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Content

227 An Evaluation of Childbirth Policy in Thailand: A Case Study in the Southern Part of Thailand (Part 1)
   Sopen Chunuan, Yaowares Somsap, Sutham Pinjaroen, Sujitra Tiansawad, Sudjai Nangham,
   Aungkana Jeamamornrat

240 Validity of the Rosenberg Self-esteem Scale in Young Women from Thailand and the USA
   Linda S. Beeber, Acharaporn Seeherunwong, Todd Schwartz, Sandra G. Funk, Nopporn Vongsirimas

251 Struggling to Get Connected: The Process of Maternal Attachment to the Preterm Infant in the Neonatal Intensive Care Unit
   Rachtawon Orapiriyakul, Veena Jirapaet, Branom Rodcumdee, Somreudee Kiatlaekakul, Sunuttra Taboonpong,
   Wandee Suttharangsee

265 Development and Validation of a Measurement Model for a Total Quality Management Sustainability Scale (TQMSS) as Perceived by Professional Nurses in Accredited Hospitals
   Somsamai Sutherasan, Yupin Aungsuroch, Sukunya Prachusilapa, Mary L. Fisher

281 Development of A Program for Enhancing Nurses’ Capacity to Wean Patients from Mechanical Ventilation
   Nitaya Pinyokham, Warunee Fongkaew, Chawapornpan Chanprasit, Terri Simpson

295 Supportive-Educational Program: Using Bioscientific Multimedia to Enhance Clinical Problem Solving Skill in General Nurse Practitioner Students
   Chularuk Kaveevivitchai, Noppawan Piaseu, Supit Luptrawan, Nilawan Sirikoon, Bhinyo Paniijpan
An Evaluation of Childbirth Policy in Thailand: A Case Study in the Southern Part of Thailand (Part 1)

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Abstract: The purposes of this descriptive study were to: 1) compare the ideas of postpartum women, their relatives, and health care providers relating to the hospital policy that does not permit non-professionals (including relatives) to be present during intrapartum, 2) explore the health care providers’ ideas relating to the problems of allowing the attendance of non-professionals with women in labor during intrapartum, and 3) explore the health care providers’ ideas relating to potential management strategies for improving the childbirth policy in Thailand. The sample of respondents numbered 1,105 and consisted of 368 postpartum women, 380 postpartum women’s relatives, and 357 health care providers. Three questionnaires were used in this study. Content validity of these questionnaires was judged by five experts and a pilot study was conducted to try out the questionnaires with 10 postpartum women, 10 postpartum women’s relatives, and 10 health care providers. The findings of this study showed that there was a statistically significant difference in the matter of wanting relatives to be present at birth between the health care providers and the postpartum women, and between the health care providers and their relatives ($\chi^2 = 160.55, 200.14, p < .0001$, respectively). The potential problems involved in allowing attendance at birth to attend the birth of a baby included: The limitations of the labor and delivery rooms, the risk of infection and being sued for malpractice, difficulties in providing intrapartum care, the lack of privacy for women in labor, and the possibility of increasing conflict between the non-professionals and the health care providers when attending births. The potential management strategies that were identified to solve the isolation policy included: 1) the renovation of the labor and delivery room to provide more privacy for women in labor, 2) increasing the number of health care providers, 3) providing childbirth classes for pregnant women’s relatives, and 4) improving the health care providers’ skills. Finally, the health care providers could improve their services by providing the type of high quality care that meets the needs of women in labor and their families.

Background and Significance of the Study

Giving birth is an important event for women and their families because it is a time when everyone is looking forward to meeting a new family member. In the past most Thai women had their delivery in their home and were attended by a non-professional midwife (mortumyae). Therefore, it was common


Key word: health policy, childbirth, attendance at birth, intrapartum

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for a woman in labor to receive psychological support from her female relatives. Most Thai women now use a hospital service because there are concerns about the safety of both mother and baby. The hospitals are very safe places because they have both advanced technological equipment and well-trained professional health care providers. In public hospitals, women who give birth are separated from their family members, and this causes some emotional disturbance because women in labor have to cope with unfamiliar environments and unknown situations alone.

