendations1 of PA (150 minutes/week)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achieve (PA ≥ 150 minutes/week)</td>
<td>600-6840</td>
<td>70</td>
<td>100.00</td>
</tr>
<tr>
<td>Not Achieve (PA &lt; 150 minutes/week)</td>
<td></td>
<td>0</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Parameters Min-Max Mean SD

| Total PA (all items)                | 21.13-309.85 | 82.37   | 49.93 |
| MET-Hr/Wk of household PA (item 1-13 of SPAQ) | 0-136.90    | 24.24   | 24.93 |
| MET-Hr/Wk of occupational PA (item 14-16 of SPAQ) | 0-40.00    | 4.58    | 8.35  |
| MET-Hr/Wk of recreational PA (item 17-27 of SPAQ) | 0-48.50    | 24.53   | 10.56 |
| MET-Hr/Wk of exercise PA (item 28-50 of SPAQ) | 0-155.00   | 18.85   | 24.27 |
| MET-Hr/Wk of transportation PA (item 51-54 of SPAQ) | 0-72.00    | 10.15   | 13.48 |

Note: MET-Hr/Wk = metabolic equivalent task hour per week; PA = physical activity; SPAQ = The Self-report Physical Activity Questionnaire,
reference (Plenty & Troiano, 2018)

### Table 5

#### The Score of the Study Variables

The participants had a high overall motivation to be physically active. In addition, all participants had a high ability to do daily activities, most participants (70.00%) had independence, and the others (30.00%) had mild dependence. Furthermore, in family support, participants had a moderate perception of family support. Moreover, the results showed a high level of relationship between persons and providers (Table 4).

#### The Correlation Between Physical Activity and Its Related Factors

All study variables, including the PA, motivation, family support, and perceived quality of patient-provider relationships, were examined and passed the general statistical assumptions of Pearson’s correlation coefficient. Functional ability was examined but not passed the general assumptions; therefore, the functional ability was used Spearman rank-order correlation coefficient. The parametric statistic can provide trustworthy results, and the non-parametric statistic was valid when our number of the study sample had a limitation. However, the number of study samples was limited. Therefore, to be especially careful in conclusion and generalizability.

The findings showed that a total PA had a significant positive correlation with a functional ability ($r = .309, p < .05$), and family support ($r = .210, p < .05$). While the results showed PA had a non-significant positive correlation with motivation ($r = .050, p > .05$), and a non-significant negative correlation with perceived quality of patient-provider relationships ($r = -.049, p > .05$). The magnitude of the correlation coefficient was stratified and applied from the related study (Schober et al., 2018) (Table 5).
**Discussion**

The research findings showed that a majority of participants had a moderate and high level of PA, and all participants met the PA recommendation. These findings were consistent with the related study, which reported that the majority of persons with HF had a moderate and high PA (Klompstra, 2016). To support the study findings, it was found that most participants in the study were men, the average age of the participants was 54 years old, and they were classified in NYHA classes I and II. Furthermore, approximately half of the participants had no cardiac devices and a hospitalization history in the previous year. Consequently, most participants may have had more chances to do PA without adverse events. However, it would be better to assess PA in subjective and objective ways to ensure that the researchers receive reliable and accurate information regarding PA (Dowd et al., 2018).

In this study, the findings revealed that PA had a non-significant positive correlation with motivation ($r = .050, p > .05$). It was not congruent with the result from a previous study that reported motivation had a significant positive correlation with PA (Klompstra, 2016). The study findings found that most participants had high motivation in all aspects. Although their motivation scores in keeping physically active were high, motivation may have less variation across the participants. Therefore, it might affect the correlation between PA and motivation in real life.

The research findings showed that functional ability had a significant positive correlation with PA ($r_s = .309, p < .05$). It was not surprising to find that functional ability had a correlation with PA for the reason that functional ability plays an important role in HF. When the persons have a low ability to perform their daily activities, their PA might potentially decrease (Tongtiam et al., 2016). These findings demonstrated that using functional ability may reflect the health status of persons with HF. However, using the functional ability may inherently overlap with PA and result in a significant positive correlation between functional ability and PA. To enhance the PA, HCPs have to consider the confounding factors such as age and gender differences which might influence PA level before offering suggestions and recommendations PA for the persons with HF (Amirova et al., 2021).

This study also showed that family support had a significant positive correlation with PA in persons with HF ($r = .210, p < .05$). It is shown that a majority of participants were married, lived with their family members, and almost half of the participants exercised and performed activities with their family members. The results were congruent with other studies that demonstrated that family support had a statistically significant relationship with self-care behaviors, including regular exercise and PA (Liangruenrom et al., 2019). Therefore, HCPs should integrate the participation of family supports to provide appropriate interventions for persons with HF.

Surprisingly, the PA had a non-significant correlation with perceived quality patient-provider relationships ($r = -.049, p > .05$). The possible reasons to explain the result, whether the participants in the HF clinic had a low, moderate, or high level of PA, they were usually satisfied with and had a good relationship with HCPs. When considering the method to assess the relationship, it could be explained that negative and positive items in the questionnaires might have influenced the rating scores of the participants (Solis Salazar, 2015). Moreover, the questionnaire was a generic instrument to assess the clients’ satisfaction and patient-provider relationships; however, it was not a specific questionnaire to assess the perceived quality of patient-provider relationships and PA in persons with HF.

---

### Table 4 The scores of the study variables (N = 70)

<table>
<thead>
<tr>
<th>Study variables</th>
<th>Possible range</th>
<th>Actual range</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation</td>
<td>0-60</td>
<td>31-60</td>
<td>50.20 (7.26)</td>
</tr>
<tr>
<td>Physical motivation</td>
<td>0-16</td>
<td>10-16</td>
<td>14.12 (1.80)</td>
</tr>
<tr>
<td>Psychological motivation</td>
<td>0-16</td>
<td>9-16</td>
<td>14.04 (2.01)</td>
</tr>
<tr>
<td>Social motivation</td>
<td>0-28</td>
<td>11-28</td>
<td>22.02 (4.27)</td>
</tr>
<tr>
<td>Functional ability</td>
<td>0-20</td>
<td>15-20</td>
<td>19.44 (1.07)</td>
</tr>
<tr>
<td>Independence</td>
<td>20</td>
<td>20</td>
<td>20.00 (0.00)</td>
</tr>
<tr>
<td>Mild dependence</td>
<td>12-19</td>
<td>15-19</td>
<td>18.14 (1.19)</td>
</tr>
<tr>
<td>Family support</td>
<td>12-60</td>
<td>13-60</td>
<td>30.77 (9.73)</td>
</tr>
<tr>
<td>Perceived quality of patient-provider relationships</td>
<td>15-105</td>
<td>81-105</td>
<td>99.30 (4.69)</td>
</tr>
</tbody>
</table>

### Table 5 The correlation coefficient between physical activity and its related factors (N = 70)

<table>
<thead>
<tr>
<th>Study variables</th>
<th>Physical activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation</td>
<td>$r = .050$</td>
</tr>
<tr>
<td>Functional ability</td>
<td>$r_s = .309^*$</td>
</tr>
<tr>
<td>Family support</td>
<td>$r = .210^*$</td>
</tr>
<tr>
<td>Patient-provider relationships</td>
<td>$r = -.049$</td>
</tr>
</tbody>
</table>

**Note:** $r$ = Pearson's Correlation Coefficient; $r_s$ = Spearman's Rank Correlation Coefficient, $^* p < .05$ (one-tailed)
In conclusion, the self-and family management framework was useful in providing guidelines for this study. The framework is defined as the ability of a person, family, community, and health care professional to manage chronic conditions (Ryan & Sawin, 2009; Grey et al., 2015). The study findings supported the assumptions, which consisted of a dynamic, interactive, and daily process to manage their conditions. Engaging the PA in persons with HF was influenced not only by the health status factors but also by the family resource factors, particularly the functional ability and family support in keeping physically active. Although motivation and perceived quality of patient-provider relationships were not related to PA in this study; however, these factors might enhance persons with HF to engage with PA and continuation of care (Chipidza et al., 2015).

The implication of this study for nursing practice, the findings of the study supported the fact that there were functional ability and family support related to the PA in persons with HF. Even though the motivation and perceived quality of patient-provider relationships were not associated with PA, these were essential factors to promote the patient's self-care, especially in encouraging and maintaining the level of PA in persons with HF (Lobel & de Quevedo, 2016). Currently, Thailand and various countries around the world are experiencing the rapid growth of the aging population and technology advancements affecting the increase of sedentary lifestyles. Therefore, these are the challenging issues that nurses have to manage and decrease their sedentary lifestyles. Moreover, it is necessary to provide the strategy in enhancing and maintaining PA in long-term care at both national and global levels.

A limitation of this study was that the study design was a cross-sectional study. The participants may have a lower or higher PA level, and the PA may be affected and changed at any time, especially in the COVID-19 situations. Purposive sampling was used in this study, resulting in a selection bias of the study sample. Additionally, the research setting as a single-center, multidisciplinary approach and the university-affiliated hospital might influence and increase the PA level in persons with HF. At best, the results of this study are generalizable to persons with HF at a similar level to the research setting.

**Conclusion**

The findings from this study demonstrated that persons with HF had suitable PA levels and met the PA recommendations. The functional ability and family support play an accountable role in keeping and maintaining PA. However, motivation and perceived quality of patient-provider relationships need to be further investigated. Based on the results of this study, we recommend that HCPs have to recognize these essential factors related to PA, especially to cooperate with the participation of the patient, family, community, and health care system for providing more effectively appropriate recommendations and suggestions among persons with HF in long-term care.

**Declaration of Conflicting Interest**

There is no conflict of interest.

**Funding**

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**Acknowledgment**

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**Authors’ Contributions**

SS contributed to study conception and design, manuscript writing, data collection, data analysis, and interpretation. AS and SD contributed to study conception and design, and critical revisions for important intellectual content, and language editing.

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**Data Availability Statement**

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

**References**


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Relationship between quality of work-life, resilience and burnout among nursing professionals during COVID-19 pandemic in Iran: A cross-sectional study

Hosein Zahednezhad¹, Armin Zareiyan¹*, and Sanaz Zargar Balaye Jame²

Abstract

Background: The COVID-19 pandemic and the increased workload and stress associated with the disease prevalence have posed a high risk of burnout to nurses. The effects of the workplace and environmental factors on resilience and burnout among nursing professionals have not been investigated in Iran.

Objective: Present study aimed to assess a model linking quality of work-life to the resilience and various dimensions of burnout among Iranian nursing professionals based on the health service workplace environmental resilience model.

Methods: This was a cross-sectional study performed on 202 Iranian nurses employed in three educational hospitals. Maslach burnout inventory, Brooks’ quality of nursing work-life survey, and an abbreviated version of the Connor-Davidson resilience scale were used to collect data. The correlation between the study variables was assessed by conducting path analysis in AMOS 22.

Results: The final model demonstrated adequate fit. The quality of working life indirectly affected burnout via a direct impact on nursing professionals’ resilience (p <0.001, β = 0.39). In addition, resilience had negative, significant effects on all the dimensions of job burnout. The quality of work-life also had negative and significant effects on emotional exhaustion (p <0.001, β = -0.38) and reduced personal accomplishment (p <0.001, β = -0.38).

Conclusion: Resilience and quality of work-life are protective variables against burnout in nursing professionals. Nursing managers can increase resilience and decrease burnout among nursing professionals by adopting policies that can improve the quality of work life.

Keywords

COVID-19; burnout; resilience; quality of work-life; nursing staff; hospitals; Iran

With the spread of the coronavirus (COVID-19) on 9 May 2020 globally, the health sectors of all countries have suffered extreme psychological and physical pressures. The challenges faced by the health sector staff are not only limited to increased workload; they frequently experience issues such as the fear of infection and disease transmission to their families, dealing with the new treatment protocols that are constantly changing, lack of personal protective equipment, care of patients with severe diseases whose condition deteriorates momentarily, and care of the co-workers diagnosed with the COVID-19 (Ho et al., 2020; Permarupan et al., 2020). In addition, the continuation of the current pandemic may increase the risk of burnout among the nurses on the frontline in fighting against the disease worldwide (Yildirim & Solmaz, 2020; Marzilli, 2021).

Burnout occurs when the individual is chronically exposed to excessive occupational stress beyond their...
adaptability level (Masiach et al., 2001). In research performed by Giusti et al. (2020) in Italy during the coronaviruses pandemic, 35.7% and 31.9% of healthcare employees had moderate and severe emotional exhaustion, respectively. In addition, 40.1% and 34.3% of the subjects had moderate and severe levels of decreased work performance, respectively (Giusti et al., 2020). Burnout is a significant cause of increased turnover intentions and reduced job satisfaction in nurses (Permarupan et al., 2020; Yildirim & Solmaz, 2020).

On the other hand, during the current global crisis, resilience could remarkably decrease stress and burnout potentially (Connor, 2006; Yildirim & Solmaz, 2020). Previous research has shown that professional protective factors like positive attitude toward the job and intimate relationships with colleagues can influence resilience at work (Cam & Büyükbayram, 2017). It is also shown that nurses are encouraged to engage in high-resilience activities without regard for the workplace and environmental factors. However, resilience-enhancing activities will not be effective if environmental factors in the workplace are not taken into account (Zhang et al., 2021). In addition, Quality of Work-Life (QWL) is one of the variables recently considered in burnout research (Jo et al., 2021).

In our study, the theoretical model (Figure 1) was designed based on the Health Service Workplace Environmental Resilience Model (HSWERM). According to HSWERM, a supportive and developmental workplace empowers nursing professionals and enables them to withstand workplace pressures that contribute to their psychological resilience (Zhang et al., 2021). In other words, the perception of high-quality work-life can build and maintain resilience in nursing professionals and have major potential to increase workplace outcomes like patient safety, quality of care, job satisfaction, and decrease job burnout.

QWL is the main requirement for the empowerment and performance of nursing professionals in healthcare systems (Dehghan Nayeni et al., 2011; Hemsworth et al., 2020). Lack of opportunities for professional advancement, inadequate salaries, poor communication with colleagues, and an unsuitable work environment are the main reasons for poor QWL in nursing (Hemsworth et al., 2020). In addition, studies have shown that low QWL has been related to extremely high levels of turnover and mental workload, which also leads to the significant reduction of performance and quality of care (Brooks & Anderson, 2005). Most researchers consider the quality of work-life to be the attitude and perception of individuals towards work, organization, and employers (Vagharseyyedin et al., 2011).

In addition, the literature review results showed that the effect of quality of work-life on resilience in nursing had not been studied so far. Early resilience researches focused on personal characteristics, but recent studies have emphasized the quality of work-life and support systems to promote resilience (Hietapakka et al., 2013). A supportive work environment and culture can moderate stressors and increase the adaptability of nurses in stressful conditions (Jose et al., 2020). According to Ghimbulut and Opre (2013), resilience is the capacity of the individual to have psychological health in dire situations from society’s perspective. However, given the challenges faced by nurses daily (e.g., care of patients on the verge of death or with severe illnesses, labor shortage, and emotional exhaustion) and for the healthcare sector to have a healthy workforce, more attention should be paid to the concept of resilience (Turner, 2014).

In Iran, from 3 January 2020 to 23 September 2021, there have been 5,477,229 confirmed cases of COVID-19 with 118,191 deaths (World Health Organization [WHO], 2021). Iranian nurses are still more exposed to burnout than ever due to the slow pace of public vaccination, the high prevalence of disease and mortality, the lack of health care workers and resources, and the high level of physical and mental workload (Afshari et al., 2021). Studies conducted in Iran during the outbreak of COVID-19 among Iranian nurses have shown that burnout in nurses is associated with reduced quality of care and increased rates of medication errors (Kakemam et al., 2021). Ariaipooran et al. (2021) showed that 51% of Iranian nurses suffer from secondary traumatic stress during COVID-19. Increasing the number of stressors and mental and physical workload of nurses can reduce the quality of work-life of nurses. In addition, a study conducted before the outbreak of COVID19 in Iran showed that two-thirds of Iranian nurses do not have a good quality of working life (Nikeghbal et al., 2021). However, the literature review results showed that few studies had examined the nurse’s quality of work-life during the outbreak of COVID-19. According to the HSWERM, it seems that by improving the quality of nurses’ working life, it is possible to improve resilience and reduce nurses’ burnout. However, the literature review results showed that so far, no study evaluating this model has been found in the Iranian nursing population, especially in critical conditions.

Therefore, considering the issues mentioned above and theoretical assumptions of HSWERM, the current study intended to assess the association between QWL, resilience, and various dimensions of burnout in Iranian nurses using path analysis (Figure 1). The research hypotheses were as follows: H1: QWL has a direct and positive correlation with resilience in nursing professionals, and H2: There are significant and reverse correlations between resilience and various dimensions of job burnout among nursing professionals.

![Figure 1 Theoretical Model](image-url)
Methods

Study Design
This cross-sectional study intended to evaluate a hypothetical model linking QWL, resilience, and burnout in nursing professionals based on theoretical assumptions of the health service workplace environmental resilience model (HSWERM).

Participants
The research population consisted of the nurses working in the three instructional hospitals affiliated with one of the clinical universities in Tehran, Iran. The required sample size for model testing is calculated by parameter estimation. It is suggested to include 5 to 20 observations for each parameter (Kline, 2015). Based on having 11 parameters in the study model, 220 subjects were enrolled in the current research. The inclusion criteria were: 1) having at least one year of work experience; 2) bachelor’s degree in nursing or higher.

A total of 202 questionnaires completed by the nurses were returned (response rate was 92%). Participants were selected using multistage sampling from three hospitals in Tehran, Iran, from 1 May 2020 - 14 June 2020. All selected hospitals were referral centers for patients with COVID-19, and all participants were either caring for patients with COVID-19 or had cared for them in the past month. The nurses were randomly selected via proportional sampling based on the inclusion criteria. To this end, a quota was allocated to each hospital and its units based on the number of nurses in each hospital and the total sample size. According to the allocated quota, the research samples in each unit were selected via convenience sampling.

Instruments

Resilience
Resilience refers to the process, capacity, or result of a successful coping despite challenging or threatening conditions (Masten et al., 1990). In the present study, resilience was measured by the abbreviated scale version of Connor and Davidson (2003) and by ten questions. The initial version of the questionnaire has 25 items. Campbell Sills and Stein (2007) normalized the scale by selecting 10 out of 25 items and testing the tool on 511 individuals. The construct validity of the new resilience scale was determined to be within the range of 44-93% based on confirmatory factor analysis, which indicated the acceptable construct validity of the scale. Keyhani et al. (2015) translated the 10-item Connor-Davidson resilience scale into Persian and confirmed its validity and reliability in the Iranian population. The content validity index and Cronbach’s alpha measured were 0.84 and 0.67, respectively. The scoring of the questionnaire was based on the Likert scale (Never = 0, Almost Always = 4); the higher scores indicated the higher resilience of the nurses. In the current study, the internal consistency of the scale was confirmed by Cronbach’s alpha of 0.84.

Burnout
Burnout is a psychological disorder incorporating emotional exhaustion (a feeling of physical and mental emptiness caused by occupational stress, which makes work boring and meaningless), depersonalization (negative and hardened response, emotionlessness, and excessive indifference to clients), and a sense of diminished personal accomplishment (understanding that individual’s performance is not associated with success) (Malach-Pines, 2000; Duarte & Pinto-Gouveia, 2017).

In this study, burnout was measured using Maslach and Jackson (1981) with 22 questions and in three dimensions (emotional exhaustion, depersonalization, and diminished personal accomplishment). The scoring of the questionnaire was based on a seven-point Likert scale (Never = 0, Very High = 6); the higher scores indicated the higher burnout of the nurses. The scores in this questionnaire range from 0 - 132 divided by the number of questions (i.e., 22), resulting in a score of 0 - 6. Also, further to the total burnout score, which is obtained through the total score of the dimensions, the score of each dimension is reported separately as well. The tool is specifically used for the assessment and prevention of job burnout in professional groups, such as nurses and teachers (Maslach et al., 2001). Moaemi et al. (2018) translated the MBI into Persian and reported the content validity index and Cronbach’s alpha of 0.91 and 0.88, respectively. In this study, the Cronbach’s alpha coefficient of this tool was 0.91.

QWL
QWL is defined as the ability of employees to satisfy their important personal needs while also achieving the goals of the organization (Brooks & Anderson, 2005; Brooks et al., 2007). In this study, QWL was measured by the Brooks’ quality of nursing work life survey with 40 phrases and four subscales to evaluate the QWL of nurses, including work-life/home life, work plan, work area, and work world. The internal reliability of the tool was estimated to be 0.56-0.88 (Brooks et al., 2007). The scoring of the questionnaire was based on a six-point Likert scale (Completely Disagree = 0, Completely Agree = 5). The higher scores indicated the higher QWL of the nurses. Azarrang et al. (2013) translated the Brooks questionnaire into Persian and measured the content validity index and Cronbach’s alpha of 0.97 and 0.70, respectively. In the current study, the Cronbach’s alpha coefficient of this tool was 0.78.