The labor process involves many physical, psychological, and social changes and experiences which may result in stress and anxiety. Empirical data show that labor support plays an important role in helping women to cope with labor pain, and in reducing psychological problems, such as fear, stress, and anxiety. Several researchers found that the buffering effects of social support are crucial in promoting people’s health.

Social support during the intrapartum period exceeded their expectations relating to personal control during childbirth, improved behavior in coping with pain, satisfaction with the childbirth experience, and the baby’s apgar score. In addition, the findings of previous studies have shown that social support reduced anxiety during intrapartum, labor pain, the likelihood of needing medication for labor pain relief, use of oxytocin, rate of forceps extraction, rate of cesarean section, and neonatal complications. In addition, Sosa et al. found that a supportive companion enhanced women’s positive behaviors, including stroking, smiling, and talking to their babies after awaking after delivery. The results of one non-Thai study showed that at 6 weeks after delivery a greater proportion of doula-supported women (doulas are women who are trained to be birth companions) used breastfeeding, reported greater self-esteem, less depression, and a higher regard for their babies and their ability to care for them compared to the control mothers. In addition, the benefits of the support of relatives, friends, or doulas on childbirth outcomes have been reported in the health literature.

Labor support can be provided by the professional health care providers (nurses, obstetricians, and midwives), women who are trained to be a birth companion (doulas), or a woman’s partner/husband, relative, or friends. Labor support is an important function of the health care providers during labor. Too stated that social support is one of the strategies employed to reduce stress during the labor period and childbirth. The main objective of providing support during intrapartum is to help a woman achieve her wishes, through offering companionship, attention to her emotional needs, and actively helping her. A number of studies have shown that nursing support affects labor pain, pain-coping behavior, psychological factors (anxiety, fear, and stress), and childbirth outcomes. One study found that labor support by nurses promoted bonding among family members. However, sometimes women in labor were left alone because the health care providers were very busy providing care for other women. Some women felt that they were not looked after well by the health care providers. This may result in women’s dissatisfaction with childbirth care and the childbirth experience.

Several previous studies found that women wanted their husbands to be present during the labor and delivery period because it made them feel supported, secure, warm, and safe. In addition, women’s husbands can provide emotional support, encouragement, and reassurance during intrapartum. The birth period is both painful and joyous so fathers should participate in the birth of their babies. A previous study has shown that most pregnant women expected to have their husbands or significant
others, such as mother, sister, or close female friend, with them during intrapartum.\textsuperscript{22} Rojanasaksothorn\textsuperscript{23} found that during intrapartum most women are afraid of labor pain, giving birth to a deformed baby, and dying during delivery. In addition, the women believed that their husbands should be there with them to encourage and reassure them.\textsuperscript{10} Bondas-Salonen\textsuperscript{21} found that women in labor wanted their partners to express their concern, to show them love and to share their worries and joy. In providing support during labor, there are three roles fathers of expectant mothers can adopt: Coach, team-mate, and observer.\textsuperscript{24} In addition, Ip\textsuperscript{25} states that most health care organizations have recognized the importance of family-centered care by allowing and encouraging the partner/husband to attend childbirth education classes and to be present during labor and delivery. In contrast, some studies show that husband support was not associated positively with the duration of labor\textsuperscript{26} or use of analgesia.\textsuperscript{19,26} In addition, Ip\textsuperscript{25} found that husband support did not help to reduce labor pain, but led to increased use of Pethidine. Anticipation, excitement, concern, anxiety, and fear all intermingle so that the father cannot remain emotionally detached enough to meet his own and the mother’s needs.\textsuperscript{27}

The hospital policy of isolating women in labor from relatives during the intrapartum period has been discussed and questioned by nurses who work in the maternity field and other health care providers. However, no official effort has been made to change this policy in the public hospitals. The reasons may be because health care providers are worried about the possibility of problems that may arise from the presence of women’s relatives. These may include, for example: Decreasing women’s privacy, an increase in suing for malpractice, increased use of analgesic, and the possibility of increased infection rates. However, no evidence or data has been produced to support these reasons. This present study explores the views of the relevant people who will be involved if this policy is changed, including postpartum women, their relatives, and health care providers. Thus this study will help to fill the gaps in our knowledge by examining the views and experiences of postpartum women, and their relatives’ ideas about attendance during childbirth.

**Objectives of the Study**

**The purposes of this study were to:**

1. Compare the ideas of postpartum women, their relatives, and health care providers relating to the hospital policy that does not permit the attendance of non-professionals at birth and during intrapartum;

2. Explore the health care providers’ ideas relating to problems associated with allowing the attendance of non-professionals at birth and during intrapartum; and

3. Explore the health care providers’ ideas relating to potential management strategies for improving the childbirth policy in Thailand.

**Research Methodology**

**Study design**

A descriptive design was used. Questionnaires were administered 24 hours following delivery to postpartum women, postpartum women’s relatives, and health care providers (directors of hospitals, head nurses of the labor and delivery rooms, obstetricians, and nurse midwives). Data were also collected by a research assistant from retrospective chart reviews of mothers’ and newborns’ hospital records.
Sample and setting

Cluster sampling was used in this study. The settings for the study were university hospitals, regional hospitals or health care centers, and district hospitals (60 -120 beds) in the southern part of Thailand.

Data collection procedure

The data were collected after approval was obtained from the Institutional Review Board of the Faculty of Nursing and the Faculty of Medicine, Prince of Songkhla University. Postpartum women and their relatives were informed about anonymity and they were informed that they were permitted to stop interviews at any time. With respect to health care providers, the investigator distributed covering letters, structured self-report questionnaires, consent forms, and stamped addressed envelopes for return.

Instruments

Structured self-report questionnaires and structured questionnaires were used in this study. Data were collected from three different groups. Thus three questionnaires were developed. The first questionnaire related to the postpartum women’s demographic characteristics (12 items), their ideas about the childbirth policy (9 items), and obstetric factors (17 items). The second questionnaire collected data about postpartum women’s relatives’ ideas about the childbirth policy. It consisted of two parts, one dealing with demographic characteristics (12 items) and the other with the childbirth policy (9 items). The third questionnaire collected data from health care providers. This questionnaire consisted of three parts: Demographic characteristics (7 items), hospital information (8 items), and the childbirth policy (12 items). Content validity was judged by five experts. After this stage a pilot study was conducted to try out the questionnaires with 10 postpartum women, 10 postpartum women’s relatives, and 10 health care providers. Some modifications were made to the questionnaires as a result.

Results

Subjects’ demographic characteristics

The sample consisted of 1,105, and included 357 health care providers, 368 postpartum women, and 380 postpartum women’s relatives.

Health care providers ranged in age from 22 to 59 years, with a mean age of 34.98 years (S.D. = 7.59). The majority of the health care providers were married (56%) and Buddhist (87.1%). Three hundred and seven (86%) had completed at least a Bachelor’s degree and had an average working experience of 9.42 years (S.D. = 7.05). The majority of health care providers were registered nurses (68.1%). Almost half of the health care providers (48.2%) were working at district hospitals. (Table 1)

The postpartum women ranged in age from 13 to 46 years, with a mean age of 27 years (S.D. = 6.63). Almost half of the postpartum women were Buddhist (45.8%). Nearly all of the postpartum women were married (98.4%). One hundred and sixteen (31.5%) had completed 6th grade, and only 17.7% had at least a vocational certificate or a Bachelor’s degree. The average income per month of the postpartum women was 9,382.09 bahts (S.D. = 8594.58). Postpartum women’s relatives ranged in age from 14 to 72 years, with a mean age of 33.97 years (S.D. = 10.44). The majority of the postpartum women’s relatives (85.0%) were married and Buddhist (50.3%). Ninety one postpartum women’s relatives (23.9%) had completed 6th grade and 34.8% had completed some high school or graduated from high school. The majority of the postpartum women’s relatives (56.5%) were laborers or farmers. The average income per month of the postpartum women’s relatives was 10,116.55 bahts (S.D. = 10,248.31). (Table 2)
Table 1  Health care providers’ demographic characteristics (n = 357)