Data Analysis
We used the path analysis method to test the theoretical model of the study. SPSS version 22.0 was used to describe the characteristics of the participants and scales, and AMOS version 22.0 was selected to conduct the path analysis. A significance level less than 0.05 was considered, and two-tailed statistical tests were used.

Before starting the statistical analysis, the database was screened for the presence of missing data. Data were expressed as mean and standard deviation for the
continuous variables and number and percentage for the categorical variables. Modification indices were used to free constraints on the parameters and improve the final model fit. In order to test the fitness of the model, Root mean square error of approximation (RMSEA) <0.08, Chi-square/degrees of freedom (CMIN/DF) GFI >0.9, adjusted goodness-of-fit index (AGFI) >0.9, Tucker-Lewis index (TLI) >0.9, and normed fit index (NFI) >0.9 were used (Bentler & Bonett, 1980; Straub, 1989). Notably, with the normal distribution of data, maximum likelihood estimation was used.

Ethical Consideration
The study protocol was approved by the Ethics Committee of the AJA University of Medical Sciences (IR.AJAUMS.REC.1399.271). Prior to the distribution of the questionnaires, the research objectives were explained to the participants, they were assured of their confidentiality, and their informed written consent was obtained. To comply with ethical standards, the questionnaires were distributed anonymously. At the beginning of each shift, questionnaires (anonymously) were distributed among the nurses in each ward, and they were asked to complete them by the end of the shift. Anonymous completed questionnaires were returned in sealed envelopes and were handed to the designated staff members at each department. It should be noted that all questionnaires were used with the permission of the original designers.

Results

Participant Characteristics
The initial analysis showed less than 2% of the missing values, so these data were replaced by the median imputation. The participating nurses were employed in different clinical wards (cardiology, intensive care, emergency department oncology, surgery, and geriatrics). In total, 81.7% of the participants were female, and the mean age and work experience of the participants were 6.76 ±7.47 and 8.24 ± 6.76 years, respectively.

Further details on mean, standard deviation, reliability, kurtosis, skewness, and intercorrelations between the study variables are provided in Table 1. The findings revealed that the nurses experienced relatively low levels of burnout (mean score: 2.05 ±0.76). In addition, the skewness and kurtosis values of the main research variables were within the range of 2 and -2, confirming the normal distribution of the variables.

### Table 1 Range, mean, standard deviation, skewness, kurtosis, and correlations of variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Range</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>QWL</td>
<td>0-5</td>
<td>2.5</td>
<td>0.51</td>
<td>1</td>
<td></td>
<td></td>
<td>0.47</td>
<td>0.47</td>
</tr>
<tr>
<td>Resilience</td>
<td>0-4</td>
<td>2.59</td>
<td>0.47</td>
<td>0.39**</td>
<td>1</td>
<td></td>
<td>-0.59</td>
<td>0.7</td>
</tr>
<tr>
<td>Burnout</td>
<td>0-6</td>
<td>2.05</td>
<td>0.76</td>
<td>-0.54**</td>
<td>-0.50**</td>
<td>1</td>
<td>-0.24</td>
<td>-0.7</td>
</tr>
<tr>
<td>Emotional Exhaustion</td>
<td>0-6</td>
<td>2.16</td>
<td>1.11</td>
<td>-0.50**</td>
<td>-0.46**</td>
<td>0.87**</td>
<td>0.28</td>
<td>-0.65</td>
</tr>
<tr>
<td>Depersonalization</td>
<td>0-6</td>
<td>1.11</td>
<td>0.97</td>
<td>-0.14</td>
<td>-0.26**</td>
<td>0.62**</td>
<td>0.99</td>
<td>0.74</td>
</tr>
<tr>
<td>Reduced Personal Accomplishment</td>
<td>0-6</td>
<td>2.53</td>
<td>0.87</td>
<td>-0.47**</td>
<td>-0.37**</td>
<td>0.73**</td>
<td>0.04</td>
<td>-0.46</td>
</tr>
</tbody>
</table>

**p <0.01

Bivariate Associations between the Study Variables
QWL had a positive and significant correlation with resilience (r = 0.39; p <0.01), while resilience was inversely correlated with job burnout in nursing professionals (r = -0.50; p <0.01). Furthermore, all dimensions of burnout were inversely correlated with the resilience and QWL of the nurses (Table 1).

Path Coefficients, Effects, and Goodness-of-fit Indices
In the present study, path analysis was used to express the observed correlations logically. One of the major advantages of path analysis is the ability to measure the direct and indirect effects of one variable on other variables and compare the obtained values. The conceptual model presented in the current research was tested via AMOS software based on path analysis. The GFIs were calculated and are presented in Table 2; the obtained results indicated the lack of fit of the research model (GFI=0.86, AGFI=0.59, CFI=0.66, CMIN/DF=15.4, RMSEA=0.26, TLI=0.32, NFI=0.65).

### Table 2 Model fit indices

<table>
<thead>
<tr>
<th>Model Fit Index</th>
<th>Initial Model</th>
<th>Second Model</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMIN (χ²/DF)</td>
<td>15.4</td>
<td>2.15</td>
<td>&lt;3</td>
</tr>
<tr>
<td>GFI</td>
<td>0.86</td>
<td>0.99</td>
<td>&gt;0.9</td>
</tr>
<tr>
<td>AGFI</td>
<td>0.59</td>
<td>0.94</td>
<td>&gt;0.9</td>
</tr>
<tr>
<td>CFI</td>
<td>0.66</td>
<td>0.99</td>
<td>&gt;0.9</td>
</tr>
<tr>
<td>TLI</td>
<td>0.32</td>
<td>0.94</td>
<td>&gt;0.9</td>
</tr>
<tr>
<td>NFI</td>
<td>0.65</td>
<td>0.98</td>
<td>&gt;0.9</td>
</tr>
<tr>
<td>RMSEA</td>
<td>0.26</td>
<td>0.07</td>
<td>&lt;0.08</td>
</tr>
</tbody>
</table>
At the second stage, direct correlations were established between the variables of QWL and the dimensions of emotional exhaustion and reduced personal accomplishment based on the corrective suggestions provided by the AMOS software; notably, the research model was re-tested (figure 2). The estimated indicators showed the satisfactory fit of the model (GFI=0.99, AGFI=0.94, CFI=0.99, CMIN/DF=2.15, RMSEA=0.07, TLI=0.94, NFI=0.98).

![Figure 2 Mediating effect of resilience between QWL and dimensions of job burnout](image)

The standardized path coefficients were in the predicted directions (Table 3). A significant and positive correlation was observed between the QWL and the resilience of the nurses (β = 0.39; t = 6; p <0.001). On the other hand, significant, inverse associations were observed between the resilience of the nurses and the dimensions of depersonalization (β =-0.26; t =-3.88; p <0.001), reduced personal accomplishment (β = -0.22; t = -3.3; p <0.001), and emotional exhaustion (β = -0.32; t =-6.35; p <0.001). In addition to the indirect correlation between the QWL and burnout of the nurses based on their resilience, direct, significant, inverse associations were denoted between the QWL, reduced personal accomplishment (β = -0.38; t = -5.76; p <0.001) and emotional exhaustion (β = -0.38; t = -6.28; p <0.001).

<table>
<thead>
<tr>
<th>Path</th>
<th>Model</th>
<th>Estimate</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>QWL → Resilience</td>
<td></td>
<td>0.39</td>
<td>6</td>
<td>0.001</td>
</tr>
<tr>
<td>Resilience → Emotional Exhaustion</td>
<td></td>
<td>0.32</td>
<td>-5.1</td>
<td>0.001</td>
</tr>
<tr>
<td>Resilience → Reduced Personal Accomplishment</td>
<td></td>
<td>-0.22</td>
<td>-3.3</td>
<td>0.001</td>
</tr>
<tr>
<td>Resilience → Depersonalization</td>
<td></td>
<td>-0.26</td>
<td>-3.8</td>
<td>0.001</td>
</tr>
<tr>
<td>QWL → Emotional Exhaustion</td>
<td></td>
<td>-0.38</td>
<td>-6.3</td>
<td>0.001</td>
</tr>
<tr>
<td>QWL → Reduced Personal Accomplishment</td>
<td></td>
<td>-0.38</td>
<td>-5.7</td>
<td>0.001</td>
</tr>
</tbody>
</table>

### Discussion

This study intended to evaluate the use of HSWERM to evaluate the correlations between the QWL, resilience, and dimensions of job burnout. The presented model had an acceptable fit, while the specific path adjustments improved the model fit and HSWERM developed by our results.

The final model indicated that in addition to the indirect effect of the QWL on burnout through improving resilience, it was directly correlated with the dimensions of emotional exhaustion and reduced personal accomplishment among nursing professionals during the current COVID-19 pandemic. Therefore, it could be inferred that improving the QWL could increase the ability of nurses to adapt to the current COVID-19 pandemic and reduce nursing professionals’ burnout.

The results showed that quality of work-life can predict the level of resilience in nursing professionals, and as a result, the level of burnout will be diminished. This finding confirmed the theoretical assumptions of HSWERM. Furthermore, this finding is compatible with the research results of Leners et al. (2014), in which a significant and direct correlation was reported between the QWL and resilience among military healthcare providers (Nikeghbal et al., 2021).

The relationship between quality of work-life, resilience, and nursing job burnout can be explained by stress theory. Burnout occurs when employees are exposed to long-term...
stressors (Malach-Pines, 2000; Monsalve-Reyes et al., 2018). According to stress theory, stress is a physiological and psychological consequence of long-term exposure to environmental stimuli such as poor quality of work-life (Hietapakka et al., 2013). A high-quality nursing work environment can empower nursing professionals and increase their coping abilities, and as a result, more resilient nurses experience less burnout (Hietapakka et al., 2013; Ambani et al., 2020; Laksmita et al., 2020). Paying attention to the quality of work-life can improve the wellbeing and attitude of employees towards different dimensions of the organization, work, and employers, thereby improving their resilience (Vagharsheyedin et al., 2011; Kelbiso et al., 2017).

Furthermore, the results showed that QWL has a direct and inverse relationship with emotional exhaustion and reduced personal accomplishment among nursing professionals. Ambani et al. (2020) showed that the quality of nurses’ work environment in Saudi Arabia affects work outcomes such as intention to leave, burnout and, job satisfaction of nurses. Permarupan et al. (2020) documented QWL attributes as factors that could manage burnout among Indonesian nurses. According to the Nursing Work-life Model, using five factors explaining the professional nursing work environment provided by Lake (2002) can lead to improving patient and nursing professionals outcomes, such as improving patient safety and reducing burnout (Laschinger & Leiter, 2006). These five factors include staff participation in organizational affairs, effective nursing leadership, effective nurse/physician relationships, adequate staffing for quality care, and support for a nursing model of patient care.

The present study results indicated inverse correlations between resilience and all the dimensions of job burnout; therefore, the improvement of resilience could protect nurses from emotional exhaustion and depersonalization while also enhancing their performance. In research by Rushton et al. (2015), a significant and inverse association was observed between resilience and burnout of intensive care unit nurses. During the coronavirus pandemic, Yildirim and Solmaz (2020) reported that resilience could reduce burnout directly and indirectly by modifying the levels of perceived stress. Despite the spread of the coronavirus and the fact that nurses are at the forefront of the battle against this pandemic, our findings demonstrated that the rate of burnout was below average in its three dimensions among the nurses, which is inconsistent with the previous studies in this regard (Mealer et al., 2012; Giusti et al., 2020).

The highest score among different dimensions of burnout was related to decreased personal performance, and the lowest was related to depersonalization. This finding contradicts the findings of Zhang et al. (2021) in Wuhan nurses and Jose et al. (2020) in Indian nurses during the COVID-19 outbreak. It seems that the high workload and inability of Iranian nurses to take care of and perform their duties accurately has the most significant impact on their burnout. Fair management and planning of workload can lead to a reduction of burnout in Iranian nurses. According to WHO (2018), the ratio of nurses and midwifery personnel per 1,000 people is 20.77 in Iran, while this ratio is 102.9 in the United Kingdom and 156.9 in the United States.

Moreover, resilience was observed to be favorable and above average, which could also be the reason for the low rate of burnout dimensions among Iranian nurses. In a study by Jo et al. (2021) on nurses in the United States, the Republic of Korea, Japan, and Turkey, resilience during COVID 19 outbreaks was moderate. One of the reasons for the high rate of resilience and low job burnout in Iranian nurses can be considered the support and appreciation of various members of Iranian society from nurses and other health care workers during COVID 19 outbreaks. In addition, it has been shown that nurses are always committed to the principles of their professional ethics in the most difficult situations. The study of Zahednezhad et al. (2021) showed that although nurses have a high workload, this does not reduce their moral sensitivity.

**Implications for Nursing Practice**

Based on the results of the present study, nursing managers can increase resilience and decrease burnout among nursing professionals by adopting policies to improve the quality of work-life in nursing professionals, such as fostering support networks of friends and colleagues along with a strong teamwork spirit, providing professional development opportunities, work-life balance, managing workload by providing adequate nursing workforce, providing a safe work environment and increased financial compensation. Among the other effective measures in this regard, especially in the case of those with low resilience levels during the current pandemic, stress management and mental health skills training programs like mindfulness-based stress coping skills could enhance resilience and protect nurses against burnout. In addition, periodic screening of nurses regarding burnout symptoms and psychological effects of COVID -19 outbreaks is also necessary to identify nurses at risk and perform immediate interventions.

**Limitations and Recommendations**

Considering that the samples of this study were selected from nurses working in public hospitals affiliated with one of the instructional universities in Tehran, Iran, the generalization of the findings should be carried out with caution. In addition, it is recommended that further investigations in this regard be focused on the comparative measurement of our research variables and testing our research model in nursing professionals of private hospitals. Furthermore, restrictions related to combating the prevalence of COVID -19 in the target hospitals also made access to nurses and the sampling process difficult. Also, due to the high rate of resilience and low rate of burnout in Iranian nurses even in the current stressful and critical situation, it is suggested that the process of resilience in Iranian nurses during crises be further investigated in future qualitative studies.

Conclusion

During the spread of the coronavirus disease, the workload and stress of healthcare providers have increased significantly, leading to a higher risk of burnout and psychological disorders. However, the current study results showed that nursing managers, by using the HSWERM and emphasizing the indicators that improve the quality of work-life, can enhance the resilience of nurses in pandemic conditions and subsequently reduce the rate of burnout among nursing staff.

Declaration of Conflicting Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Authors’ Contributions

AZ: conceptualization, methodology. HZ: data curation, writing original draft preparation, software. SZBJ: supervision, writing, reviewing and editing, validation. All authors reviewed the results and approved the final version of the manuscript.

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Data Availability Statement

The datasets generated during and analyzed in the current study are available from the corresponding author on reasonable request.

References


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"I am afraid that others will feel scared and disgusted with me. So, I will keep it a secret until I die": A qualitative study among patients with tuberculosis receiving DOTS regimen in Thailand

Apinya Koontalay¹, Wanich Suksatan², and Kantapong Prabsangob³*

Abstract
Background: Tuberculosis (TB) has become a significant public health problem leading to a top ten mortality. Directly Observed Therapy, Short-course (DOTS) is recommended as a critical element for curing and preventing TB. However, patients who have been living with TB often receive barriers and challenges, which may lead them to discontinue the DOTS treatment.

Objective: This study aimed to understand patients’ experiences living with TB and receiving DOTS regimens.

Methods: A qualitative descriptive study was employed. Semi-structured interviews were done among twenty tuberculosis patients selected using convenience sampling from the slum community in Bangkok, Thailand. The thematic approach was used for data analysis.

Results: Two main themes were developed: (1) troublesome disease and (2) emotional challenges. The first theme comprises three subthemes: confronting death, accepting lifestyle change, and DOTS challenges. The second theme consists of two subthemes: isolation from others and stigma.

Conclusion: The findings could guide nurses and other healthcare professionals to develop the treatment guideline and the DOTS strategy using a holistic approach.

Keywords
burden of disease; DOTS; holistic care; nursing; qualitative; tuberculosis; Thailand

Pulmonary Tuberculosis (TB) is a serious health care problem associated with mortality as a top ten worldwide death (World Health Organization, 2019). According to World Health Organization (WHO), the number of global cases is around ten million, and more than one million people die every year (World Health Organization, 2019). Besides, the number of new incidences increases by two to three million annually (Imsanguan et al., 2020). From statistics, Thailand is one of the 14 worst countries having the highest burden of tuberculosis, human immunodeficiency virus (HIV), and multiple drug-resistant cases (MDR) spreading across the country rapidly (Johnston et al., 2009). However, WHO communicates a universal strategy for reducing the prevalence of pulmonary TB cases to be less than 10 per 100,000 population by 2034. Additionally, Directly Observed Therapy, Short-

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course (DOTS), is recommended as a critical element for the cure and prevention of TB (Ahmad et al., 2018; World Health Organization, 2019). The DOTS is the policy package for TB control in order to achieve drug adherence (Gyimah & Dako-Gyekye, 2019; Tadesse, 2016). Thailand is challenging the high prevalence of lower cure rate and non-adherence to TB drugs regarding drug adverse, barrier of access to healthcare, lack of knowledge, and psychological distress (Tadesse et al., 2013). Consequently, a significant barrier to TB control is related to the non-adherence to TB drugs (Choowong et al., 2019; Gugssa et al., 2017; Imsanguan et al., 2020). To be consistent with taking the TB drug by family, the health profession should systematically monitor and ensure that TB patients will take the drug (Brown et al., 2015). Recent studies show that those who had first TB diagnosis would perceive the experience of stigma as leading to hiding their illness and impact on the consists of adherence to the drug (Brown et al., 2015; Tadesse, 2016). Also, the burden of treatment can be the workload of health personnel to conduct DOTS and barriers to access health facilities as TB patients need to receive DOTS every day (Dias et al., 2013).

The Thai national guideline recommends choosing the family member to monitor the drug taken in TB patients to promote drug adherence (Choowong et al., 2019). Currently, Thailand’s structure has changed from expanding to single-family; inevitably, it is difficult to monitor (Yu et al., 2018). Therefore, focusing on poor compliance and barrier to self-care in TB reveals that well-being is a barrier to encouraging TB adherence to drugs (Brown et al., 2015). Furthermore, pulmonary TB is a chronic illness, and TB patients suffer from long-term treatment as the burden of disease (Tadesse et al., 2013). In addition, TB patients experience psychological distress such as stigma, anxiety, or depression as transferred to physical health (Brown et al., 2015; Tadesse, 2016).

However, TB patients perceive the burden of diseases such as lack of social support to reach the DOTS, resource facility, or cost of treatment led to halting continuing care and loss of follow-up (Brown et al., 2015; Tadesse, 2016). Those are considered several factors leading to the burden of disease and obstacles to treatment for TB (Gyimah & Dako-Gyekye, 2019; Tadesse, 2016). Therefore, this study aimed to explore patients’ perceptions regarding their experience in the DOTS treatment, which may inform the burden of the disease and improve TB health care in continuum care.

Methods

Study Design and Setting
A qualitative descriptive approach was used to explore patients’ experiences living with pulmonary TB. The research was conducted in a slum community in Bangkok, Thailand.

Participants
Twenty participants were selected using convenience sampling. The inclusion criteria of the participants were (1) those who were diagnosed with pulmonary TB and (2) who received the DOTS treatment.

Data Collection
Data were collected from April 2018 to December 2018. In this study, the researchers worked together with community nurses for the data collection process. First, the participants who met the inclusion criteria were invited to participate. Then, once they agreed, the researchers and nurses asked the participants for a convenient interview date and time.

The data were collected using semi-structured interviews. Each interview was audio-recorded and lasted for 30-90 minutes. The questions were developed based on findings from a previous study of the burden of disease among TB patients (Gyimah & Dako-Gyekye, 2019). Hence, the example of the questions such as: “How do you live with TB?”, “How do you experience the burden of disease?”, “How about your treatment with DOTS?” and continued following the answers from the participants. The interview was conducted using the Thai language, and it was stopped until the researchers heard the same information repeatedly.

Data Analysis
The audiotapes were transcribed verbatim by the first author after checking for accuracy by comparison with the audio recordings. The interview transcripts were read twice and compared recording by two authors (AK and WS) several times to obtain a comprehensive perspective on the content and ensure accuracy. The meaning was categorized, and codes were addressed, modified, and merged, if necessary, by referring to cluster and individual aspects.