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Health Care Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>Age (years) Mean = 34.98 S.D. = 7.59</td>
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<tr>
<td>Marital status</td>
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<tr>
<td>- Single</td>
<td>145</td>
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<tr>
<td>- Marriage</td>
<td>200</td>
</tr>
<tr>
<td>- Divorce / separated</td>
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<tr>
<td>- Widow</td>
<td>3</td>
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<tr>
<td>Religion</td>
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</tr>
<tr>
<td>- Baddish</td>
<td>311</td>
</tr>
<tr>
<td>- Muslim</td>
<td>44</td>
</tr>
<tr>
<td>- Christian</td>
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</tr>
<tr>
<td>Educational level</td>
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<td>307</td>
</tr>
<tr>
<td>- Master degree</td>
<td>24</td>
</tr>
<tr>
<td>- Doctoral degree</td>
<td>11</td>
</tr>
<tr>
<td>- Other</td>
<td>11</td>
</tr>
<tr>
<td>Working experience (years) Mean = 9.42 S.D. = 7.05</td>
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</tr>
<tr>
<td>Position</td>
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<tr>
<td>- Doctor</td>
<td>41</td>
</tr>
<tr>
<td>- Obstetrician</td>
<td>23</td>
</tr>
<tr>
<td>- Head of department</td>
<td>2</td>
</tr>
<tr>
<td>- Director of hospital</td>
<td>3</td>
</tr>
<tr>
<td>- Registered nurse</td>
<td>243</td>
</tr>
<tr>
<td>- Head nurse of labor and delivery room</td>
<td>42</td>
</tr>
<tr>
<td>- Nurse supervisor</td>
<td>1</td>
</tr>
<tr>
<td>Type of Hospital</td>
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<tr>
<td>- District hospital</td>
<td>172</td>
</tr>
<tr>
<td>- Provincial hospital</td>
<td>95</td>
</tr>
<tr>
<td>- Regional hospital</td>
<td>56</td>
</tr>
<tr>
<td>- University hospital</td>
<td>18</td>
</tr>
<tr>
<td>- Private hospital</td>
<td>16</td>
</tr>
</tbody>
</table>
An Evaluation of Childbirth Policy in Thailand: A Case Study in the Southern Part of Thailand (Part 1)

Table 2  Postpartum women and their relatives’ demographic characteristics (n = 725)

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Postpartum women</th>
<th>Postpartum women’s relatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Age (years)</td>
<td>Mean = 27</td>
<td>S.D.= 6.63</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Buddhist</td>
<td>168</td>
<td>45.8</td>
</tr>
<tr>
<td>- Muslim</td>
<td>199</td>
<td>54.2</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Single</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- Married</td>
<td>362</td>
<td>98.4</td>
</tr>
<tr>
<td>- Divorced/separated</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- Widowed</td>
<td>3</td>
<td>.8</td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- No education</td>
<td>18</td>
<td>4.9</td>
</tr>
<tr>
<td>- Grade 4</td>
<td>24</td>
<td>6.5</td>
</tr>
<tr>
<td>- Grade 6</td>
<td>116</td>
<td>31.5</td>
</tr>
<tr>
<td>- Grade 9</td>
<td>91</td>
<td>24.7</td>
</tr>
<tr>
<td>- Grade 12</td>
<td>53</td>
<td>14.4</td>
</tr>
<tr>
<td>- Vocational/technical</td>
<td>32</td>
<td>8.7</td>
</tr>
<tr>
<td>certificate</td>
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<td></td>
</tr>
<tr>
<td>- Bachelor degree</td>
<td>33</td>
<td>9.0</td>
</tr>
<tr>
<td>- Master degree</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
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<tr>
<td>- Housewife</td>
<td>114</td>
<td>31.0</td>
</tr>
<tr>
<td>- Laborer</td>
<td>119</td>
<td>32.3</td>
</tr>
<tr>
<td>- Company employer</td>
<td>17</td>
<td>4.6</td>
</tr>
<tr>
<td>- Business owner</td>
<td>57</td>
<td>15.4</td>
</tr>
<tr>
<td>- Government officer</td>
<td>5</td>
<td>1.4</td>
</tr>
<tr>
<td>- Farmer/fisherman</td>
<td>56</td>
<td>15.3</td>
</tr>
<tr>
<td>- Soldier</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- Teacher</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- Student</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- Retired governmental officer</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Income (bahts)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean = 9,382.09</td>
<td>S.D.= 8,594.58</td>
</tr>
</tbody>
</table>
Ideas relating to attendance at birth during the intrapartum period