The two authors analyzed the interviews in parallel separately. Then, results were discussed together to reach an agreement on themes and subthemes. The Thai language was used for interviews and coding, and the English language was used in data analysis and manuscript writing. In addition, transcripts were made anonymized and were available for the researchers only. The participants’ quotes were carefully translated from Thai to English by a researcher proficient in both languages. The primary goals of the translation are to maintain the meaningful content of the quote and preserve the patients’ voices. Additionally, the thematic analysis outlined by Saks and Allsop (2012) was used to manage the data and enable a more systematic analytical approach to obtain an overview and identify themes and subthemes.

Rigor
To ensure the rigor of the data collection, all interviews were conducted by using a semi-interview guide. AK conducted all the interviews to ensure data saturation. Three authors (AK, WS, and KP) were involved in all data
analysis steps, independently reread the interviews, discussed the findings, and developed codes and themes.

**Ethical Consideration**
The study was approved by the Research Ethics Committee of Suan Sunandha Rajabhat University, Thailand (No. COA 1-026/2018) and complied with the principles laid down in the Declaration of Helsinki. Prior to the study, the researchers explained the purpose and the procedures of this study to participants. All participants have signed informed consent before enrollment, and they could withdraw from the study at any time without any penalty.

During the interviews, some participants had an emotional feeling and were sensitive while talking about some of the themes pertaining to their stigma moment. Therefore, the interview was paused to calm them down then resumed with their permission, or the participants could take a break or reschedule the interviews.

**Results**

**Characteristics of the Participants**
This study consisted of 20 patients with pulmonary TB treatment, divided into 15 males and five females, with ages ranging from 20 to 56 years old. Most patients had the DOTS experience at least six months \((n = 15)\).

**Thematic Findings**
Two themes were developed in this study: (1) Troublesome disease and (2) Emotional challenges (see Figure 1). Each theme has subthemes described with the following quotes from the participants.

![Figure 1 Themes and Subthemes](image)

**Theme 1: Troublesome disease**
Most participants expressed their perception of being extremely agonized from several symptoms, thereby making them feel close to death. The first main theme describes the experience of troublesome diseases consisting of three subthemes; (1) confronting death, (2) accepting lifestyle change, and (3) DOTS challenges.

**Subtheme 1.1: Confronting death**
Most participants stated as they visited a door of death that they experienced extreme agonizing and suffering from several symptoms, such as severe coughing and difficulty breathing. They were unrealized to the worsening symptoms until they perceived extreme pain and agonized and required hospitalization.

"I was so tired as I nearly died. It was difficult to explain how I was tired as it was so difficult to breathe as I received less oxygen. Sometimes, it was so agonized while I was breathing to pull up-down with my chest as my chest was so heavy. I felt like something heavy pressed on my chest making me difficult to breathe as an elephant sitting on the chest." (ID1)

"When it was flared-up as it was difficult to breathe as I nearly die. I have never been like this before as I could not breathe well." (ID6)

Consequently, participants experienced extremely painful and agonized various symptoms of the TB disease. Furthermore, their limited understanding of the nature of TB disease thereby led them inadequately prepared for recognizing and responding to the acute episode of TB disease.
Subtheme 1.2: Accepting lifestyle change
Several participants stated that their lifestyles had changed since being diagnosed with TB disease. They expressed their need to adhere to medications to cure the disease. In addition, their daily physical performances have been changed by disease’s progressive as they are tired easily compared to before.

"My life has changed since I have TB disease, and I need to take almost ten tablets per day. I never took tablets as much as this before. So, I have no choice because what helps me to get better is the medication." (ID12)

"My life has changed since I have got this disease. So, I could not work or even walk or talk as before because I was tired easily. So, I have to do everything slowly or take a break or sit down if I feel tired." (ID4)

As a result, participants accepted the lifestyles change to the new situations affecting the medication adherence and adjusting their physical activities to new norm living rather than those who are unaccepted the new norm life.

Subtheme 1.3: DOTS challenges
Most participants expressed their concerns about supports from their families to continue the DOTS treatment. Although they confronted challenges with side effects of the TB medications, they also received strong support from their families that could help them continue complying with the TB medications.

"It is great to have someone to remind you about time for medications, to ensure you won’t forget" (ID3)

"At first, I could not believe that I had got TB diagnosis as I denied the disease and treatment. So, my mum encouraged me to follow the DOTS treatment. She always monitors while I take the medicines. It is great to have someone to remind me time for the medications, to ensure that I do not forget to take it."

"I have been following the DOTS for nearly two weeks, and my wife always monitors me. I have several side effects such as weight loss, nausea, loss of taste. Sometimes, I feel that my body cannot tolerate the side effects anymore, and I want to stop taking it, but my wife encourages me to take it. It is good to have family supports and encouragement to take these medications." (ID15)

As a result, participants stated that they received support monitoring the DOTS from their intimate and family. Some participants suffered from side effects of the medications, thereby making them discontinue the DOTS.

Theme 2: Emotional challenges
Several participants experienced a negative emotional by being diagnosed with TB. Most of them described that they were isolated from family and society. The second theme addresses the emotional challenges, which are (1) isolation from others and (2) stigma.

Subtheme 2.1: Isolation from others
Participants explained that they experienced negative feelings about having TB due to their limited understanding of the disease, which led to bad emotions, such as loneliness, fear, or shame. They also expressed that they isolated themselves from others because they did not want others to have the disease.

"I use a scarf as a mask because I do not want to use a mask because people will think that I’m sick with the awful disease. So, I separate everything such as a cup, dish, spoon, and towel from everyone at work or even my family because I do not want them to get the disgusting disease from me." (ID5)

"I do not sit in a public because I'm too scared that I'm a cross-infection of TB. So, I sit separately from others, even my family." (P11)

Most participants perceived that they were cross of infections to others easily caused by the misunderstanding concepts of TB disease.

Subtheme 2.2: Stigma
Most participants experienced being diagnosed with TB as it is repulsive in society due to their lack of knowledge of the TB disease. Also, Thai people believe in a traditional culture that being diagnosed with TB is one of the diseases ignored by society. Their perception of stigma thereby leads them to emotional distress, such as stress and hopelessness.

"It is so sad having TB diagnosed. I heard that TB is one of the diseases that the whole world disgusts. I'm so scared that the disease could not be the cure." (ID13)

"Once I have been diagnosed with TB pulmonary, the whole world stops moving, why it happens to me. I feel stressful. I have never been out drinking or smoking, so I have a lot of questions for myself. Of course, I do not want to tell anyone that I have been diagnosed with TB. I am afraid that others will feel scared and disgusted with me. So, I will keep it a secret until I die." (ID6)

Consequently, participants experienced a perception of stigma due to the misunderstood nature of TB disease. In addition, their cultural beliefs also influence negative emotions leading them to decide to hide the disease.

Discussion
This study demonstrates the consequence of the actual experience of patients with pulmonary TB receiving the DOTS treatment. They challenge troublesome disease and emotional challenges (Yu et al., 2018). This study also explores experience with TB pulmonary to promote the optimal health care for the success of the DOTS treatment (Brown et al., 2015; Dodor, 2012).

The findings indicate that participants’ perceptions of troublesome disease are extremely painful from several symptoms, as they expressed, close to death. In addition,
most participants stated that they perceive emotional
distress such as depression, stigma, or isolation as they
recognize that it is a disgusting disease by their limited
understanding of TB disease.

As participants suffer from various symptoms such as
the difficulty of breathing, exhausted and limited physical
activities. They are also highly agonized in active phases
as they cannot breathe efficiently as they get closer to
dying. In addition, they also perceive that the disease
impacts their daily living (Brown et al., 2015). However,
those realized lifestyle changes seem to cope with
strategies successfully, adapt to a new norm, and comply
with treatment rather than those uncertain about their
illness (Orenstein et al., 2009). A few participants stated
that they have trouble with medicine as they could not
tolerate the side effects of TB medications, leading them to
discontinue the DOTS treatment and rely on their severity
of side effects (Culqui et al., 2012).

The result also found that most participants perceive
emotional distress caused by a reaction from the
communities or society, making them have stigma having
cross infections into others. Most participants also stated
that they perceive isolation from others—the psychological
distress impacts continuing compliance with the DOTS
 treatment. The unjust treatment might indicate the needs
of patients as well as the holistic care approach.

The emotion of stigma could decrease the ability to
perform daily physical living and the adherence to
prescriptions (Choowong et al., 2019). Participants stated
that they have stigma caused by the cross-infections to
their intimate or society. As a result, they experience
overwhelmingly troubling disease and treatment, side
effects of TB drugs, and emotional distress. However, the
cultural belief becomes a part of their lives and influences
how they cope with strategies and manage the disease
(Orenstein et al., 2009). Most participants learn from
previous experiences that TB is diagnosed as a disgusting
disease leading them to hide their condition (Getahun et
al., 2016). The emotional issue is an essential aspect of
living with TB regarding patients’ adherence, well-being,
and quality of life (Bastos et al., 2017). Besides, healthcare
professionals should be concerned with patients' emotional
aspects and pay more attention to their individual needs in
order to improve their quality of life and well-being (Kim
et al., 2009).

In addition, nurses and multidisciplinary teams should
be concerned about the perception of individual patients'
 experiences to enhance the consistency of the DOTS
treatment (Kigozi et al., 2017). Therefore, nurses play an
essential role in the multidisciplinary team to implement
and develop the educational program guidelines to
 promote medication compliance in terms of individual
needs.

Further study should examine the implementation of
adherence treatment, psychological support, and patient
educator to promote and enhance treatment compliance.
The limitations of this study are challenging to find the
eligible participants. Some patients conceal their illness
and find it difficult to find the available and suitable location
for interviews.

However, this study provides new knowledge, although
it was conducted in 2018. Nevertheless, the findings are
still significant in the current situation because TB is still a
big issue in Thai society. Therefore, health professionals,
including nurses, need to pay attention to the DOTS
strategy.

Conclusion

The inner voice of TB patients is important information for
healthcare professionals in order to improve the DOTS
strategy. The current study found that patients with TB are
overwhelmed by troublesome disease and treatment and
suffer from negative emotions such as stigma and feeling
isolated from others. In addition, TB patients perceive
physical and mental health problems leading them to
discontinue the DOTS treatment due to their insufficient
knowledge of TB disease. Therefore, nurses and
healthcare professionals should develop an educational
program that includes psychological aspects based on
individual needs to improve the holistic approach.

Declaration of Conflicting Interest
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study.

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AK and WS drafted the article, conducted a review of the literature.
AK, WS, and KP conducted the data and data analysis. All authors
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Data Availability Statement
All data generated or analyzed during this study are included in
this published article. The data sets are not publicly available due
to the information that could compromise research participants’
privacy.

References
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Nurses’ view of the nature of the support given to parents in the neonatal intensive care unit

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Abstract

Background: Most parents of Neonatal intensive care unit (NICU) babies often expressed dissatisfaction with the nursing care in NICU because of their unaddressed needs, resulting in emotional strain. This raises an essential question of how NICU nurses provide support for the parents. However, this can be relatively challenging in the NICU setting.

Objective: To explore nurses’ views on the nature of parental support provided in NICU settings in Brunei Darussalam.

Methods: This study employed a qualitative research approach conducted in 2020. Ten nurses were individually interviewed in semi-structured interviews. The data were analysed using thematic analysis.

Results: Three broad themes were identified, namely: (1) Emotional and informational support (2) Keeping the support going (3) Seeking help from others. The data provide insights into how nurses provide emotional and informational support to parents in the NICU setting. Challenges were encountered in providing support and were addressed through the involvement of the doctors and emotional support continuity by nursing colleagues.

Conclusion: This paper describes two critical supports given to the parents in the NICU setting and the challenges that underline these supports and proposes strategies used by nurses to help the parents. The balance needed between work demand and parental support is highlighted. In order to give more robust parental support, ongoing interactions with doctors and nursing colleagues are required.

Keywords

intensive care units; neonatal; Brunei; parents; qualitative research; hospitals; nurses

Recent figures on Brunei’s infant mortality rate has indicated an increase whereby the percentage of neonatal deaths was reportedly caused by perinatal conditions and congenital abnormalities (Ministry of Health Brunei Darussalam, 2017). Babies with such conditions usually require an extended stay in NICU (AlJohani et al., 2020). Thus, parents of the patient in the NICU find themselves in an emotional strain. Hence, the NICU nurses need to provide support. However, a NICU setting can be challenging in providing parental support.

Interpersonal relationship with the parents is one of the challenges frequently mentioned in the literature that became a barrier for nurses providing support to NICU parents. Many ethical controversies in NICU result from communication problems between parents and healthcare professionals (Janvier et al., 2014). NICU nurses expressed that interaction with the patient’s parents is challenging as parents are new to the situation (Strandås & Fredriksen, 2015). The stressful workload can lead to miscommunication between nurses, colleagues, and parents, resulting in unnecessary conflict and disagreement (Strandås & Fredriksen, 2015). Work overload limits the time for nurses to interact with parents (Mrlashari et al., 2020). One of the critical problems is the lack of appropriate interactions with parents, such as giving information (Kadivar et al., 2015). Therefore, special attention needs to be given to interact with parents because communication is crucial in supporting the NICU parents.

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The first phase involved the collection of data through interviews and focus groups with parents, nurses, and other healthcare professionals. In contrast, the second phase entailed the analysis of the collected data to establish meaningful broader patterns of insights. The research team reading and re-reading the data collected was crucial for understanding the nurses’ experiences in providing care for critically ill patients and their families. It highlighted the importance of nurse-parent communication in maintaining a positive atmosphere in the NICU setting.

Study Participants
The research participants were recruited using a purposive sampling strategy. The eligible criteria include participants who have at least one year of working experience as registered NICU nurses of RIPAS Hospital and can understand and converse in Malay or English. RIPAS Hospital was chosen as the setting and recruitment centre for this study because most critically ill neonates are referred here for intensive care in Brunei. The nurses were recruited through the gatekeeper, authorised as the middle person between researchers and potential participants. A printed participants’ recruitment sheet with information about the study was given to 17 nurses attending the recruitment. Unfortunately, only ten agreed to participate. The participants’ average work experience was between 6 to 20 years of service.

Data Collection
This study was conducted in Brunei Darussalam between October 2020 and January 2021. The research team conducted individual interviews, whereby a pilot interview session was first conducted with one of the study participants with no significant interview guide changes. The individual interviews were held in a private room within the hospital premises and lasted an average of 57 minutes. Data were collected from October 2020 to January 2021. The data were collected with an interview guide containing six semi-structured and open-ended questions to guide the researcher to focus on the theme. All researchers collected all data. The following open-ended questions were presented in Malay and English: what do you understand with the term providing parental support. Follow-up questions were asked about their educational background related to that aspect, experience and the challenges in providing parental support in NICU. Field notes were taken throughout the interview to ensure a general understanding of what had been shared and prevent any bias on the data collected. The interviews were audio-recorded with consent and were then transcribed verbatim. A calm atmosphere was maintained to encourage the participants to describe their experiences in as much detail as possible.

Data Analysis
All interviews were transcribed verbatim and analysed using six phases of the thematic process described by Braun and Clarke (2021). The first phase involved the research team reading and re-reading to become familiar with its content. In contrast, the second phase entailed coding the transcripts and collating all relevant data extracts for further stages of analysis. The third phase prompted the research team to examine the codes and collected data to establish meaningful broader patterns of potential themes. Phase four involved comparing the themes to the transcripts to ensure they presented a

Methods

Study Design
A qualitative descriptive study design was undertaken as it was the most appropriate in addressing the research questions. It allows Bruneian nurses’ voices to be heard, providing a unique chance to examine the nature of nurses’ support for parents in the NICU setting.
credible story about the data and answered the research question. The fifth phase involved doing a detailed analysis of each theme and defining its scope and focus. Finally, in phase six, the research team combined the analytic narrative and data extracts and contextualised the results in the existing literature. It is critical to highlight that all phases were followed recursively, whereby we moved back and forth between phases. These phases were viewed as a roadmap for analysis, facilitating a complete and in-depth engagement with the data analysis. English words or phrases were used when translating from Malay to English since the source words have an English translation. There were no complicated words or phrases to translate or interpret.

**Trustworthiness**

The four aspects of qualitative research’s trustworthiness are credibility, dependability, conformability, and transferability (Polit & Beck, 2018). All of these aspects have been established in this study. All interviews started with warm-up questions about their views of providing parental supports in the NICU setting. This set of questions ensured that the participants shared a similar understanding of the nature of parental supports with the researchers. All the audio recordings were transcribed verbatim to retain the data analysis and objectivity quality. Meanwhile, quotes from the participants are presented in the findings for conformability. For credibility, the analysis process was finalised in collaboration with all the researchers. The data was saturated during the eighth interview, but two more individual interviews were carried out to ensure no more information emerged. The participants’ age range and level of experience were broad, contributing to the findings’ transferability.

**Ethical considerations**

Permission to recruit, interview and collect data from participants was obtained with full approval from the Joint Committee of the Institute of Health Sciences Research Ethics Committee and Medical and Health Research Ethics Committee (Reference: UBD/PAPRSBIHSREC/2020/78). All participants were given the information sheet on the research study. Participation in the research study is entirely voluntary and consented to by the participants before the interview. They also have the right to withdraw from the study at any time without requiring any reason. All participants’ identities were kept anonymous, and participants were identified in the data using the Participation Identification Number (PIN).

**Results**

The data analysis generated three broad themes that illustrated nurses’ views of their role in providing support to parents in the neonatal intensive care unit: (1) Emotional and informational support, (2) Keeping the support going, (3) Seeking help from others. Quotations of participants are used to illustrate findings.

**Emotional and Informational Support**

The participants in the study agreed that giving emotional support in the NICU setting is critical. There are several ways to deliver this support cited by the participants, such as building rapport with the parents by orienting them on their environment. This can establish a trust relationship with the parents.

We anticipate that the patient’s stay will be lengthy. Parents are already terrified by the word “ICU.” As a result, when they first arrived, we talked with them and became friends with them. This might provide comfort to them as well as support to their parents. All of this enables them to open up to us and ask us questions about their concerns (Participant 10)

While engaging with the parents, the participants stated that they also provide reassurance to help the parents cope with their feelings.

I usually suggest that the parents take a break. All of us here, including the nurses and doctors, are doing our best to help your baby. Just saying that will reassure them and allow them to smile a little, talk to us without feeling embarrassed to ask questions and get information (Participant 8)

While comforting them, the participants also help the parents to focus less on medical treatment and more on the spiritual side of life.

We also advise parents to recite prayers for their babies in times of need. Everything will be well if it is God’s will. All matter must be returned to God (Participant 3)

Participants agreed that parental participation might help parents cope emotionally. They would help the parents care for their baby by holding it and changing diapers. They also allow parents to feed Orogastric Tubes, but they should share a few alert signs they should observe when feeding.

We teach the parents how to give the OGT feeding and observe their baby, as some premature babies become blue while feeding. We also advise them to look out for signs of trouble breathing. Some babies are not tolerating their feeding (Participant 3)

Another salient support reported by the participants is that informational support according to their needs. They also encourage the parents to ask questions to identify their concerns. Moreover, they regularly update the parents on any changes in the baby’s plan, management, and treatment to prepare them.

Parents often ask questions they already know the answers. I think they keep asking until they are satisfied with the answer (Participant 4)

Although giving informational support is essential for the parents, the participants reported that they just explained
the nursing care part and did not elaborate on the medical aspect.

We usually tell parents simple things. For example, our nursing care and the progress of the baby. Usually, parents inquire about their baby's weight (Participant 6)

Participants described that they are generally careful while presenting the baby’s medical condition to avoid misinterpretation, leading to anxieties.

It is unlikely that we fully explain the medical aspect of the neonates' condition or about the surgical procedures. We let doctors explain things to parents. We are afraid of speaking or doing something wrong. Parents will ask questions until they are satisfied (Participant 6)

**Keeping the Support Going**

The participants described the challenges in keeping the supports going, mainly when there is concern about the uncertainties of the baby’s condition. The participants reported finding it difficult to answer, explain, and find the right words to the parents, especially in critical conditions.

When parents ask if their baby is OK or will live, the answer is never simple since each baby is different. Parents usually inquire about the NICU stay of their child. It is difficult to say (Participant 3)

Furthermore, participants mentioned that approaching the parents can be challenging because they cannot accept their newborn’s condition.

It is tough if the parents cannot accept their baby’s situation. Even after we clarify, parents refuse to hear negative stuff about their baby (Participant 4)

Some of the participants also described that approaching parents who have neglected their babies could be difficult.

Some parents only see their babies once in a while. As a result, we are unable to reach them. It is challenging for us to get them to engage in the care (Participant 10)

Furthermore, the participants reported that providing support to the parents had been challenging due to time constraints. This can be due to the imbalanced nurse-patient ratio, work overload, and the need to prioritise the neonates' care.

When there are multiple newborns to look after, it might be difficult to provide timely support to the parents. Parents, of course, require attention. They have some questions. Unfortunately, we do not have the time to assist these parents with many things on our plates (Participant 5)

The workload increases when multiple healthcare professionals see a patient. The multidisciplinary team did not always agree on decisions, and communication was hampered. Thus, providing ongoing information support to parents can be difficult for the nurse.

When multiple teams are caring for the newborn, their plans can conflict. It happened that they forgot to update the other team, and the parents asked us (Participant 5)

**Seeking Help from Others**

The participants explained how they would seek help from the doctor to explain to the parents while they were occupied with their nursing duties to keep the support going. They also stated that when the parents required additional medical information, they would consult with the doctor.

Some parents require detailed explanations. They inquire about X-rays, medicine, and more. So, whenever possible, we would involve doctors in the explanation (Participant 8)

When it comes to providing emotional support, the nurses appear to be prepared with their ideas and enlist the help of other colleagues in addressing the requirements of the parents.

Emotional support takes time. So, I generally ask a colleague to first chat to and comfort the parents (Participant 5)

**Discussion**

The findings provide a glimpse into the nurses’ views of providing parental support in the NICU in Brunei Darussalam. It reveals two primary supports that the participants have delivered to the parents: the emotional and informational. In addition, there are two sets of challenges in keeping the support going, namely the uncertainties and time factors of giving parental support. In order to solve this, they would involve the doctors and their colleagues to help them.

The participants pointed out that they must build rapport with the parents to establish a trust relationship in giving them emotional support. It is stated in a study on parents of premature infants in NICU that the nurses are expected to develop a relationship of confidence with them as a form of emotional support (Gutiérrez et al., 2020). An integrative review of parent satisfaction with care provided in NICU shows that nurse-parent relationships are the most crucial factor in influencing parents' satisfaction with their NICU experience (Cano Giménez & Sánchez-Luna, 2015). It was stated that parental support could be strengthened by developing trust relationships between parents and the healthcare team (Foe et al., 2018). Moreover, in research on the perceived needs of the parents of premature infants in NICU, assurance was found to be a critical need for the parents (Bhandari et al., 2017; Wang et al., 2018). A study on NICU parents who shared what they feel substantial in making their experience better stated that they wanted their voice to be taken seriously, especially when identifying changes in the condition and decisions in caring for their baby (Petty et al., 2019). A study also proves that spiritual care received by the mother in NICU has a lower stress level than those who only received usual care (Küçük Alemdar et al., 2018). The participants also involved the
parents in caring for their children. Parental involvement in infant care, which provides bonding time for both parents and baby, is another element of emotional support. Hence, we support the parents’ autonomy in caring for their baby (Feeley et al., 2016). Bonding time between them was also proven to improve both parents and the baby (Foe et al., 2018; Akkoyun & Tas Arslan, 2019).

Another primary support by the participants in this study is informational support according to the parental need. This is where they encourage parents to ask questions in order to establish their concerns. This act of encouragement is vital because, in a study on NICU parents, they sometimes feel uncomfortable. They do not want to burden the nurses when asking for help (Serlachius et al., 2018). According to the nurses, some parents ask many questions until they are satisfied. This is to accommodate their needs in knowing more information that can reduce anxiety and control their baby (Serlachius et al., 2018). Moreover, nurses also prepare parents by continuously updating parents on any changes in the treatment plans of the baby. Providing adequate information about their baby through effective communication with parents can increase parents’ satisfaction (Sankar et al., 2017).

However, in keeping the support going, the participants experienced several challenges. First is the concern about the uncertainties of the baby’s condition. It is difficult for the participants to approach, answer, explain, and find the right words for the parents, especially when the baby is in critical condition. A study on NICU nurses described challenging factors in their interaction with the parents. It was reported that nurses are more likely to experience a challenging parent-staff interaction when there is medical complexity in the baby’s condition and extended stays in the NICU (Friedman et al., 2018). This causes nurses to balance the parents’ emotional condition and the information shared with the parents to avoid counter-productive feedback and maintain open, transparent and honest communication between the parents to maintain a trust relationship (Strandás & Fredriksen, 2015). Furthermore, this shows that each parent needs individualised parental support from the nurses, which effectively reduces the parents’ anxiety and depression compared to standard care (Cano Giménez & Sánchez-Luna, 2015).

Time was another factor that proved challenging for the participants in delivering their support to the parents. An optimal number of nurses allows them to allocate enough time to support the parents effectively (Akkoyun & Tas Arslan, 2019). The effect of this challenge can be reflected through a study on NICU parents in assessing their satisfaction with systems of NICU care where they shared that there is limited time to answer their concerns (Sankar et al., 2017). In a study on NICU mothers determining the factors and environmental deficit in NICU, it was evident that the mothers felt a lack in the amount and quality of communication with the nursing staff to explain things to attend to their concerns (Williams et al., 2018). A study on physicians’ and nurses’ perspectives on the challenges in implementing family-centred care in NICU stated that work overload limits their time interacting with the NICU parents (Mirlashari et al., 2020). Research on NICU parents’ satisfaction in NICU care suggested less satisfaction in the care and treatment where nursing care was missed, such as comfort and talking to the parents. Their satisfaction is vital as their NICU experience acts as a foundation of their parental role (Lake et al., 2020). Another study on NICU nurses shared the same findings. They also often find it challenging to balance critically ill patients and parents as they need to prioritise caring for the patient in an acute situation (Strandás & Fredriksen, 2015). It was a challenge when duty had similar importance with nurse-parent communication (Kadivar et al., 2015). The findings also revealed that the multidisciplinary healthcare team sometimes does not share the same decision and impaired communication. Continuity of care can be challenging to maintain when there are many other staff involved in the treatment with different professional judgement, opinions and ethical values, which can cause confusion among parents and raise their concern for the well-being of their child (Strandás & Fredriksen, 2015). This usually happens when the interprofessional team cannot reach a common ground in complete agreement and share a decision (Dunn et al., 2018). In addition, parents have reported that there are organisational problems which comprehend on lack of care continuity between staff, inadequate collaboration with other healthcare disciplinary team, absence in a nurse who is taking care of the parents only and poor information giving during handover report to next shift resulting in impaired communication between nurses and parents (Kadivar et al., 2015).

In keeping the support going, the participants would seek help from others; they would involve the doctors and their colleagues in helping them. Thus, they must also provide informational support to the NICU parents regarding the baby’s condition, especially regarding medical-related information, requiring their expertise and robust explanation. To maintain the information support is delivered to the parents, the nurses would seek help from the doctor to explain to the parents when they are occupied with their nursing tasks. Communicating with the healthcare team is a positive interpersonal behaviour that can ensure the quality of nursing care and contribute to a positive workplace culture (Oldland et al., 2020). It is the role of a nurse to collaborate with other health care providers and assist in the medical care while implementing the nursing therapy (Barbosa, 2013).

The study needs further research to understand the challenges experienced by the NICU nurses and why these challenges arise in practice, education and supportive environment. The researchers recommends educational training to deliver emotional support for parents with critically ill babies or medical complexes. This enhances the nurses’ skills and confidence in providing holistic care to the parents and maintaining continuous efficient support.

The study’s main implications for nursing practice, both nationally and internationally, include the urgent need for
nurses to get structured training and resources to equip better and empower them to support parents in such situations, such as emotional support training. Such training may provide personal and professional improvement for nurses and healthcare team members through a focused time of debriefing sessions among the healthcare team. In addition, future research should look into the available resources to parents and provide culturally consistent and structured support in the future.

Conclusion

In this current study, the participants described the emotional and informational supports given to the parents in the NICU setting. While they positively provide such care, they also expressed concern over the embedded challenges. Simultaneously, the participants also reported their attempts to balance work demand and parental support. Continuous engagements with doctors and nursing colleagues are deemed critical in order to provide more robust parental support. This study has extended our understanding of the parents’ perceived emotional and informational supports in the NICU setting. However, this may be constrained through concern over nurses’ ability to manage the work demands. Further research should be undertaken to examine parents’ views of the nurses’ supporting role; this can, in turn, improve the experience and quality of emotional care and informational needs for the parents.

Declaration of Conflicting Interest
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Authors’ Contributions
All authors have equal contributions in this study started from the proposal, data collection, data analysis, final report, and development of the manuscript.

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Data Availability Statement
The data that support the findings of this study are available from the corresponding author upon reasonable request.

References


Assessing the financial burden of hemodialysis treatment in Malaysia

Nur Fatin Aqilah Mohd Fadzli, Ali Aminuddin Mohd Rasani, and Soon Lean Keng

Abstract

Background: Patients with chronic kidney disease (CKD) spend substantial money on hemodialysis (HD) treatment. The growing intersection between socioeconomic status and financial burden represents an emerging challenge to the CKD community.

Objective: This study assessed the financial burden of HD treatment on patients at a Malaysian tertiary teaching hospital.

Methods: A cross-sectional study was carried out in the HD unit at a Malaysian tertiary teaching hospital from January to February 2021. Patients undergoing HD were purposively selected. A self-administered questionnaire was used to collect data on socio-demographic, finances, the patient's health history, treatment costs, and healthcare utilization. In addition, Pearson Chi-Square tests were used to analyze the data.

Results: A total of 100 patients receiving HD treatment were included in the study. The mean age was 62.06 years (SD = 27.50), with 52% reporting moderate financial burdens. The financial burden was associated with employment status, salary, and income class among HD patients (p <0.05).

Conclusion: Evidence showed a large proportion of Malaysian patients receiving HD treatment came from the B40 income bracket. The findings indicate that financial burdens can impact HD patients and are related to employment status, salary, and income class. Therefore, the ability to identify HD patients’ financial needs is critical in nursing practice.

Keywords
hemodialysis; chronic kidney disease; renal dialysis; health care cost; financial burden; nursing; Malaysia

Chronic kidney disease (CKD) is a leading cause of morbidity and mortality worldwide. According to the 2015 Global Burden of Disease report, 1.2 million people died due to kidney disease (Kassebaum et al., 2016). A population-based study of CKD in Malaysia in 2011 found that the prevalence of CKD was 9.07 percent, rising to 15.48 percent in 2018, accounting for approximately 3.85 percent stage 1 CKD, 4.82 percent stage 2 CKD, and 6.48 percent stage 3 CKD, with 0.33 percent stage 4–5 CKD (Saminathan et al., 2020). In Malaysia, an increasing trend of end-stage renal disease indicated a need for dialysis treatment, with an incidence rate of 216 per million in population in 2016 (Wong & Goh, 2018).

For decades, the number of CKD patients requiring dialysis has increased, with 50 million patients worldwide requiring HD treatment. The global dialysis population is rising, particularly in low- and middle-income countries. However, a significant number of people worldwide lack access to dialysis and kidney replacement therapy, and millions die each year from kidney failure, often without supportive care (Himmelfarb et al., 2020). At the start of treatment, most HD patients were given a thrice-weekly schedule. An incremental approach to dialysis initiation (starting at 1-2/week and increasing as needed) may offer potential benefits such as preservation of residual renal function, fistula preservation, and cost savings (Jahan & Wolley, 2019). However, the demand for HD treatment consumes a disproportionate share of the national healthcare budget (Bavanandan et al., 2016). It consumes a disproportionate share of Malaysia’s limited healthcare resources (Surendra et al., 2018).

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Although the cost of dialysis is relatively low in many Asian countries when compared to income, these figures become unaffordable (Prasad & Jha, 2015). HD treatment is an expensive procedure requiring specialized resources and significantly burdens patients, families, and healthcare systems (Al-Shdaifat & Manaf, 2013). In Malaysia, a hybrid private-public model for financing dialysis therapy from non-governmental organizations (NGOs) shows that the cost of HD tripled between 2004 and 2015. According to the 24th Malaysian Dialysis and Transplant Registry (MDTR), 37183 patients received dialysis in 2015. The figure increased by two and a half times from 15087 in 2006. In 2006, there were 3710 newly diagnosed HD patients; however, by 2014, the prevalence had more than doubled to 7597 (Wong & Goh, 2018). In Malaysia, the government has remained the primary source of dialysis funding (63 percent). These funds were used to provide subsidies to non-profit HD centers and payment for dialysis treatment in private facilities for public pensioners, civil servants, and their dependents. Out-of-pocket costs or self-funding accounted for 17.3 percent, with charity accounting for 14.7 percent (Wong & Goh, 2018).

HD treatment is an expensive procedure that burdens patients and necessitates social care. Therefore, HD imposes a significant burden on patients and the healthcare system (Al-Shdaifat & Manaf, 2013; Li et al., 2021). The rise in the incidence and prevalence of HD and CKD, as well as the loss of financial support, household income, HD medication, and treatment costs, all play a significant role in influencing the financial burden (Al-Shdaifat & Manaf, 2013; Ismail et al., 2019; Li et al., 2021). Malaysians are classified into three income groups based on their median monthly household income: B40, M40, and T20. B40 represents the bottom 40% of Malaysian household income, M40 represents the middle 40%, and T20 represents the top 20%. B40 are lower-income groups, with monthly household incomes less than MYR4850. M40 is a middle-income group, with monthly household income ranging from MYR4851 to MYR10970. The upper class, T20, is defined as a household with a monthly income that exceeds MYR10971 (Department of Statistics Malaysia (DOSM), 2019). As a result, the operational definition of financial burden in this study is those HD participants who earn a monthly household income of less than MYR4850, implying that they are financially incapable of paying for HD treatment. In light of this burden, nurses play an essential role in determining a patient's financial capacity for medical treatment costs, including social referral coordination (Karam et al., 2021). Therefore, this study could help the nursing profession assess patients' socioeconomic status, especially those in the lower-income bracket, for the social and financial referral. While evidence suggests that the prevalence of CKD is rapidly increasing in Malaysia, little is known about how much HD treatment costs due to the financial burden. As a result, the purpose of this study is to assess the financial burden of HD treatment on patients at a Malaysian tertiary teaching hospital.

Methods

Study Design

A cross-sectional study was conducted at a Malaysian tertiary teaching hospital. The study setting was selected based on the hospital committed to achieving functions as a teaching and referral hospital in the northeast of peninsular Malaysia.

Participants

A purposive sampling technique was adopted in this study. The study population comprised patients in the HD unit with the following inclusion criteria: 1) Diagnosed CKD patients aged 18 years and above undergoing HD and 2) consented voluntarily in the study. Participants who had dialysis time <1 year or dialysis is not regular, who cannot cooperate in the survey, with dementia, mental problems, disturbance of consciousness, abnormal communications, or severe complications, were excluded from the study. The sample size was calculated based on Thapa et al. (2021) using the following parameters: the standard normal distribution value was 1.96, α (two-tailed) of 0.05, β of 0.20, and the expected correlation coefficient (r) of 0.3, the minimum required sample size was 85. There may have been cases where patients were unwilling to continue participating in the study. As a result, a 20% non-response rate was used, and the sample size was 102.

Measures

Data collection utilized a self-administered questionnaire adapted from Al-Shdaifat and Manaf (2013) with permission. The questionnaire consisted of four parts, A, B, C, and D. Part A consists of socio-demographic data such as age, gender, employment status, treatment status, and monthly household income. Part B consists of items on financial data such as monthly household income, financial use before and after treatment, the main source of income before and after treatment, and any prescriptive on traditional. Part C consists of items about the patient’s health history and related costs such as a session of HD a week, type of transportation, cost of transportation go and return of HD, medications and other medical supplies, and any alteration in working hours during HD treatment. Finally, part D consists of items that aim to trace the number of visits to the clinic, private or public hospital, and the amount spent.

Scoring for the socioeconomic was performed on employment status, treatment status, and impact. For employment status, no score for unemployment and one score for employed. For funded treatment status, fully funded was 0, semi-funded was two scores, and self-funded was three. For impact, one score was allocated for negative impact while no score for no negative impact. Participants with 1-2 (76-100%) scores for negative impacts were labeled as a less financial burden. Participants who scored 3-5 (51-75%) scores were labeled as a moderate financial burden. Those participants who scored 6-8 (76-100%) were labeled as having a significant

financial burden. In determining questionnaires’ appropriateness and ethical soundness, a pilot study was performed to pretest the questionnaire with 5% of the sample size among HD patients who did not form part of the study participants. The internal consistency coefficient (Cronbach’s α) was 0.74, considered a good reliability value.

**Data Collection**

Data collection was performed at the HD Unit from early January 2021 to the end of February 2021. A structured self-administered questionnaire in Bahasa Malaysia language (local language), forward-backward translated and validated, was employed to suit the study participants' language. Two independent researchers and one from the Language Unit reviewed and pre-tested the final Bahasa Malaysia questionnaire for appearance and content. A pilot test was performed on 5% HD patients, not included in the actual study. The selected HD patients’ lists were disseminated to the researchers for verification and recruitment by the HD nurse on duty. In addition, the researchers verified participants’ status for recruitment eligibility for any disabilities that prohibit them from participating in this study. If the selected participant refused to participate in the study, the participant was excluded, and a new participant was selected purposively by the researchers.

**Data Analysis**

The collected data were entered into the Statistical Package for Social Sciences (SPSS) version 24 program. Descriptive statistics were used (means, standard deviations, frequencies, and percentages). Pearson Chi-square was used to test the association between socio-demographic data (employment status and monthly household income) and financial burden in HD patients. The results of the pilot test and incomplete questionnaires were excluded from the final analysis. A p-value of 0.05 was considered significantly associated with the outcome variable in all variables.

**Ethical Considerations**

The study was approved by the institution’s human research ethics committees (USM/JEPeM/20120645). All participants were given patient information sheets and signed informed consent forms to give their permission to be a part of the study. The study was carried out following the Helsinki Declaration and institutional requirements. Coded numbers were used during data collection to ensure anonymity and confidentiality.

**Results**

The study enlisted a total of 100 HD patients (98% response rate). The participants’ mean age was 62.06 years (SD = 27.50), with females outnumbering males by 55% to 45%. More than three-quarters (77%) belonged to the aged group of 40-55 years. Most of the participants (78%) were married. A little less than half of the HD participants (46%) had completed secondary school. Most HD participants (55%) were unemployed during HD treatment, while 45% were employed. For treatment status, it was observed that the government fully funded most participants (62%). The remainder, 13% and 25% were semi-funded and self-funded, respectively. On monthly household income, 7% of participants had more than MYR5000, and 27% ranged from MYR3000-5000. The remainder, 35% had MYR2000-3000; 12% had MYR1000-2000, while 19% had MYR below MYR1000 (Table 1).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean (SD)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-28</td>
<td>62.06 (27.50)</td>
<td>9</td>
<td>9.0</td>
</tr>
<tr>
<td>29-39</td>
<td></td>
<td>14</td>
<td>14.0</td>
</tr>
<tr>
<td>40-55</td>
<td></td>
<td>77</td>
<td>77.0</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td>45</td>
<td>45.0</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>55</td>
<td>55.0</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td></td>
<td>55</td>
<td>55.0</td>
</tr>
<tr>
<td>Unemployed</td>
<td></td>
<td>45</td>
<td>45.0</td>
</tr>
<tr>
<td>Treatment status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fully funded</td>
<td></td>
<td>62</td>
<td>62.0</td>
</tr>
<tr>
<td>Semi funded</td>
<td></td>
<td>13</td>
<td>13.0</td>
</tr>
<tr>
<td>Self-funded</td>
<td></td>
<td>25</td>
<td>25.0</td>
</tr>
</tbody>
</table>

| Monthly household income (MYR) |     |     |
| ---                           |     |     |
| < MYR 1000                    | 19  | 19.0|
| MYR 1000-2000                 | 12  | 12.0|
| MYR 2000-3000                 | 35  | 35.0|
| MYR 3000-5000                 | 27  | 27.0|
| MYR >5000                     | 7   | 7.0|

MYR – The Malaysian Ringgit, the currency of Malaysia

On the level of financial burden, it was observed that most HD participants (52%) faced a moderate burden, of which the remainder 24% and 24% had a high and low burden, respectively. There was no significant association between the level of the financial burden and the variables (gender, age, and treatment status). However, a significant association was found between the level of the financial burden and socio-demographic variables, monthly household income (p = 0.006), employment status (p = 0.001), and income categories (p = 0.023) of HD participants with more than three-quarters (93%) falling into the B40 category. Therefore, the distribution of five categories of monthly household income was listed B40, M40, and T20 to categorize the participants’ income tiers (Table 2).
Table 2: Association of socio-demographic variables and financial burden among HD participants (N = 100)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Level of financial burden, n (%)</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment status</td>
<td>Low (45), Moderate (22), High (0)</td>
<td>0.001*</td>
</tr>
<tr>
<td>Employed</td>
<td>45 (45.0)</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>55 (55.0)</td>
<td></td>
</tr>
<tr>
<td>Monthly household income</td>
<td>Low (1), Moderate (13), High (7)</td>
<td>0.006*</td>
</tr>
<tr>
<td>&lt; MYR1000</td>
<td>1 (1.0)</td>
<td></td>
</tr>
<tr>
<td>MYR1000-2000</td>
<td>3 (3.0)</td>
<td></td>
</tr>
<tr>
<td>MYR 2000-3000</td>
<td>11 (11.0)</td>
<td></td>
</tr>
<tr>
<td>MYR 3000-5000</td>
<td>11 (11.0)</td>
<td></td>
</tr>
<tr>
<td>&gt; MYR 5000</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Income tiers categories</td>
<td>Low (23), Moderate (47), High (23)</td>
<td>0.023*</td>
</tr>
<tr>
<td>B40</td>
<td>23 (23.0)</td>
<td></td>
</tr>
<tr>
<td>M40</td>
<td>1 (1.0)</td>
<td></td>
</tr>
<tr>
<td>T20</td>
<td>1 (1.0)</td>
<td></td>
</tr>
</tbody>
</table>

*pPearson Chi-square test, p ≤0.05, was considered to be statistically significant

Discussion

CKD is a significant and growing driver of the global non-communicable disease burden. Approximately 40,000 individuals are on dialysis in Malaysia, and an estimated more than 7000 new patients are diagnosed with CKD every year (Murugesan, 2019). According to this study, the average age of HD participants was 62.06 years (SD=27.50), and 55 percent were female. In contrast to the Malaysian Dialysis and Transplant Registry 2015 (Malaysian Society of Nephrology, 2015), our study found that patients diagnosed with CKD under 65 had an increased need for HD treatment. Worldwide, the incidence of the elderly has increased in recent decades, resulting in a rapidly growing number of older patients beginning HD treatment (Shah et al., 2018). As a result, our healthcare systems will face significant challenges, as this population will require more healthcare for comorbid conditions. Our study observed that females comprise the higher proportion of the HD population. Similar results were also found in Shah et al. (2018) on 1247 HD patients in Portugal and Poland, where a higher percentage of women had HD treatment. Although CKD disproportionately affects both genders and ages, disparities in HD utilization among males and females; and age groups after accounting for pre-dialysis health are not well studied. According to Maddux (2018) on gender differences in CKD, people have come a long way in understanding how CKD affects men and women differently. She also emphasized the importance of better understanding why women are more likely than men to be diagnosed with CKD but have poorer treatment outcomes, indicating the need to investigate this issue. As a result, efforts and research are required to investigate the systematic underlying mechanisms of gender and age group disparities in HD practices.