The findings of this study showed that the majority of the postpartum women (79%) wanted to have their relatives with them during intrapartum. In addition, the majority of the postpartum women’s relatives (83.6%) would like to be with women in labor during intrapartum. However, most health care providers (67.9%) did not want women’s relatives to be present during intrapartum. There was a statistically significant difference in the matter of wanting relatives to be present at birth between the health care providers and the postpartum woman, and between the health care providers and their relatives \((\chi^2 = 160.55, 200.14, p < .0001\), respectively). (Table 3)

The potential problems of allowing attendance at birth during intrapartum

The potential problems of allowing the attendance at birth to attend births included: The limitations of the labor and delivery room (41.2%), increasing incidences of women suing for malpractices (11.2%), difficulty in providing intrapartum care (25.2%), lack of privacy for women in labor (17.9%), and the increased risks of infection during childbirth (21%).

Potential management strategies for improving the childbirth policy in Thailand

Potential management strategies were recommended by postpartum women and their relatives to solve the problems associated with the isolation of women in labor from relatives at births. These included: 1) the renovation of labor and delivery rooms to provide more privacy for women in labor (52.2% and 50.3%, respectively), 2) providing preparation classes for attendance at birth (64.9% and 58.4%, respectively), and 3) providing private labor and delivery rooms (31.5% and 38.2%, respectively). (Table 4)

Table 3 Subjects’ ideas about attendance at birth (n = 1,105)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Did not want</th>
<th>Want</th>
<th>(\chi^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Care providers</td>
<td>239</td>
<td>67.9</td>
<td>113</td>
</tr>
<tr>
<td>Postpartum women</td>
<td>77</td>
<td>21.0</td>
<td>290</td>
</tr>
<tr>
<td>Health care providers</td>
<td>239</td>
<td>67.9</td>
<td>113</td>
</tr>
<tr>
<td>Postpartum women’s relatives</td>
<td>62</td>
<td>16.4</td>
<td>317</td>
</tr>
<tr>
<td>Postpartum women’s relatives</td>
<td>77</td>
<td>21.0</td>
<td>290</td>
</tr>
<tr>
<td>Postpartum women’s relatives</td>
<td>62</td>
<td>16.4</td>
<td>317</td>
</tr>
</tbody>
</table>

* p < .0001 ns = not significance
An Evaluation of Childbirth Policy in Thailand: A Case Study in the Southern Part of Thailand (Part 1)

Table 4 Potential management for improving childbirth policy (n = 725)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Postpartum women</th>
<th>Postpartum women’s relatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>- Renovate the labor and delivery rooms to have more privacy</td>
<td>192</td>
<td>52.2</td>
</tr>
<tr>
<td>- Provide preparation classes for birth attendants</td>
<td>239</td>
<td>64.9</td>
</tr>
<tr>
<td>- Have private delivery room</td>
<td>116</td>
<td>31.5</td>
</tr>
</tbody>
</table>

Potential management strategies were recommended by health care providers for solving the problems associated with the isolation of women in labor at births. These included: 1) the renovation of the labor and delivery rooms to provide more privacy for women during the intrapartum period, 2) increasing the number of health care providers to ensure appropriate care, 3) providing childbirth classes for pregnant women’s relatives to increase their knowledge in order to prevent misunderstanding among health care providers, the women in labor and their relatives, and 4) improving health care providers’ skills in order to prevent malpractice.

Suggestions were made as to appropriate topics for preparing for attendance at birth. The majority of subjects stated that the pregnant women’s relatives had to be educated and informed about the following: Pain relief techniques (84.3%), the process of labor (72%), the mechanisms of birth (67.2%), the empowerment of women in labor (67.5%), and how to act during intrapartum (76.5%).

Discussion

The findings of this study showed that there were different ideas on the hospital policy concerning attendance at birth among health care providers and their clients. It was found that the majority of postpartum women would like to have their relatives to be with them during the intrapartum period. In addition, postpartum women’s relatives wanted to be in the labor and delivery room to provide emotional support. However, the majority of health care providers did not want to have women’s relatives or non-professionals in attendance at birth during the intrapartum period.