Although our study only included HD patients from a single-center, it demonstrates that the financial burden of HD treatment costs can be substantial and overwhelming when correlated with socioeconomic status. This study adds to the body of knowledge about monthly household income, employment status, income categories, and the financial burden of HD treatments in Malaysia. We discovered that more than three-quarters (93%) of Malaysian households with HD patients were in the B40 income bracket. For people with low and middle incomes, the rising out-of-pocket costs of HD treatment, as well as living with CKD and its comorbid conditions, can be overwhelming. According to the World Bank’s Human Capital Index 2018, Malaysia ranks 55th out of 157 countries, achieving the country’s goal of becoming a developed country while remaining classified as a middle-income country (World Bank, 2020). Thus, the scenario for B40 CKD patients appears bleak and disheartening. The public sector funds the majority of HD treatment (67.1 percent), which includes not only the Ministry of Health (MOH) but also multiple organizations owned by either the federal or state governments (Malaysian Society of Nephrology, 2015).

However, only a few people were able to receive dialysis treatment. Therefore, making life-changing decisions about affording HD treatments and managing life can be difficult for the B40 category group. Furthermore, dialysis treatment rates in all Malaysian states have surpassed 100 per million state population. As a result, the financial burden of HD may be stressful for the B40 group, which accounted for 93 percent of the study subjects. In line with previous research (Prasad & Jha, 2015; Surendra et al., 2018), our findings show that the financial burden of HD treatment is significant. Although the cost of dialysis in Malaysia is relatively low with income, these figures quickly become unaffordable. However, our study’s findings indicate that participants (62 percent) who reported being fully funded may not have faced a financial burden.

Nonetheless, 13% and 25% were semi-funded and 25% self-funded, respectively, while 45% were unemployed. As a result, this suggests that the HD patients in the B40 category were from a lower socioeconomic background and were more likely to succumb to the disease if they did not receive HD treatment. The national dialysis provision is awaiting approval of a dialysis welfare subsidy from the Malaysian Ministry of Health (MOH) or acceptance into the MOH dialysis program when a vacancy
becomes available. According to Himmelfarb et al. (2020), the global dialysis population is growing, particularly in low- and middle-income countries. As a result, millions of people die each year from kidney failure, often without receiving supportive care. As a result, nurses can play a significant role in assessing the patient’s financial capabilities for medical treatment costs in nursing practice, including social referral coordination as needed (Karam et al., 2021).

Similarly, World Kidney Day (2015) reported that millions of people die each year because they do not have access to affordable dialysis. Furthermore, Malaysia’s economy has been at its worst since the Asian financial crisis of 1998 (Shukry, 2021). The financial burden can have an impact on patients’ access to medical care. A CKD or ESRD patient, for example, may avoid HD treatment. As a result, this study emphasizes the overarching message that significant efforts are required to support transformative changes in accessible HD treatment.

The current study finds no significant association between the level of financial burden and variables (gender, age, and treatment status). As a result, additional research is required to confirm it. In addition, other studies on HD treatment costs and outcomes are also necessary for the government to provide dialysis in Malaysia. In addition, there are several limitations to the study. For starters, only HD patients in one setting were included for practical reasons, which may not represent the entire picture of Malaysia’s household financial burden and poverty impacts of HD treatment. Second, due to a lack of local data, it is impossible to compare the findings of this study to those of other contexts.

Conclusion

Evidence shows a large proportion of Malaysian patients receiving HD treatment came from the B40 income bracket. The findings indicate that financial burdens can impact HD patients and are related to employment status, salary, and income class. As a result, the ability to identify HD patients' financial needs is critical in nursing practice.

Declaration of Conflicting Interest

The authors have no conflict of interest to disclose.

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Authors’ Contributions

All the authors contributed equally to the conception and design of the study; approved the final version of the article. NFA conducted the study and data analysis. AAMR supervised the research activities. AAMR and SLK contributed to drafting the article and involved the critical revision of the article.


Resilience among nurses working in paediatric wards in Brunei Darussalam: A qualitative study

Nur Raihan Ramli¹, Hjh Siti Nor’ainah Hj Mohd Noor², and Yusrita Zolkefli*³

Abstract
Background: Resilience has become highly relevant for nurses working to avoid the negative impact of stress and maximise the positive benefits.
Objective: This study aimed to explore and describe experiences of resilience among nurses when they first started working in paediatric wards.
Methods: A qualitative, interpretive descriptive approach was used to guide the study. Purposive sampling was employed to recruit 8 participants, which proved sufficient to achieve theoretical saturation. Semi-structured individual interviews were conducted in 2020 and audio recorded. An inductive analytic approach was utilised.
Results: Three overarching themes arose from the analysis: (1) The transition period (2) Gaining the trust of others (3) Having a positive mindset.
Conclusion: This study found that nurses used multiple strategies of resilience in order to cope with workplace stress when they first began the transition period. However, as they become familiar with the workplace and gain the trust of others, this factor enables nurses to have a positive outlook toward job setbacks.

Keywords
resilience; psychological adaptation; nurses; paediatric; Brunei; workplace; optimism

Like any other profession, nursing has its benefits and challenges, where it has been known to be a challenging profession that is physically and emotionally demanding. Being a nurse is presently a vast and diverse role that requires relentless work lasting from seven to longer hours to provide daily care for patients' physical, emotional, and spiritual needs. Working in a stressful environment, nurses need to have resilience as a protective factor for their physical, mental, and emotional well-being, such as fatigue, unhappiness, depression, and emotional exhaustion (Yilmaz, 2017). Resilience is defined as overcoming stress or the ability to rebound from adversity and overcome a difficult situation in life, such as trauma, threats, tragedies, interpersonal problems, serious health problems and coping with changes or disasters (Çam & Büyükbayram, 2017). The diversity of resilience approaches in response to the challenges that nurses endure are classified into physical resilience, which includes physical activity and outside interests (Robertson et al., 2016); social resilience, which provides for social support or relationships, gives great credence, and modifies current behaviours (Manomenidis et al., 2019); and psychological resilience, which includes holistic self-care, positive emotions, and self-control (Shin et al., 2018).

Every year, hospitals are prepared to recruit nurses to replace retiring senior nurses, resulting in an increased demand for nurses. It is however salient that those pursuing this nursing career are expected to be mentally and physically well-prepared for all the challenges that await. It can be challenging at times, particularly for new graduate nurses making the transition from graduate nursing student to professional nurse whereby they are highly expected to work skilfully. It is stated that the most vulnerable time as a graduate nurse is during the first 12 to

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24 months in practice (Parker et al., 2014). Several studies also found that nurses find the transitioning period challenging, stressful, and emotionally exhausting. For example, Ankers et al. (2018) reported that the variety of demands placed on nurses throughout their transition stage may cause them to feel shocked, leading to negative emotions.

Since 2015, when the first Women and Children Centre was officially opened in Brunei Darussalam, there has been a significant increase in the recruitment of new graduate nurses to work in the paediatric settings. Paediatric settings have different services in terms of care and treatment than nurses in adult wards due to physiological and emotional differences between adults and children. Because they provide care to vulnerable paediatric patients with a high potential for emotional interaction and underlying complexities, the nurses may face different challenges than nurses who care for adult patients (Buckley et al., 2020). According to a recent study by (Waterworth & Grace, 2021), paediatric nurses show deficient levels of resilience and a high rate of burnout. Hence, to develop better insights into such resilience, we sought to explore and describe the resilience experience of nurses when they first started working in paediatric wards.

Methods

Study Design

The qualitative approach used in this study was based on Thorne (2016) interpretative description design. This approach laid the framework for data collecting and analysis, allowing researchers to look at everyday nursing practice in relation to social, personal, and organisational constructs.

Study Participants

The study participants were recruited using a purposive sampling strategy involving seven paediatric wards in the largest hospital of Brunei, RIPAS Hospital, namely Paediatric General Ward, Isolation Ward, Acute Paediatric Unit (APU), High Dependency Unit (HDU), Neonatal Intensive Care Unit (NICU), Paediatric Intensive Care Unit (PICU), and Special Care Baby Unit (SCBU). The researcher did not have any direct contact with the participants before the commencement of the study. Therefore, the gatekeepers played a role in limiting to limit possible bias. The inclusion criterion was that the participants had to be registered nurses with less than six years of working experience and had at least one month’s work experience in any paediatric ward. This is to increase the probability of having adequate working exposure. The participants were approached face-to-face through a single recruitment briefing, narrowing down to 19 nurses in total. They were then informed about the research study and the interview process. As a result, a total of eight paediatric nurses agreed to participate in the study. Nonetheless, more than half of the potential volunteers were unable to participate due to their hectic schedules, and some did not fit the study’s inclusion criteria.

Data Collection

This study was conducted in Brunei Darussalam between October 2020 and December 2020. The research team conducted semi-structured individual face to face interviews. Participants were asked to describe their early experiences and reflections on their roles in paediatric wards and how they have developed their sense of resilience in the workplace. Depending on the interview, further follow-up questions were used for clarification when needed, such as “Can you tell me more about that?” and “Can you give an example?” The interview lasted between 25 - 85 minutes. After the eighth interview, the researcher observed repetitive and similar responses from the subjects, indicating that the data had achieved saturation.

Data Analysis

We used an inductive analytic approach in this study, based on Thorne (2016) method, to find patterns in the participants’ experiences and better understand the phenomenon unique to their social and personal context within the clinical practice setting. Data analysis was used throughout the data collection process to look for emergent themes and patterns based on the participants’ responses, which referred to their experiences and perspectives when they first started working in paediatric wards (Thorne, 2016). Within and across transcripts, participant narratives were compared and contrasted to see if any emerging patterns or relationships matched the data acquired from previous interviews and transcripts. Patterns in the data were compared and contrasted to see if they reflected our interpretation of the nurses’ experiences or if they contradicted our interpretation (Thorne, 2016). The research team compared the findings to audio data interviews and written transcriptions to ensure that the data was authentic. The transcripts were not returned to participants for any comments and corrections. English words or phrases were used when translating from Malay to English since the source words have an English translation. There were no complicated words or phrases to translate or interpret.

Trustworthiness

This study utilised the Consolidated Criteria for Reporting Qualitative research (COREQ) to guide the reporting (Tong et al., 2007). Using purposive sampling ensured that the participants’ accounts offered adequate descriptions of the phenomenon under study. The interviews were guided by semi-structured open-ended questions that allowed them to express as much as they wanted regarding their experiences freely. The discussions strove to promote dialogue and asked for clarification of the narratives to achieve credibility.

Furthermore, the analysis process was conducted in a reflective dialogue between the researchers. The research team conducted the interviews for dependability,
transcribed the recordings verbatim, and quotes from the nurses were presented in the findings for conformability. The research team performed coding, analysing, and categorising of the data. The team then further checked and confirmed the data to reach a consensus on allocating and matching findings to sub-themes and themes. The results might be transferred to improve other nurses' understanding of the quality of care, getting to know each detail and information, and a positive mindset with sufficient representation by the participants’ quotes.

Ethical Considerations
A Joint Committee of Institute of Health Sciences Research Ethics Committee and Medical and Health Research Ethics Committee approved the research (Reference: UBD/PAPR SBIHSREC/2020/41). The four ethical principles of respect, autonomy, beneficence, non-maleficence, and justice, were considered. The heads of the hospital and paediatric wards gave their approval for the study. All participants were given verbal and written information about the study’s aim, including its design, and that their participation was voluntary. They have the option to withdraw at any point before the data analysis. All participants provided written informed consent, and data confidentiality was maintained at all times.

Results
The participants were aged between 23 and 31 years old, consisting of one male and seven female participants. Two work in the Paediatric General ward, four work in the acute wards and two in intensive care settings. They had worked as paediatric nurses for a period ranging between one and six years. Only half of the participants had previous clinical experience in the paediatric department as student nurses. None had undergone paediatric nursing training. Three overarching themes were identified from the analysis: (1) The transition period, (2) Gaining the trust of others (3) Having a positive mindset.

The transition period
This theme describes how the participants feel about their role during the transition at their workplace. They were very well aware that they lacked experience in caring for paediatric patients. Half of the participants expressed anxiety about working as paediatric nurses because they had no practical experience in paediatric wards throughout their student years. As one participant put it, Initially, I had no experience in paediatric nursing because I chose community and operating theatre as my elective course. I was scared when handling kids as I did not know how to (Participant 7)

Despite this, the participants with clinical experience in paediatric wards had concerns about their abilities during their student year. Some participants reported that their clinical experience in certain paediatric wards was restricted to a few days and that their practical involvement was minimal. The majority of them were only permitted to observe clinical procedures. The participants reported feeling anxious about treating paediatric patients since they lacked expertise and had no paediatric nursing training. To them, the health of paediatric patients is more delicate than that of adults, and hence they must be more attentive and efficient when caring for paediatric patients.

The majority of the participants believed that enhancing their knowledge is one strategy to address the difficulty. This is performed by enlisting the support of co-workers who are willing to mentor them in order to improve their performance at work. Several participants believed that having a colleague from the same cohort has aided them in sharing their experiences and learning from one another’s mistakes. Furthermore, most of them highlighted the importance of consulting an expert such as a senior nurse or a doctor when in doubt.

You always have to ask, even if sometimes the question may seem dumb. You have to ask if you are unsure. You just have to ask. Do not act as if you know, or you will end up getting scolded (Participants 1 & 5)

During the transition period, several participants suggested about taking as much opportunity as possible to be more familiar with the practice. However, few reported that some co-workers seem reluctant to assist, particularly when too many questions are asked. The expectation was placed on new nurses to learn on their own, which was a common practice at the time. Participants emphasised the need to develop self-care by reflecting on themselves and engaging in activities that keep them focused and develop their knowledge. This can be accomplished by having a place or someone to express oneself to, praying, engaging in recreational activities, or working out to relieve stress after a long day at work. The participants described that self-care could provide them with a sense of relief and regain the strength they need to continue working.

Sometimes I catch up with my friend, vent and seek entertainment. Sometimes, I need to rest and do sports to improve my performance, which I find helpful (Participants 7 & 8)

Gaining the trust of others
Most participants found it difficult to get to know their patients, families, co-workers, and doctors as they transitioned into their jobs. The patient-family-nurse relationship, nurse-nurse relationship, and nurse-doctor relationship are all subthemes of this theme. Several participants held that it was difficult to perform a procedure on paediatric patients in a patient-nurse interaction. They stated that they would require one or more staff to undertake certain procedures because a child would not remain, for example during intravenous cannulation. In some cases, the participants observed that most paediatric patients would not cooperate since they are terrified or may even cry, making any assessment impossible for most
nurses. In developing a rapport with the patient, the participants emphasised the need to interact with the child and convince them when performing any procedure. One participant shared:

I will ask them, “How are you today?” or persuade them by giving them a sticker if they cooperate during the procedure (Participant 2)

Meanwhile, since family members frequently accompany a child, the participants described how it might be challenging for inexperienced nurses to deal with the patient’s family, particularly when the parents press them with questions. On the other hand, some participants do not view parents as a threat. They accept and value the fact that parents are apprehensive and have several concerns. When the participants recognise the parents' anxiety, they must be prepared to reassure or discuss with them.

In a nurse-nurse relationship, the participants mentioned about getting along with senior nurses or co-workers at their workplace. The majority of them stated that they struggle to establish rapport with their co-workers in order to understand their personalities. Several participants reported encountering uncomfortable situations on the ward, including inappropriate comments, ragging, bullying, and backbiting. These incidents cause distress and may even result in a breakdown for some participants.

If they do not trust me, I respect their decisions, but their way of speaking does affect my mentality. If they are disrespectful, it tends to discourage me. I do not want any nurses to go through this (Participant 6)

The majority of participants felt that being helpful and demonstrating one’s competence to perform the skill ensures and earns their trust. One participant expressed:

For me, all the little things we do to help them can make them feel appreciated (Participant 3)

Some participants described that it takes a while to get to know one another; therefore, they have to know when to talk and approach each co-worker. Moreover, several participants would try to start a conversation to build rapport with their co-workers.

Besides getting along with patients, their family and co-workers, most participants find it challenging to get along with doctors. Several have stated that they struggle to establish rapport with their doctors, and that they must be cognisant of a particular doctor's rigidity. Furthermore, some doctors would prefer looking for a senior nurse even when the particular nurse is not in charge. These instances create an impression among some participants that some doctors do not trust newly employed nurses.

Some doctors do not want new nurses when they make their rounds. Senior nurses, on the other hand, are preferred. Senior nurses, I believe, have a good understanding of how doctors conduct rounds and what they want without having to be reminded repeatedly (Participant 5)

However, most participants held that they would try to know the doctor’s routine by meticulously observing their ward rounds. Some participants would prepare the information and respond to the doctor's inquiries to persuade and gain the doctor’s trust and demonstrate independence.

**Having a positive mindset**

This theme describes the participants understanding of resilience working in paediatric wards and its value towards themselves and others. The majority of them defined resilience as having a positive mind in their everyday work despite all the challenges they face as a nurse. They have taken into account a psychological approach of resilience when overcoming the challenges at their workplace. Their psychological perspective involves focusing on the positive aspect of the event. The participants revealed that they tend to accept what they have experienced since the beginning of their work in the ward and focus on providing care for patients.

The strength comes from my mindset. I have to think positive to be a better nurse. If I think negatively, it will affect my performance (Participants 5 & 6)

Instead of dwelling on negativity, the participants motivated themselves to stay strong and push themselves for self-improvement. It was learned from the interviews that the value of resilience is for the character growth of nurses to broaden knowledge for their satisfaction. Aside from physical and social resilience, being psychologically resilient has helped them endure stress at the workplace.

One participant pointed out the presence of resilience in oneself.

If you do not have resilience, I do not think you can deal with the daily stresses that change day by day because stress experienced in one day is different from the next day and the day after, so if you cannot cope with the daily changes, I think the stress would add up (Participant 1)

The participants were mindful of the challenges they go through physically and socially and how this could also have psychological effects as these challenges interlink. The participants' ability to stay positive in their everyday work enables them to manage their mental health, emotions, and relationships.

**Discussion**

This study entails the participants’ experiences and common challenges when working in paediatric wards and how they have empowered them by demonstrating the three resilience approaches: physical, social, and psychological resilience. They do not specifically use the term ‘resilience’. However, they show the same elements that develop their resilience. Firstly, the study indicates that
the participants described their transition period when working in the paediatric setting. The transition period involves an effort towards increasing knowledge and self-care. The majority of them verbalised a lack of experience in paediatric care for nurses who do not have previous experience and those who have previous experience during their student years.