The reasons why the postpartum women and their relatives in this study wanted attendance at birth during the intrapartum period was because it could provide what women in labor need, including giving social support, sharing the childbirth experience, and reducing the women’s anxiety. Sometimes women in labor had been left alone because the nurse was very busy providing care for other women. A previous study found that continuity of care was positively associated with the probability of patient satisfaction with the childbirth experience. Another previous study showed that fathers, when compared with the midwives, were physically present longer during the experience and were observed to be more involved with their partners in terms of giving comfort and touching. Women in labor also perceived their partners’ attendance to be supportive, although this was not related to what they actually did, but rather to their being present.

The attendance of relatives at birth can help to provide forms of physical and emotional support.
that nurses cannot give. Previous studies showed that support during labor by the husband improves the progress of labor\textsuperscript{1,3,9,17,18} and promotes bonding among family members.\textsuperscript{18} Similarly, several previous studies found that women wanted their husbands to be present during labor and delivery because it made them feel supported,\textsuperscript{10-12} secure,\textsuperscript{20} warm,\textsuperscript{20} and safe.\textsuperscript{10,24} In addition, women's husbands were able to provide emotional support, encouragement, and reassurance during intrapartum.\textsuperscript{10} Other previous studies found that pregnant women expected to have their partner, significant others or her relatives with them during the intrapartum period\textsuperscript{22,30} in this study, the findings showed that almost a half of the postpartum women (47.1\%) wanted their husbands with them during the intrapartum period.

Most health care providers did not want women's relatives to be present during the intrapartum period. This was because they were concerned about women in labor's privacy and the difficulties experienced in providing care to the women. This is because labor and delivery take place normally in wards that are not private, contain many patients and to which the public has easy access. All women have to stay in the same room during the first stage of labor; as a result, many hospitals do not allow family members into the labor and delivery rooms. However, some district and a few private hospitals allow relatives' attendance at birth in the labor and delivery rooms. In this study, the findings showed that most public hospitals have a policy of not allowing attendance at birth by significant others. There were several reasons, for this, including concern for women's privacy, the possibility of infection of the laboring woman or her newborn, the increasing tendency to sue for malpractice, conflict between health care providers and relatives in attendance at birth, and difficulties faced by health care providers in their working conditions. In addition, there was a danger that conflict might take place during a crisis, such as when communication was not clear, and women in labor did not have enough understanding about the care processes. Some women and their relatives might sue hospitals because they misunderstood or did not understand the situation they were in.

In this study, however, health care providers did suggest that there was potential to develop better management to improve this childbirth policy during intrapartum. These steps included renovating the labor and delivery rooms to give more privacy, setting up private labor and delivery rooms, and providing preparation classes for those who want to attend when their wives or relatives give birth. However, it is quite difficult to renovate the labor and delivery rooms in the public hospitals, because of the limited space available for labor and delivery rooms. In addition, in several hospitals there is a shortage of registered nurses and they cannot increase the new services as necessary. Thus some health care providers suggested that the hospital should allow relatives' attendance at birth and during intrapartum to provide the care and support that women in labor want. However, preparation is needed for attendance at birth, because there is emotional involvement and relatives need to know what type of support is required. Giving birth is a crisis for both the pregnant woman and her partner. For a father, as much as for the mother, the birth of his baby represents a rite of passage, requiring a major emotional readjustment. He has to cope with fear for his partner's and his baby's safety, and to deal with his own emotional state, the intensity of which may surprise him.\textsuperscript{31} Attendance at childbirth can be considered a potentially stressful situation for fathers.\textsuperscript{32} However, Ip\textsuperscript{16} found that the father's presence during labor can contribute to the laboring woman's psychological well-being. But fathers must
be well prepared so that they can provide effective practical help, particularly concerning pain control, to ensure that the women in labor’s needs are met. Most of the health care providers suggested that companions at a birth should be prepared about matters such as providing support during labor, the process of labor, pain relief techniques, and the potential complications that may arise during the intrapartum period.

The midwife’s role is not just to invite fathers to accompany their partners who are in labor, but also to prepare fathers, both psychologically and physically, to provide practical support that can meet the women’s needs. Nolan found that some men reported that it was very difficult for them to deal with the sight of their partners in pain and to accept women’s instinctive behavior during labor. Some women might not control their pain or their behavior well; they might scream and want to end the labor and delivery period by asking for a cesarean section. This might cause the husband to feel inadequate because of feeling unable to help his partner to cope with the labor pain and birth, or do what she wants. Furthermore, previous studies found that fathers have reported feelings of anxiety and helplessness during labor.