Furthermore, none of the participants in this current study has undergone pediatric nursing training, making them question their capability to perform their tasks. Previous studies reported that newly registered nurses felt immense pressure and stress for being lost due to inadequate knowledge and lack of experience for work (Woo & Newman, 2020). Consistent with Latimer et al. (2017), higher secondary trauma and burnout were experienced by the nurses with less experience. In Freeling and Parker (2015) study, experienced nurses viewed new graduate nurses lacking clinical experience and appropriate content during academic programmes. Even though previous studies are not pediatric-focused, a lack of experience is still the main challenge that new nurses face at their workplace. In response to a lack of experience, the participants seek guidance by asking for help from senior co-workers, other nurses, and doctors to increase their knowledge. Martin and Wilson (2011) established that graduate nurses have the highest incidence of errors and mistakes during their first few months. Therefore, the availability of experienced nurses’ support can be safer for the graduate nurse and improve patient care (Pineau Stam et al., 2015).

Providing adequate supportive educational measures for the nurses is based on the adequate contribution of the senior organisational level (Pineau Stam et al., 2015). Nevertheless, some co-workers were reluctant to help the participants. Similar studies were carried out where other nurses were considered unavailable or unconcerned in assisting the new nurses (Parker et al., 2014). In another study where all qualified registered nurses seek help when encountering difficulties, it becomes difficult to work around co-workers with challenging personalities (Teoh & Lim, 2019). Eventually, the nurses to experience stress can lead to potentially negative patient outcomes (Gardiner & Sheen, 2016) and hinder them from becoming competent nurses (Martin & Wilson, 2011). Even so, one study explored that the new qualified registered nurses would do a further reading at home to improve their clinical knowledge and skills (Baumberger-Henry, 2012), which the participants in this current study less frequently did.

Self-care can be defined as a care process by any action or behaviour that helps their well-being. This approach is considered physical resilience, which refers to the ability of the body to adapt to challenges and recover from them (Hurley, 2020). Like Berger et al. (2015), pediatric nurses used prayer, counselling, exercise, humour, and distraction coping strategies. Alternatively, self-care was an effective strategy and developed physical resilience to overcome stress at work. Practising self-care by looking after one’s emotional and physical health is a professional’s responsibility to provide quality care (Shimoinaba et al., 2015).

Secondly, gaining the trust of others in the workplace, including patients, family members, co-workers, and doctors, was the challenges that participants encountered in building social resilience. Social resilience indicates individuals or communities’ ability to tolerate, absorb, and adjust to environmental and social threats of various kinds (Keck & Sakdapolrak, 2013). When caring for paediatric patients, most participants find it challenging to perform assessments and procedures as most paediatric patients they had encountered were uncooperative, similar to a study of nurses working with children with chronic conditions, where they acknowledged their patients as non-compliant (Buckley et al., 2020). Different studies found higher levels of burnout in pediatric nurses who cared for specific patient populations, such as children with cerebral palsy (Vicentic et al., 2016). However, only several participants highlight their concern about caring for paediatric patients with uncommon diagnoses for the current study. Most participants highlighted challenges in giving care for paediatric patients in general. Other than uncooperative paediatric patients, the participants were concerned about reassuring family members, especially parents who ask too many questions. A similar study revealed the work is demanding as the nature of care requires them to work closely with the parents, especially when they encounter challenging parents such as angry, distrustful, confrontational, and demanding special attention (Dix et al., 2012).

Apart from that, having a supportive environment is necessary at the workplace. However, some participants in this study experienced difficulties getting along with their ward co-workers, where some encountered unpleasant events such as offensive conversations, ragging, bullying, and backbiting. Other studies faced similar problems with nurses they closely worked with, especially senior nurses, and described it as unprofessional behaviour (Freeling & Parker, 2015) or horizontal violence (Parker et al., 2014). Consistent with this finding, some participants end up in a breakdown. Walker et al. (2013) suggested that desensitisation and acceptance of this culture is one reason nurse unit managers may not be aware of this type of behaviour. These negative behaviours have been shown to cause the nurses resistant to ask their co-workers for help (Kelly & McAllister, 2013).

Aside from nurses, the participants also described the difficulties getting along with the doctors, where they remarked that the doctor would prefer senior nurses instead. Another study described doctors as being disrespectful to nurses (Teoh & Lim, 2019). This suggests that participants struggle to build interpersonal relationships with their co-workers and doctors. Nurses will experience lower burnout and post-traumatic stress disorder when a positive working environment (Caza & Milton, 2012) and good relationships (Dos Santos Alves et al., 2017) with their co-workers and the doctors.
Thirdly, the participants view resilience as having a positive mindset. Caza and Milton (2012) indicated that resilience incorporates behaviour, emotions, and psychological manifestation of active adaptation and professional growth in severe adversity. In developing a sense of resilience, the participants in this study used a psychological resilience approach when encountering any challenges by viewing the positive side of the challenges as they believe it benefits their performance quality. Psychological resilience is a developmental and psychosocial process through which individuals exposed to sustained adversity or potentially traumatic events experience positive psychological adaptation over time (Graber et al., 2015). Similar studies done by Cope et al. (2016) established that participants stayed focused on the positive by reflecting upon the event to learn a lesson from it. They described it as a valuable antidote to a fight-and-flight reaction to stress-dependent problems. In addition, the participants’ response to resilience is consistent with findings of studies on nurses from the different departments as positive thinking and positive expectations for the future (Gito et al., 2013). It is believed that psychological resilience is recognised as an overarching approach for the participants to deal with and adapt to the physical and social challenges in the ward.

This study finding suggests that nurses on paediatric wards experience multiple challenges, including doubting their ability to care for paediatric patients, difficulty seeking assistance, and developing interpersonal relationships with patients, family members, co-workers, and doctors. This study revealed that the participants used several resilience approaches as protective factors in their daily unpredictable, stressful working conditions. Thus, this study affects nurses and the nursing profession in Brunei Darussalam, especially those who educate, regulate, and manage nurses. The challenges of nurses entering the workforce must therefore be addressed. The organisations may also wish to consider further nursing training to prepare them better to work with paediatric patients.

Limitation
Firstly, there are more female participants compared with the male participant. However, this is also due to the total number of male nurses in the paediatric departments. Secondly, a few participants during the interview could not understand the term resilience, which may affect the information they provided. However, a simple definition was provided for a clearer view.

Conclusion
This study indicated fewer differences in challenges and resilience approach for paediatric nurses than other nurses in adult wards. The study identified three broad themes that represent the development of the resilience approaches of the participants in controlling over the work-related challenges. Based on the findings in this study, the participants encountered doubt of their skill in caring for paediatric patients, difficulty seeking help, and building interpersonal relationships with the patient, family members, co-workers, and doctors. Thus, nursing management must foster a more positive transition atmosphere in order to assist new nurses in developing resilience. Additionally, the effectiveness of nurse preceptors in assisting nurses should also be evaluated. These practices can assist nurses in developing resilience, managing work-related stress, and general well-being.

Declaration of Conflicting Interest
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Authors’ Contributions
All authors have equal contributions in this study started from the proposal, data collection, data analysis, final report, and development of the manuscript.

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Data Availability Statement
The data that support the findings of this study are available from the corresponding author upon reasonable request.

References


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Validation of a Thai version of the Hope Scale among patients with acute myocardial infarction

Ampika Inyoo and Rapin Polsook*

Abstract

**Background:** Hope is essential for patients with acute myocardial infarction, which is often regarded as an active coping for those with life-threatening diseases. Higher hope consistently is related to better health outcomes. However, the instrument for assessing hope has not been previously tested among Thai patients.

**Objective:** This study aimed to assess the validity and reliability of the Hope Scale among Thai patients with acute myocardial infarction patients.

**Methods:** This was an instrument validation study conducted from March to December 2020. A total of 213 patients with acute myocardial infarction were included and selected using a simple random sampling. The back-translation method was used to translate an English version to a Thai version of the scale. Principal Component Analysis (PCA) and Cronbach’s alpha were used for construct validity and reliability.

**Results:** The findings showed that the Cronbach’s alpha of the Thai version of the Hope Scale was acceptable (.75), and the scale consists of four factors, which explained 63.36% of the total variance. Communalities in each factor ranged from .45 to .84. Overall, the appearance of the factor structures was reasonable and understandable.

**Conclusion:** The reliability and validity of the Thai version of the Hope Scale were suitable for the measurement of hope in Thai patients. This scale can be used by nurses and others to assess hope in Thai patients with acute myocardial infarction.

**Keywords**

acute myocardial infarction; factor analysis; hope; instrument; nursing; Thailand

Acute myocardial infarction is one of the major causes of sudden death. It is estimated that 17.9 million people around the world die from acute myocardial infarction annually (World Health Organization, 2019). When patients are diagnosed with ST-Elevation Myocardial Infarction (STEMI) or acute myocardial infarction, they require emergency stenting therapy to return blood flow to the coronary artery (Harvard Medical School, 2019). After they have passed through this unexpected situation, patients typically feel as if they have a fresh start in life and perceive no chest pain as a clear sign that they will not get sick again, can return to work, and usually feel healthier (Snyder, 2002; Hsu et al., 2003).

Snyder (2002) stated that hope is a person’s perceived capability to derive pathways to the desired goals and motivate oneself via agency thinking to use those pathways. Higher hope consistently is related to better outcomes in physical health. When a patient facing an initial diagnosis of acute myocardial infarction has hope, that patient will hope for better health, a return to work, and an improved lifelong routine (Kristofferzon et al., 2008; Benyamini et al., 2014). Therefore, hope is essential because it motivates patients with acute myocardial infarction to live longer and to be ready to change their behavior for improved health, which is a strong predictor of a good quality of life. These individuals also show a greater willingness to undertake lifestyle changes and be happier (Alarcon et al., 2013). On the other hand, there is an increased rate of mortality in acute myocardial infarction patients who are found to lack hope (Everson et al., 1996).
Furthermore, these patients have been found to experience feelings of weakness and were less able to control pain and make adjustments that lead to better health-related quality of life (Bjornnes et al., 2018).

Previous studies about hope in Thailand have focused primarily on chronic illnesses such as cancer, HIV, stroke with rehabilitation phase, and end-stage renal disease. The hope in these patients with chronic illness is usually to stay alive longer and to be able to care for themselves and take care of their own daily activities. Studies on hope in patients with acute illness in other countries have centered on patients with acute myocardial infarction, hypertension, heart failure, and cancer, as well as patients who have undergone cardiac surgery. Findings in those studies have indicated that after patients with acute myocardial infarction had been through a critical situation and coronary artery stenting, they felt like having a new life because they did not feel any chest pain or because they were feeling better (Petrie et al., 1996; Snyder, 2002). Eriksson et al. (2013) found that 3.8% of patients diagnosed with acute myocardial infarction after 1–7 months still had low hope. However, it was also found that if a patient with acute myocardial infarction had hope, they tended to be healthier and were able to return to normal life activities (Kristofferzon et al., 2008; Alarcon et al., 2013; Eriksson et al., 2013). When patients have hope, the body releases endorphins and enkephalins that make the body feel relaxed (Groopman, 2005). As a result, heart rate, respiratory rate, and blood pressure are decreased (Chaudhry & Gossman, 2019), as does the level of cortisol, which is a cause of clotting in coronary arteries (Jutla et al., 2014).

Many studies have used the Herth Hope Index to assess hope in patients, such as hope assessment among the elderly with coronary artery disease (Sriwirun et al., 2019), Buddhist practice, health perception, and hope in persons with HIV infection/AIDS (Rakhab et al., 2007), and Hope among breast cancer patients receiving chemotherapy (Kaewnil et al., 2015). Moreover, it has already been translated into Thai with psychometric properties of the Thai Herth Hope Index in patients with stroke (Tantisuvanitchkul et al., 2020).

In this study, the researchers set out to investigate another specific tool to evaluate hope in patients with acute myocardial infarction; the assessment tool should be coherent, easily understood, and comprehensive. The Hope Scale was developed and analyzed by Snyder (1995) to assess hope using 12 items, and it has been used in studies of acute illnesses such as spinal cord injury (Blake et al., 2018). For nurses, tools such as these are important for evaluating each patient’s level of hope and helping patients stay healthy and live longer. After assessing the level of hope, the nurse should be able to provide guidance as to specific areas of lowered hope and then recommend or make use of particular interventions (Herth & Cutcliffe, 2002).

To assess the level of hope in patients with acute myocardial infarction, a highly valid and reliable instrument with the appropriate format and number of questions is needed. To date, no such instrument for Thai acute myocardial patients has been developed and tested. The purpose of this study was to validate a Thai version of the Hope Scale among Thai patients with acute myocardial infarction in order to assess whether it would be valid in a new population.

**Methods**

**Study Design and Study Participants**

This was an instrument validation study, which involved 213 patients with an initial diagnosis of acute myocardial infarction and measured the validity and reliability of the Hope Scale. The participants were selected from three central Thai hospitals with the approval of the Institutional Review Board of each hospital. There were 213 STEMI patients from the cardiology outpatient department recruited using a simple random sampling. In exploratory factor analysis, the sample size had to be 200 cases to meet the statistical power (Hair et al., 2010).

The inclusion criteria of the sample were (1) Thai patients with a first diagnosis of acute myocardial infarction and post percutaneous transluminal coronary angioplasty who had come for follow up at the outpatient of cardiac center within 1–7 months; (2) Aged between 30 – 59 years; (3) no cognitive impairment and no disease complications; (4) willingness to participate in the study; and (5) good reading and writing skills in the Thai language. The exclusion criteria were applied to subjects who had acute symptoms such as dyspnea on exertion or those with acute heart failure or other unstable conditions.

**Ethical Considerations**

Ethical approval was obtained from the Ethics committee of the Faculty of Medicine, King Chulalongkorn Memorial and Siriraj Hospitals (IRB NO.063/63, 221/2563, and from the Ethnic committee of the Police General Hospital (IRB NO. Nq09011120/63). The purpose of the study, the benefits, risks, and duration of the study were communicated to all patients. All participants signed informed consent forms before completing the questionnaires.

**Instrument Translation and Validation Process**

In this study, hope is the perception of the person of internal motivation for the desired goal. The Hope Scale was developed by Snyder (1995). Twelve items were selected by consensus that constituted the face validity of the scale and then structured on a Likert scale from 1 to 4 for a range of responses on a self-rating questionnaire (Snyder, 1995). Of these twelve items, four were positive items, four were negative items, and four items served as distracters to make the content of the scale less obvious. These distractor items were not calculated into the hope score.

Participants were asked to respond to each item from 1 (definitely false) to 4 (definitely true) with a total score ranging from 8.00 to 32.00 (Snyder, 1995, 2002). Analysis
indicates that the Hope Scale has acceptable internal reliability. More specifically, the item-remainder coefficients for each item are significant (ranging from .23 to .63), and the coefficient alpha is acceptably high (Cronbach’s alphas of .74 to .84) (Snyder, 1995).

**Translation process**

The back-translation method was used in this study (Dhamani & Richter, 2011). The tool was translated from English into Thai by two instructors at the Chulalongkorn University Language Institute who are experts in both Thai and English languages, and by an independent translator who is a nurse instructor with expertise in cardiovascular nursing and who studied abroad for more than five years. The investigators compared both versions in the original language, checked with the translators and advisors, discussed the differences, and produced a final consensus version. The translation process results indicated that the original version and the Thai version of the scale had a similar interpretation. The researchers did not find any misunderstanding in the translation.

**Content validity**

The validity of the content of the final Thai version was assessed by five experts: a cardiologist, a psychiatrist, and three nursing educators to ensure that it was acceptable and that the meaning of each item was correctly translated. The experts were asked to assess the level between the items and the definition of the concepts as presented. A four-point Likert-type scale ranging from 4 (definitely false) to 1 (definitely true) was used to rate each item, and the content validity index (CVI) was calculated for the Hope Scale. The average level of relevance of the questionnaire items used was 100%, which showed that the Thai version of the Hope Scale accurately reflected the English version. The CVI was found to be 1.0, indicating a good level of validity of the content for the Thai version.

**Construct validity and reliability**

Before testing the scale with a large sample size, pilot testing was conducted among 30 samples (Hair et al., 2010), Thai acute myocardial infarction patients at the outpatient medical center and outpatient post-cardiac angioplasty center at Police General Hospital, in order to finalize the Thai version of the Hope Scale. It is noted that these 30 samples were not included in the main study. The results indicated that internal consistency was acceptable (DeVellis, 2012), with Cronbach’s alpha of the Thai version of the Hope Scale of .75. The item-total and inter-item correlation factors were also acceptable (r = .09 to .56, r = .00 to .75, respectively). According to Hair et al. (2010), item-total correlation with coefficients between .3 and .7 was considered acceptable.

After the pilot testing, Exploratory Factor Analysis (EFA), especially Principal Component Analysis (PCA) extraction, was applied with varimax rotation for the extracted factors. For extraction and conceptual consideration, factors with eigenvalues greater than one were extracted, a screen plot was prepared, and the cumulative percent of variance was extracted. Factor loadings ≥ .4 were set as sufficient to establish a factor (Hair et al., 2010).

**Data Collection**

The data were collected from March to December 2020. After obtaining permission to access the subjects, the investigator conducted the study in the external cardiology departments. The researchers explained the advantages and risks of intervention and protection of human rights in non-technical terms and then obtained patient approval to participate in the study. If patients met the inclusion criteria and accepted the invitation to participate, they had to sign a consent form. Participants were then encouraged to complete the Hope Scale; however, during the data collection, participants were able to refuse or leave with no consequences. Each process lasted about 10-15 minutes.

**Data Analysis**

Statistical analysis was performed with the SPSS Statistics software package version 22 (license by Chulalongkorn University). The level of statistical significance was assigned a p-value of .05. Descriptive statistics and exploratory factor analysis were used to examine the construct validity of the Hope Scale. The data met the significant assumptions of factor analysis.

**Results**

**Characteristics of the Participants**

The characteristics of the 213 cardiac patients in Thailand who met the study’s inclusion criteria are shown in Table 1. Participants were between the ages of 33 and 59. The proportion of men was 87.3%, whereas the proportion of married persons was 78.4%. With regards to education, the largest proportion of participants (53.1%) had a higher education, followed by those with a secondary school education (35.7%) and a primary school education (10.8%). Most participants (41.3%) earned between 15,000 and 30,000 Baht monthly (~ 500 – 1,000 USD). The Cardiac Canadian Society Class was used to categorize the severity of patient symptoms: class I (62.4%), class II (8.0%), class III (13.2%), and class IV (16.4%).

**Factor Analysis Results**

Prior to the exploratory factor analysis, the assumptions required for the factor analysis were tested. The linearity of the variables and the factorization characteristics of the variables were analyzed. The correlation coefficients were .75. In the present study, the Kaiser-Mayer-Olkin measure of sampling adequacy was .71, which is considered a good value. The Bartlett’s test of sphericity of the 12 items showed statistical significance (χ² = 647.08, DF = 66, p-value = .000), indicating that the population correlation matrix was not an identity matrix.
Table 1 Demographic and clinical characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N = 213</th>
<th>Percent (%)</th>
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<tbody>
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<tr>
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<tr>
<td>Female</td>
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<td>Age, min-max, (mean ± SD )</td>
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<td>Financial status, monthly income</td>
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<td>30,001–45,000 Baht</td>
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<td>&gt; 45,000 Baht</td>
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</tr>
<tr>
<td>Class 3</td>
<td>28</td>
<td>13.2</td>
</tr>
<tr>
<td>Class 4</td>
<td>35</td>
<td>16.4</td>
</tr>
</tbody>
</table>

*SD = standard deviation

The principal component analysis extraction method was used for extracting the factors. The Hope Scale had an orthogonal rotation of varimax factors (Table 2). Four factors that explained 63.36 % of the total variance were identified. Communalities in each factor ranged from .45 to .84. Factors 1 through 4 explained 21.26 %, 15.99 %, 15.31 % and 10.80 %, of the variance, respectively (Table 2).

Table 2 Total variance explained and communalities (N = 213)

<table>
<thead>
<tr>
<th>Item</th>
<th>Initial Eigenvalues</th>
<th>Rotation Sums of Squared Loadings</th>
<th>Communalities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
<tr>
<td>Hope 2</td>
<td>1.983</td>
<td>16.523</td>
<td>42.718</td>
</tr>
<tr>
<td>Hope 3</td>
<td>1.476</td>
<td>12.297</td>
<td>55.015</td>
</tr>
<tr>
<td>Hope 4</td>
<td>1.001</td>
<td>8.342</td>
<td>63.357</td>
</tr>
<tr>
<td>Hope 5</td>
<td>.813</td>
<td>6.775</td>
<td>70.132</td>
</tr>
<tr>
<td>Hope 6</td>
<td>.786</td>
<td>6.547</td>
<td>76.679</td>
</tr>
<tr>
<td>Hope 7</td>
<td>.679</td>
<td>5.659</td>
<td>82.338</td>
</tr>
<tr>
<td>Hope 8</td>
<td>.602</td>
<td>5.019</td>
<td>87.357</td>
</tr>
<tr>
<td>Hope 9</td>
<td>.506</td>
<td>4.214</td>
<td>91.571</td>
</tr>
<tr>
<td>Hope 10</td>
<td>.425</td>
<td>3.538</td>
<td>95.109</td>
</tr>
<tr>
<td>Hope 11</td>
<td>.323</td>
<td>2.695</td>
<td>97.804</td>
</tr>
<tr>
<td>Hope 12</td>
<td>.264</td>
<td>2.196</td>
<td>100.000</td>
</tr>
</tbody>
</table>

Scoring
The maximum total score is thirty-two, and a higher score means higher hope (Snyder, 1995, 2002). Previous research did not mention grade levels associated with scoring; however, the authors divided the evaluation scale into three levels: low, moderate, and high hope. A score of 8.00 – 15.99 is identified as low hope, 16.00 - 24.99 as moderate hope, and 25.00 - 32.00 as high hope.

Factor Loading
The Thai version of the Hope Scale had four factors, with a total of 12 items. Based on factor loading in Table 3, Factor 1 had six pathway items (Items 1, 2, 4, 6, 8, and 9), Factor 2 had two “agency” items (Items 10 and 12), Factor 3 had two “worry” and “fatigue” items (Items 3 and 7), and Factor 4 had two “emotional” items (Items 5 and 11).
Discussion

In this study, the reliability and validity of the Hope Scale were found to be acceptable for the evaluation of hope in Thai patients with acute myocardial infarction. The overall ranges of the item-total and inter-item correlation coefficients were appropriate. Cronbach’s alpha showed that the questionnaire is sufficiently reliable (α = .75). Most of the items seemed worth keeping, as deletion resulted in a decrease in the alpha.

While removal of some items that had r < .30, Cronbach’s alpha was not different from retention of all items. Furthermore, all the items used to measure hope matched with the original version. These results were consistent with Hair et al. (2010) which indicated that an item-total correlation coefficient of > .30 was found to be acceptable. For inter-item correlations, coefficient < .30 indicated that items were not present in the tool, whereas a coefficient > .70 showed repetition.

This exploratory analysis of the Hope Scale in the Thai version revealed four subscales of hope: the agency, the pathway, the worry and fatigue, and the emotional. The Thai version was found to be inconsistent with the original version, but there was a difference between the articles in each sub-scale. Due to the major cultural and linguistic differences between Thailand and Western countries, it is important to take this into consideration in the points that discuss agency, pathway, and distraction. Additionally, one-third of participants had secondary school education (35.7%). They were able to seek out information about cardiovascular disease, so they understood and had an awareness of the symptoms and the consequence of cardiac disease (Rusteen et al., 2005; Wang et al., 2006). Once they had gotten past the critical situation and no longer felt chest pain, it signaled to the patients that they had survived and were recovering from the disease. As a result, patients have hope consistent with the study of Srirurun et al. (2019), which found that the elderly with coronary artery disease tend to have a high hope score.

Furthermore, many of the participants were married (78.4%), so they had someone to take care of them. In Thailand, people usually have close relationships with their extended families, and most participants lived with family members, so it was possible for family members to participate in the care and support of these patients (Polsook & Aungsuworach, 2021).

In the subscales of all items of the Thai version, there were differences from the original version with regard to agency, pathway, and distraction. However, all elements reflected and presented hope in patients with myocardial infarction. Therefore, for Thai patients with acute myocardial infarction, the Thai version of the Hope Scale has proven to be a reliable and valid measure of hope.

For nurses, the term of hope is related to nursing activities; it is because nurses are seen as a source of hope for empowerment and encouragement for patients to survive, which fills the patients with confidence in the treatment and promotes improved outcomes (Stephenson, 1991; Herth & Cutcliffe, 2002). Thus, the nurses can evaluate the patients’ hope in order to plan appropriate interventions for patients with a low level of hope.

This study was, of course, subject to some research limitations. Participants were diagnosed with an acute myocardial infarction, which is a group of heart diseases. Therefore, the conclusion cannot be generalized to patients diagnosed with other medical conditions like non-communicable diseases or cardiac surgery. Future studies are necessary to evaluate the use of the Hope Scale among other groups of patients with cardiovascular, non-communicable disease, and other conditions in Thailand. A sample size of 300 or more, according to the rule of thumb, is also needed for good power factor analysis (Williams et al., 2010).

However, the study can contribute to knowledge development and strengthen nursing science to improve care for patients with acute myocardial infarction. Based on the finding of the study, hope’s assessment should be promoted to enhance the care of acute myocardial infarction patients because low levels of hope can be linked to the recurrence of coronary artery stenosis. It would be beneficial for patients with acute myocardial infarction to be screened for hope so appropriate intervention can be
provided in an effort to decrease the readmission rate among patients in this group. Future experimental studies are needed in order to demonstrate genuine effects: decreasing readmission in this group, improving quality of life, living longer, and decreasing the cost of admission.

It seems clear that nurses should promote hope as part of the care of acute myocardial infarction patients. As part of the multidisciplinary care team, nurses can screen the level of hope and discuss available options with the health care team to provide appropriate intervention for each patient. For policymakers, it should be better if they can pass the screening tool of hope to help patients deal with the severity of the disease to improve quality of life and decrease the readmission rate.

Conclusion

The reliability and validity of the Thai version of the Hope Scale were suitable for the measurement of hope in Thai patients with acute myocardial infarction. However, information on the reliability and validity of the instrument should be confirmed in larger populations. Although there were differences in the components of the items of the factor analysis between the Thai version of the Hope Scale and the original version, the items of the Thai version of this questionnaire were the same as those in the original version and based on hope. This tool and the knowledge contained in this article can be used by nurses and others to assess hope in Thai patients with acute myocardial infarction.

Declaration of Conflicting Interest

There are no potential conflicts of interest to declare.

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Authors’ Contributions

All authors participated and contributed equally to the study. AT and RP designed the study, collected data, analyzed the data, wrote and revised the manuscript. All authors agreed with the final version of the article to be published.

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Data Availability Statement

Data sets generated and/or analyzed during the current review are available from the corresponding author upon reasonable demand.

References


Aesthetic expressions as data in researching the lived-world of children with advanced cancer

Barbara Lyn A. Galvez¹, Waraporn Kongsuwan¹*, Savina O. Schoenhofer²*, and Urai Hatthakit³

Abstract
Background: Understanding the true world of children needs a special method. Using aesthetic expressions through artworks with reflections assists nurse researchers in exploring children’s feelings, thoughts, and behaviors in relation to their health and well-being.
Objective: This article focuses on the use of aesthetic expressions as innovative data sources in a study of the lived worlds of children experiencing advanced cancer.
Method: The use of aesthetic expressions in Gadamerian hermeneutic phenomenology and aesthetics, by means of van Manen’s approach using draw and write, is examined as a suitable approach in a study of the lived worlds of children experiencing advanced cancer.
Results: The aesthetic expressions through the Draw-and-Write method of data generation were well-suited to a hermeneutic phenomenological study involving the group of Filipino children living with advanced cancer. The children drew images and figures of themselves, their families, classmates, friends, and teachers in several places and events during the series of two days. The drawings showed their facial expressions, home, parents, hospital stay, school activities, extracurricular activities, and other daily activities.
Conclusion: Aesthetic expression linked to art and connected to human experience drew the participants into different realms and expanded their perceptual capacities so that the fullness of the meaning of the experience was appreciated. The understanding of the experience through aesthetic expression provided sensitivity to and awareness of the variation of experience among children with advanced cancer. It is hoped that this paper can contribute to an understanding of aesthetic expressions as pathways to understanding and support health professionals as they embark on their goal of creating or restoring a comfortable relationship with children.

Keywords
aesthetic expressions; cancer; children; lived world; hermeneutics; nursing

Aesthetic expression is essentially conveying and communicating feelings. The experience of beauty can allow us to contemplate and enjoy created images of our own freedom. Aesthetic freedom liberates us to inform others who we are as a way of thinking, behaving, or working that exists (Gadamer, 1997). An aesthetic philosophical stance enables the practice as a creative humanistic discipline involving processes of dynamic interactions expressed through actions, bearing, conduct, attitudes, and narrative (Carper, 1999). Aesthetic expressions had been used in research mostly with adult persons. Previous studies used drawing (Kongsuwan & Locsin, 2010), and another study investigated the use of aesthetic expressions in promoting successful aging (Wikström, 2005). Sadruddin and Hameed-ur-Rehman (2013), using phenomenology to study the self-perceptions of children with cancer, reported that the approach helped gain insight into the data through drawing. Their study...
concludes that most of the children under the treatment of cancer view themselves in isolation and their self-image is often poor due to baldness and mask-wearing; few children drew positive self-images (particularly children ages 11 and 12).

The focus of this paper is the use of the aesthetic expression as a viable, valuable data source in a study of the lived worlds of children experiencing advanced cancer. Creativity is a bridge to learning (Farrell-Kirk, 2007). When a child is creative and curious, the child can come up with answers to the problems the child encounters. Drawing is a fun and pleasurable activity for children wherein they can express themselves in ways that tell stories of their experiences (Fargas-Malet et al., 2010). Aesthetic expression is especially useful when dealing with sensitive issues like advanced cancer in children. It allows them to step back from their own experience and discuss broader issues first until they feel safe enough to relate the unique meaning of their own lived experience.

Gadamerian hermeneutic phenomenology as a research methodology, elucidating lived experience and revealing lived meaning, involves isolating themes (van Manen, 1997) from texts, producing understanding and interpretation of the lived experience. The themes can be viewed as written interpretations of lived experiences. Thus, in the application of hermeneutic phenomenology, the requirement is to examine the text, to reflect on the content to discover something telling, something meaningful, something thematic. Having isolated phenomenal themes, one rewrites the theme while interpreting the meaning of the phenomenon or lived experience. van Manen (2014) recognized art as a source of lived experience and asserted that art objects are “visual, tactile, auditory, and kinetic texts” (p.353) that consist of non-verbal communication but constitute a language with its own grammar.

The aim of this paper is to present the research methodology of the hermeneutic phenomenological approach by using aesthetic expressions as data sources in a study of the lived worlds of children experiencing advanced cancer. Philosophical underpinning research methodology and the details of data generation and analysis are described and discussed.

**Gadamer's Hermeneutics and Aesthetics Philosophy**

To study the life-world of children suffering from advanced cancer, this study employed hermeneutic phenomenology as a framework. As a philosopher, Gadamer explored the fields of hermeneutics as well as aesthetics. The focus of his work was on how language shaped experience as well as the interpretation of that experience. The intention of this approach was to provide an explanation for the lived experience. The lived meaning would then be revealed by a process involving understanding and interpretation (Gadamer & Hahn, 1997).

Hans-Georg Gadamer (1900-2002), a German philosopher, posited philosophical hermeneutics. According to Gadamer, one cannot interpret reality without presupposition or background (Alawa, 2016). Gadamer paid attention to the phenomenon of art. Gadamer detailed that hermeneutics should not be considered as just a method of interpretation. Instead, it refers to “a mode of human understanding of dialogue between interpreter and text” (Bourgeois, 2007, p. 3). This renders relevance to aesthetics in discussions about the human search for truth. Using the aesthetic model, it is only natural to be affected and possibly transformed by an individual who encounters the truth expressed by an artwork or a text.

Gadamer (2006)’s hermeneutics and aesthetics mean the self-understanding of each person. Furthermore, Gadamer’s work on the experience of art is a starter for understanding thoughts, feelings, and perspectives. Gadamer believes that the experience of art is communicated to each person as something present and concurrent. Experiences and encounters with art speak and connect directly with those who encounter them. Hence, hermeneutics, the study of understanding, embraces aesthetics, as far as Gadamer is concerned.

According to Gadamer, hermeneutics is the art of interpretation and operates wherever what is said is not instantly clear. He further explains that natural beauty does not say anything. This means that natural beauty does not need enhancements to bring out the beauty and some of us have to work harder to shine. It is not even about physical beauty. It is something that a person radiates from within that makes them beautiful. At that point, works of art, created by and for men, say something to us (Gadamer, 1997).

Aesthetics inspire art and its motivation lies within an experience rather than an activity that is indefinite in terms of form, function, interpretation, and practice. Aesthetics is concerned with the perception, appreciation, and production of art. Aesthetic experiences, such as graphic representation (drawing), narratives, and storytelling, are linked to the perception of external objects, which tell us about the world outside our bodies. Using our senses of sight, hearing, touch, smell, and taste, we perceive colors, sounds, textures, etc., of the world at large.

**van Manen’s Hermeneutic Phenomenology**

The discipline of phenomenology may be defined primarily as the study of structures of experience or consciousness. Literally, it is the study of "phenomena": appearances of things, or things as they appear in our experience, or the ways we experience things, thus the meanings things have in our experience. By the same token, phenomenology studies conscious involvement as experienced from the personal or first-person point of view (Smith, 2013).

According to van Manen (2014), phenomenology is a philosophical discipline that reflects the meaning of life as we live it and the nature of responsibility of personal actions, behaviors, intentions, and intentions as we meet them in the life-world.

Hermeneutic phenomenology is a method of creating meaning and understanding of human experience as it is lived, such as the phenomenon in this study, children’s...
lived experience with advanced cancer.

Furthermore, van Manen (1997) stated phenomenology transforms "lived experience into a textual expression of its essence, in such a way that the effect of the text is re-living and a reflective statement of something meaningful" (p.36). Lived experience, as explained by van Manen (2014), is the experience we live through before reflecting on it. Thus, the experience is lived through, and meaning is developed from reflection on that experience.

Gadamer’s hermeneutics guided the researcher in interpreting the meaning the children drew from the aesthetic outputs (drawing and writing). However, the interpretation has the possibility to be seen in a new light by others with different points of view about a subject (Gadamer, 2006). The method of interpretation and aesthetics by Gadamer were joined together in the process where the drawing and writing, as aesthetically understood, were interpreted by the researcher applying reflection and critical thinking.

The term life-world articulates how individuals’ truths are constantly influenced by the world in which they live (Heidegger, 2002). According to van Manen (2014), the way to employ the reflective inquiry process is to engage in the existential themes of ‘lived relation’ (relationality), ‘lived body’ (corporeality), ‘lived space’ (spatiality), ‘lived time’ (temporality) and ‘lived thing’ (materiality). van Manen affirms that existentials are universal themes that are helpful when one engages in an exploration of meaning regarding aspects of our lived world experience and when studying a phenomenon. Followings are the explanations of each lived world (van Manen, 2014).

Lived relation (relationality) guides our reflection with respect to the phenomenon being studied as to how people or things are connected.

Lived body (corporeality) serves as a guide to reflect on how one experiences the body vis-à-vis the phenomenon that is being studied. It is also a way to find out how we pay attention to our bodies and how our desires, fears, and anxieties incarnate themselves in the world we dwell in. In the same way, it pertains to how the phenomenon under study is perceived, sensed, touched by the body.

Lived space (spatiality) guides our reflection as to how one experiences space in relation to the phenomenon under study. It relates to how we are shaped by space and vice versa, as well as how space is experienced from place to place.

Lived time (temporality) is a guide to our reflection to question how time is being experienced differently. For instance, the time spent waiting is experienced differently compared to when an individual is actively involved in something. It also shares the experience of wishes, plans, and goals an individual strives for in life. The sense of identity is generated by recollecting the time of one’s childhood, times of exercising a professional activity, and one’s love life. It likewise guides our reflection on the signs of maturation and growth.

Lived things (materiality) guide one’s reflection as to how one experiences things. Materiality informs one of how experiences of things and the world contribute to the vital meaning of phenomena like global warming, the atmosphere of a city, and the spectacle of a grand vista.

Methods

The qualitative research design of this study employs a method based on hermeneutic phenomenology underpinned by Gadmerian philosophy as well as the approach suggested by van Manen (Galvez et al., 2021) to reveal the meaning of the life-world of children with advanced cancer by uncovering details as they were experienced by the participants. The participants were asked to illuminate meanings of their experience living with an advanced stage of cancer through graphic representations (drawings) followed by narrative descriptions (writings), with follow-up individual face-to-face interviews.

Ethical Considerations

Before conducting the research, required approval was obtained from the Institutional Review Board of the Social and Behavioral Sciences, Faculty of Nursing, (number 2017 NSt – QI051) Prince of Songkla University, Thailand. Moreover, before conducting the study, the researchers asked permission from the parents of the children suffering from advanced cancer or from their guardians. After obtaining ethical approval, the children and their parents or guardian were invited to establish initial contact and ask them to become participants in the study.

Access to Participants

The participants were children diagnosed with advanced cancer who lived in the central Philippines. Snowball sampling was utilized to recruit the participants. The number of participants was based on data saturation (Grove et al., 2015). Selection of participants was based on the following inclusion criteria: (1) Ages 10 to 14 years old; with a diagnosis of advanced cancer (2nd stage) as reported by their parent or guardian; (2) Capable of communicating in the English language; (3) Expressing their willingness to become participants in the study; and (4) Physically and mentally capable of expressing their personal experience by relying on graphic representations as well as verbally in the form of narrative descriptions (drawing and writing).

Once appropriate ethical approval was obtained, the researcher launched the process of finding prospective participants. The researcher approached a parent who had a son registered in a cancer foundation, described the study, and discussed the nature of the child’s participation; permission was then obtained to approach the child. At the same time, the researcher enlisted the parent’s assistance in identifying other parents with the same situation, so they could also be invited to participate in the study.

With each prospective child participant, the nature of the study and measures to protect human rights were described fully in language understandable to the child. Any
questions the child had about participation were answered thoroughly. Everyone approached consented to participate in this study.

Establishing Trust and Connection
After written consent was obtained, the researcher established emotional connections with the young participants based on trust and understanding (Hockenbury et al., 2017). The researcher established rapport with the children first by presenting the research study as an experience that would not cause harm and could even bring happiness by conveying their experiences of being sick (Silbert-Flagg & Pillitteri, 2018). The researcher was consistent and demonstrated to the child participants what they were being asked to do. When the researcher promised that she would telephone the children, she followed through by calling them and subsequently moved to engage them in data collection tasks. Interactions in each child-researcher dyadic relationship were friendly and unguarded, characterized by trust and connection.

Data Generation
Data generation methods in this study consisted of participants’ characteristics, drawings and written descriptions, and observations made during the interviews. (1) Participants’ characteristics collected included gender, age, cancer type, family and school background; (2) Draw and write was used to assist the child’s expression of the story of their lived experience; (3) An interview was carried out to allow the participants to reflect, recollect and recall all about their experiences which transpired before, during and after diagnosis of advanced cancer including treatment; (4) An audiotape recording was done to aid the researcher in transcribing the data in full; (5) Observational data were recorded during the interview to understand the participant’s behavior, facial expressions, position changes, body movements and non-verbal indications of boredom.

Drawings and writings (narratives). During the graphic representation phase, the experience of the participating children afflicted with advanced cancer was expressed by them in their aesthetic outputs. The researchers provided them with the following materials: drawing pad, crayons, pencils, eraser, watercolor, and color pens, and chose the materials which suited their preference for drawing. The researchers instructed each participant to come up with a drawing illustrating their lived experience as a child diagnosed with cancer. The time limit allotted for drawing was 30 to 45 minutes.

Afterward, for their descriptive narration (phase 2), the children were asked to describe in writing the images or pictures they had created. Paper was provided for this purpose. The children also had the option to express their descriptions verbally rather than in writing. Their account was then recorded on audiotape, as this was also agreed on in the consent form.

Interviews. Following the drawing and writing activity, personal face-to-face interviews were conducted with the participants. The interview questions were open-ended and unstructured in approach; probes were used in response to participants’ answers, eliciting further information; for example, “What made you feel that way?” and “What does this remind you of?” The participants were given a choice to select an interview location that provided safety, privacy, and a quiet environment for one hour and thirty minutes with the audiotaped record. The participants disclosed what they felt comfortable with sharing.

Interviews were completed over at least three occasions. In the initial interview (30 minutes), a demographic profile of participants from parent/guardian and participants was obtained. Participants’ characteristics collected included gender, age, cancer type, family, and school background. The second interview was the in-depth interview (1 hour and 30 minutes) in which participants explained their drawings and writings. The last interview (30 minutes) was conducted for follow-up clarification of the second interview.

Observation. The observation was done on three occasions during face-to-face interviews with participants. Observations of behaviors were recorded, e.g., changing position frequently in the seat, tapping a pencil on the table, and facial expressions indicating feelings of sadness and happiness. Observations were recorded by handwritten notes during the three interviews. Observations included participants’ tones, expressions, and associated actions during the interviews, as well as descriptions of the overall settings and the experience of the data collection process.

Data Analysis and Interpretation
The data analysis process of hermeneutic phenomenology involves arranging the interview transcripts, observation notes, or other non-textual materials that the researcher gathered to increase the understanding of the phenomenon. Analysis was done in two steps. First, analysis of data generated by drawings made by participants was performed. Second, the analysis of narrative descriptions and interview transcriptions was conducted. Last, the analysis of observational data was done.

Analysis of drawings. The researcher first inspected, one by one, the drawing created by each participant. For the analytical steps, the principles formulated by Farokhi and Hashemi (2011) served as the guide. Particular attention was given to symbols and images, objects, and places.

Analysis of narrative descriptions and interview transcriptions. After recording the interpretations of the participants, the researchers examined the written and audio-recorded narrative descriptions while they made field notes. Guided by the approach formulated by van Manen (2014) as part of hermeneutic phenomenology, thematic and existential reflections, as well as the writing method, were utilized by the researcher to interpret the lived meanings associated with aesthetic expressions (van Manen, 1990, 1997). The five life-worlds of the lived body, lived space, lived time, lived relation, and lived thing were
used in thematic reflection (van Manen, 2014). The researcher used exact quotes from the interview session and described activities in the order in which they occurred. Descriptions were provided without inferring meaning.

**Analysis of observational data.** Observations were analyzed as directed by Kawulich (2005). The researcher kept a separate notebook for personal observations made during interviews with each participant. Field notes included jottings, diagrams, individual notes, and diary-type entries with date, time, place, and pseudonyms to protect participants’ confidentiality. The entries for each participant were summarized each day and organized with page numbers and a short identifying description.

**Trustworthiness**
To assure trustworthiness, the study observed four criteria developed by Lincoln and Guba (1985). These were credibility, confirmability, transferability, and dependability. Credibility was obtained by triangulation and member-checking. The triangulation methods used in this study involved the use of four data sources, including graphic representations, narrative descriptions, interview transcriptions, and observation.

After each interview, the researcher summarized the results of the interview and asked the participant to confirm their responses. These data were clarified in the daily journal written by the researcher during data collection. The daily journal was used to achieve confirmability by recording the time and date of data collection, features of the context, the physical setting where the data collection took place, the researcher’s own reflections, and questions and interpretations that came up during interviews. Transferability was established by providing ‘thick’ or detailed descriptions of the phenomenon. Dependability was established by an external audit with an expert review.

**Results**
Examples of participants’ characteristic data (in Table 1), data generation, data analysis, and interpretation of the participants (in Table 2) are presented.

<table>
<thead>
<tr>
<th>Participant number</th>
<th>Gender/Age</th>
<th>Cancer Type</th>
<th>Family Background</th>
<th>School Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2</td>
<td>Male / 10 years old</td>
<td>Acute lymphocytic leukemia (ALL) at the age of 10</td>
<td>He came from separated parents whose father was unemployed and lived with another woman while his mother worked in Manila and is remarried.  He stayed with his grandparents, who took care of him. His mother paid for his chemotherapy sessions. He excelled in math and was an honor student.</td>
<td>He is in Grade III. Goes to a Town elementary public school. Maintains good grades in Math and Science subjects.</td>
</tr>
<tr>
<td>P7</td>
<td>Female / 14 years old</td>
<td>Acute lymphocytic leukemia (ALL)</td>
<td>She was 14 years old when diagnosed with advanced cancer. She had to stop schooling. Very conscious of how her cancer diagnosis had affected her family emotionally and financially. She expressed a lot of guilt that her family, including her siblings, had to stop school and work very hard to finance and support her treatment.</td>
<td>She is in Grade 8 from a private elementary school in their province. Her favorite subjects are English, Language, and Spelling. She is praised by her teachers for her good performance in school before cancer treatment.</td>
</tr>
<tr>
<td>P10</td>
<td>Male / 14 years old</td>
<td>Retinoblastoma at the age of 14</td>
<td>He was an errand boy who would buy food for his family using his bike. Also, being an eldest, he realized his younger brother was still very dependent on his parents while he enjoyed the company of his twin brothers.</td>
<td>He is still in Grade 3 on account of failing marks in his report card related to absences from the classroom and school activities due to advanced cancer. He goes to a public school in the city.</td>
</tr>
</tbody>
</table>
Table 2 Examples of data analysis and interpretation

<table>
<thead>
<tr>
<th>Participant Number</th>
<th>Data Analysis and Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2</td>
<td><strong>Graphic representation</strong></td>
</tr>
<tr>
<td></td>
<td><img src="image.png" alt="Image" /></td>
</tr>
</tbody>
</table>

**Narrative description**

The drawing “My Sad Story” depicted his understanding of his medical situation. He experienced physical discomforts and felt not normal because of his frail body and inability to walk. And yet, with the presence of his grandparents, who would give him the foundation to fight his struggle, he found trust in them. Moreover, he remembered his absences vividly in school due to chemo sessions. He was weak and frail. That was when his father would carry him on his back because he could not walk to school due to his limbs which were not strong enough to support the body. He equated this to his past active life when he would walk to school with his friends, laughing, having fun, playing, and sharing jokes on their way to school.

**Observation**

(Misty eyed) when he mentioned his mother. He added that his mother never cared for him while he had cancer at a young age. I held his hands at the table. At this point, I asked if he was ok? If he wanted to go with the interview? (He smiled and nodded his head and said yes, we would continue. Wiping his eyes. Then smiled.)

**Reflection of themes within the lived world**

**Lived body:**
Theme: physical discomforts and feeling not normal

“My father lifts me in his back to school because my extremities were painful and weak. I would limp when I walk to school, and I fall on the way to school” (P2, L-162-63).

**Lived relation:**
Theme: having support from extended family

“My grandpa provides my daily school allowance.” (P2L-164.). “My grandma takes care of our family’s needs and gives me extra attention.” (P2L-166).
Theme: friends to play with at school

“I am happy when I can play with my friends, especially on weekends when we are off from school” (P2L-308-309).

**Lived time:**
Theme: a broken heart

“There comes a moment when I cry in my sleep because I miss my mother.” (P2, L-192).  
Theme: signified a child’s sadness felt due to a maternal separation

“I draw my mother last because of the fact that she does not care about me. It makes me sad when I was drawing her.” (P2, L-300-301).

**Lived space:**
Theme: walked with friends and classmates to school every day

“I really enjoy walking with my friends and classmates to school every day because we tell stories and laugh out loud.” (P2, L- 183-184).

**Lived space:**
Theme: living well at home and enjoying with friends at school

“I get enough rest and sleep at home. But I always look forward to good health again so I can enjoy the fun with my friends in school.” (P2, L-378-380).
<table>
<thead>
<tr>
<th>Table 2 (Cont.)</th>
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<tbody>
<tr>
<td><strong>P7</strong></td>
</tr>
<tr>
<td><strong>Graphic representation</strong></td>
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<tr>
<th><strong>Narrative descriptions</strong></th>
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<tbody>
<tr>
<td>It is evident in her drawing and narrative that there was longing in the participant to go back to school. She has also mentioned in her drawing that her friends were an important aspect of her life. The drawing and the narrative both displayed that the participant was fully aware of the situation that cancer put her family and herself in, as well as the sacrifices needed to commit to her treatment.</td>
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<tr>
<th><strong>Observation</strong></th>
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<tr>
<td>(Eyebrows brought together with the wrinkled forehead) when she mentioned that her family and friends learned about her cancer. (Sides of the mouth flexed) When the news was revealed by her mother about her diagnosis of cancer.</td>
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<thead>
<tr>
<th><strong>Reflection of themes within the lived world</strong></th>
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<tbody>
<tr>
<td><strong>Lived body:</strong></td>
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<tr>
<td>Theme: physical health affected</td>
</tr>
<tr>
<td>“I was made to understand by my mother that as a child with cancer, it will affect my physical health.” (P7, L-119-122).</td>
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<tr>
<td>Theme: feelings not used to deal with</td>
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<tr>
<td>“I was made aware that it will also bring up an extensive kind of feelings that I am not used to dealing with.” (P7, L-121-122).</td>
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<tr>
<td><strong>Lived relation:</strong></td>
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<tr>
<td>Theme: family over-protective</td>
</tr>
<tr>
<td>“My parents and brothers turned strong and overprotective of me because they want to do what is right for me.” (P7, L-162).</td>
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<tr>
<td>Theme: absence of peer interaction</td>
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<tr>
<td>“The ability to get together with my friends was lost. I feel separated from my friends who denied the fact that I have cancer.” (P7, L-319-320).</td>
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<tr>
<td><strong>Lived time:</strong></td>
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<tr>
<td>Theme: hopeful of recovering and starting treatment immediately</td>
</tr>
<tr>
<td>“I feel hopeful that I can recover and move forward to the future as I start the treatment immediately.” (P7, L-165-166).</td>
</tr>
<tr>
<td><strong>Lived space:</strong></td>
</tr>
<tr>
<td>Theme: family and friends are not really in harmony with what is going on with her</td>
</tr>
<tr>
<td>“It is hard to have leukemia. I feel lonely even if I have my family and friends around me. This is because my family and friends may not be really in harmony with what’s going on with me.” (P7, L-331-332).</td>
</tr>
<tr>
<td><strong>Lived thing:</strong></td>
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<tr>
<td>Theme: mobile texting and calling teacher for updates about the present condition</td>
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<tr>
<td>“I keep connected with my teacher in school through mobile texting and calling for updates about my condition.” (P7, L-206-207).</td>
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</table>
Table 2 (Cont.)

<table>
<thead>
<tr>
<th>P10</th>
<th>Graphic representation</th>
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<td><img src="image.png" alt="Graphic" /></td>
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Narrative description
He was very self-conscious of the physical appearance of his eye, which he made a habit of wearing sunglasses wherever he would go. He believed that the grotesque appearance of his eye would make people afraid of him.

Observation
(adjusting his sunglasses) At home, when sent to do errands for his family from a nearby store or market to buy food, he would ride his bike. Also, being an eldest, he realized his younger brother was still very dependent on his parents while he enjoyed the company of his twin brothers (swinging his legs). He also had three best friends who were his buddies and protectors in school (transferred to another chair. Smiling).

Reflection of themes within the lived world

**Lived body:**
Theme: physical discomforts
“My right is swollen, and my left ear has hearing difficulty.” (P10, L-381-382). “I was tired and losing weight.” (P10, Line-475).

**Lived relation:**
Theme: supportive family
“My mother and father took care of me during my chemo because I was too frail.” (P10, L-499-500).

**Lived time:**
Theme: remembering the past active life and hopeful thoughts for the future
“When I was a young child, I was energetic and playful. I helped my parents in farming jobs.” When I first learned of my eye cancer, I ignored thinking about it and continued helping my parents (P10L-409-411). “I endured the side effects of chemo with the belief that I will recover and live a normal life.” (P10, L-491). “I have a strong will to live, allowing me to continue my usual activities in helping my family and continue schooling.” (P10, L-512-513).

Thematic Reflection
From data analysis and interpretation of some participants, a narrative of the holistic analysis of the different distinctive qualities and characteristics representing the lived experience characteristics representing the aesthetically expressed lived experience of school-aged children afflicted with advanced cancer was presented. The presentation of this lived experience embracing the five life-worlds was carried out to elucidate the themes. Thematic reflection was undertaken by the researcher in the study to reveal something meaningful from the various experiential accounts of the participants. Thematic reflection on each individual participant’s data was done by reading and rereading the transcripts, and then brought all those themes together and endeavored to find common themes from the individually produced themes. The structure of the text was described in terms of meaning units and significant statements to analyze them and identify the thematic aspects of the participants’ experience.

As for the interviews transcribed word for word, all transcripts were read several times for familiarity, marking any sentences or phrases that were particularly significant in terms of clarity. Participants were asked to describe the hidden meanings observed in the repeated symbols in the participants’ drawings. Next, the documents were analyzed by applying van Manen (1990)’s three approaches for identifying thematic aspects of a phenomenon.

The researcher read all of the transcripts repeatedly to familiarize herself with them. While doing so, she marked any phrases or sentences she considered particularly significant and clear. The researcher then inquired from the participants whether they could elucidate any hidden meanings behind the symbols and imagery found in their drawings. Next, the researcher analyzed the documents.
For this, van Manen’s three approaches for identifying thematic aspects of a phenomenon were applied.

The researcher discovered that applying each of the three approaches helped her reflect on the lived meaning of school-age children diagnosed with advanced cancer and identify broader themes. Furthermore, tables and diagrams of themes were created to visualize the findings, which was helpful in generating further meaningful descriptions.

First, the holistic/sententious approach was used. The researcher attended to the entire text, which captured the fundamental meaning of the text, to generate a narrative or paragraph. Meanwhile, not all participants have the same result. Pieces of information of the past with inference to the present as evidenced by children’s drawing, narrative, interview excerpts, and observation were brought together, analyzed, and merged into the whole picture of the life-world. Then when the researcher began to pool themes from the entire set of data and analyze the pooled theme, a model representation of the life-world of school-age children with advanced cancer emerged.

Next, utilizing the selective/highlighting approach, the researcher reread the text and highlighted certain phrases that were of particular significance in revealing the experience of the participants.

Finally, the detailed/line-by-line approach was used wherein each individual sentence or cluster of sentences was carefully examined. As a result of this process, thematic statements were generated about what exactly was revealed by every sentence or sentence cluster. The researcher then identified the particular themes that emerged from this procedure.

**Guided existential reflection.** Existential reflection embracing van Manen’s five life-worlds (lived body, - relation, - time, - space, and – thing) functioned as a guide to finalize the process of data analysis and thematic reflection. Thus, in this study, the researcher found these five existential elements to be particularly helpful when engaging in reflection. Considering this existential ground allowed the researcher to better understand the lived experience of school-age children diagnosed with advanced cancer. The data were then sorted and the themes organized around the five life-worlds, and the themes were further refined by making sure that each life-world was represented as completely as possible.

**Writing as analysis.** To become more immersed in the lived experience of children afflicted with cancer in an advanced stage, the researcher embarked upon a process of writing and rewriting. Firstly, after each participant’s first interview, a draft was composed out of the conver-
sation and the contents were later transcribed. The researcher then discussed significant statements that were captured in discussion with respondents in the course of the second interview. These ‘hermeneutic conversations’ provided an opportunity for the participants to reveal further insights about their experiences.

After the completion of all the second interviews, the researcher wrote and rewrote. In doing this, she further refined and re-defined the themes. The writing process assured that the transcribed interviews were done into a textual quality of documentation wherein the researcher’s understanding of school-aged children with advanced cancer was improved and to make sure that each participant’s voice was reflected in each of the study’s themes. According to van Manen (1997), “when qualitative descriptions of human experience integrate aesthetically textured descriptions, it can deepen the sense of understanding in the reader. This experience is so strong or striking that it may stir us at the core of our being” (p. 364). This study could lead to a deeper understanding of the lived experience of school-aged children with advanced cancer in a novel and touching way. The five existential elements guiding the researcher’s reflection (‘lived body,’ ‘lived relation,’ ‘lived time,’ ‘lived space,’ and ‘lived thing’) constituted a practical framework for organizing the findings.

Initially, the journey of the participants, as reflected in the time axis, began with a negative viewpoint, as can be seen in the themes presented in the inner circle in Figure 1. Nevertheless, they were able to transform these negative experiences into positive ones (themes presented in the outer circle in Figure 1). By changing their perception about cancer through technology, they became hopeful and cognizant of the positive outcome, which later benefited them. They connected to the world through technology and gained information about cancer. They also used technology to communicate with others and comply with the technology of the hospitals to recover from cancer. The other factors that made the shift from negative to positive possible were: support from extended family and school administrators, self-transforming negative experiences and developing inner strength, and inspiration from God. They saw a positive outcome in their negative experience, namely: recovery as a result of chemotherapy. Despite the difficulty of transition, the participants waited for comfort to follow discomfort and were able to do it. They turned their experience around and transformed it into something beneficial. They made the decision to see cancer from another viewpoint and chose to react differently. They lived in places where they could be secure and protected.

Although the circumstances happened beyond their control and having physical discomforts was initially the most distinct character of cancer and chemotherapy treatment that impacted the participants’ bodies, they found a way out of it. The participants did not have control over the external events that happened to them, but their internal reactions made a powerful turning point. Cancer made them tough, and in the same way, they became resistant to emotions. The aesthetically expressed life experience of children with cancer was described as living life in a world with negative experiences while simultaneously existing as hopeful persons for a better life.

The diagram below presents the summary of how children diagnosed with cancer in an advanced stage uncovered through their stories how they experienced their life worlds of body, relation, time, space, and thing.
Discussion

The results were achieved in the study of the life-world of Philippine children with advanced cancer (Galvez et al., 2021). This paper presented a more detailed description of the process of using the draw-and-write data gathering procedure together with interviews suggesting two important points. First, this data collection approach may be useful in any phenomenological nursing study with children. Further, there is some evidence that this approach may have praxis elements and could be used to enhance the positive feelings and emotions of children with advanced cancer in a manner that is a therapeutic intervention that is cost-effective and easy to practice.

As nurses, we are expected to have a more sensitive understanding of the existing condition of children suffering from advanced cancer. Knowing and understanding the experiences of children is vital in healthcare. This need also challenges the nursing profession to promote acts of caring that are meaningful and relevant to children’s needs. The importance of children is often reduced to triviality and insignificance in an adult-dominated world. However, nurses recognize that the young in society are as important as the aged since all persons are of equal worth. Children often communicate their needs in different ways, which may not be easily recognizable by their adult caregivers. Their expressions are based on their young and immature perspectives, which may not be congruent with common adult understanding.

It is the responsibility of the nurses as the researchers to enter into an interview/conversation with an awareness of their place and role in relation to the other in that setting (McCaffrey et al., 2012). The researcher’s compassionate feelings change with a deepening sense of the
interconnectivity of the topic with children. It is the strength and adaptability of children to have the potential to endure better and effectively use their emotions, thoughts, and behavior to extract the best possible outcomes in their cancer situations. Hermeneutic phenomenology paved an opportunity for the researcher to describe what it means to live in and among a world experienced by each child with advanced cancer in their own way through “draw and write.” The procedures functioned effectively to communicate a topic, collection of pertinent data, and then analyze.

Implications of the Study
The results of this research study would further enhance the understanding of the experiences of children with advanced cancer. The insights collected from the participants could be valuable in addressing the identified needs and concerns of these children. This may help pediatric patients with other diseases and procedures during hospitalization to translate their feelings in their drawings. This way, nurses can provide an appropriate therapeutic response.

The findings of this study may contribute to the expansion of the body of knowledge involving the most effective scheme to move through the burden of advanced cancer in children and improve outcomes with a focus on improving health experience in ways that heal and comfort.

The outcome of this research may raise worldwide mindfulness of the impacts of cancer on children. The use of the aesthetic expression in children with life-threatening illnesses, such as cancer, could be a therapeutic intervention among nurses in administering care and managing conditions of children with cancer.

Limitations of the Study
The location of the study was in a number of areas on the island of Negros in the Philippines. The participants in these areas used some local idioms in communicating with the researcher whose meaning was not fully understood. This compelled the researcher to verify their meaning by asking for clarifications from the participants and other locals. The highly sensitive nature of the topic and its potentially high level of intensity in interpersonal exchanges need to be recognized as constituting a possible limitation even if the safe and quiet venues for the interviews were chosen by the participants themselves and privacy was assured.

Conclusion
The lived experience of school-age children with advanced cancer revealed as expressions of their life-worlds. Activities at home, in school, with friends, and in the community were struggles for physical and emotional balance. The discomforts from treatments hindered their activities of daily living. Changed body image resulted in bullying, while prolonged school absence led to reduced academic accomplishments compared with their peers. The hospital became the focus of their lives, finding the strength to understand and accept pain, struggle, and limitations because of supportive families, comfort from hospital technologies, online support from friends, which gave them joy. Being back to school was fun, and faith brought them to a state of balance; the participants remained hopeful with positive thinking to cope and be free from cancer while looking beyond for a better future.

Aesthetic expression linked to art and connected to human experience drew the participants into different realms. It expanded their perceptual capacities so that the fullness of the meaning of the experience was appreciated. The understanding of the experience through aesthetic expression provided sensitivity to and awareness of the variation of experience among children with advanced cancer. It is hoped that this paper can contribute to an understanding of aesthetic expressions as pathways to understanding and support health professionals as they embark on their goal of creating or restoring a comfortable relationship with children.

Declaration of Conflict of Interest
The authors have no conflict of interest to declare.

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Authors’ Contributions
BLAG: Research design, data collection, data analysis, writing, and editing of the manuscript. WK: Research design, data analysis, writing, and editing of the manuscript. SOS: Writing and editing of the manuscript. UH: Writing manuscript. All authors agreed with the final version of the article to be published and are accountable for all aspects of the work.

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Data Availability Statement
The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.
References


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