In one qualitative study all fathers interviewed expressed the desire for more support for themselves. Therefore, to avoid making dangerous mistakes, relatives in attendance at births need to understand the complex physiological changes the mother is undergoing. Hence preparation classes should be offered to all pregnant women and their relatives to help them behave appropriately during labor and delivery. However, it may be too much to expect many men to be able to witness their loved one’s pain, to nurture and encourage her in managing her pain, and to act as her advocate. It might be hard for them to maintain their perspective and confidence in a strange environment filled with busy, confident, commanding professional people. For most men, keeping out of way, cooperating with the staff, and letting the staff do what they feel is best, may seem to be the most suitable role.

Two Thai researchers recommended that hospitals in Thailand should change the childbirth policy to allow husbands or relatives to be with women during the first stage of labor. This was to enable them to provide emotional support, reduce anxiety, and thus promote good rapport in the family. Several authors have agreed that future practice during childbirth in Thailand should be changed to allow family members to be with women during the intrapartum. In addition, one study found that women who received continuous support during the intrapartum period were more satisfied with their experience than women in the control group.

Conclusions

The concept of providing support for women in labor is not a new one. During the past century, the practices surrounding childbirth have changed dramatically; these have moved from women-supported birth in the home to highly technological processes in the hospital setting. Childbirth in hospital has, subsequently, become an emotionally isolating event for many women. The needs of women, however, have not changed. They still require a sense of safety, acceptance, freedom from fear, and the presence of a supportive companion throughout labor and birth. Husbands’ or women’s relatives should be included in management of labor plans, and need support to develop their role as coach, particularly when the women experience pain. In Thailand only a few district hospitals allow attendance at birth by relative that enables them to be with the women during the first stage of labor, but not during the second stage. Thus, the recent
and current official policy of isolating women during childbirth should be revised. Some changes need to be made in Thai hospital practices to improve childbirth outcomes, and to increase the satisfaction of women and their families during the childbirth experience. Finally, the health care providers themselves could also improve their services by making available the type of high quality care that meets the needs of women in labor and their families.

Acknowledgements

We are very grateful to the health care providers who filled in the questionnaires for the postpartum women and their relatives. The project was funded by a research grant from the Prince of Songkla University.

References

นโยบายการใส่คลอส: ถึงเวลาที่จะมีการเปลี่ยนแปลงหรือไม่ (ตอนที่ 1)

โดยที่usal, +Sans, สายสี, สายสีน้ำส้ม, สายสีทับทิม, สายสีน้ำเงิน, สายสีน้ำเงิน

บทคัดย่อ: การศึกษาเชิงระบบเครื่องมีวิจัยประสงค์เพื่อ 1) เปรียบเทียบความคิดเห็นของหญิงระยะหลังคลอด หญิงระยะหลังคลอด หญิงระยะหลังคลอด และผู้ให้บริการเกี่ยวกับนโยบายการคลอดที่ไม่ยุ่งยากให้หญิงระยะหลังคลอด หญิงระยะหลังคลอด และผู้ให้บริการเกี่ยวกับนโยบายการคลอดที่ไม่ยุ่งยาก 2) สวัสดีความเห็นของผู้ให้บริการเกี่ยวกับปัญหาของการให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การให้การ
Validity of the Rosenberg Self-esteem Scale in Young Women from Thailand and the USA

Linda S. Beeber, Acharaporn Seeherunwong, Todd Schwartz, Sandra G. Funk, Nopporn Vongsirimas

Abstract: Although the appraisal and evaluation of self is thought to be a universal process, the determinants of self-esteem may vary as a function of culture. Since self-esteem is a plausible mediator between stressors and development of mental health issues in women, accurate measurement of this construct is important for nursing research. Examination of the appropriateness of Rosenberg Self-esteem Scale, a widely-used self-esteem instrument developed in the United States of America, for use in Thai culture is essential prior to administration to Thai populations. Five investigators, two from Thailand and three from the USA compared the validity of the Rosenberg Self-esteem Scale (RSS) with a Thai-language version translated by Thangjitpukdeesakul, in two samples consisting of 765 Thai and 397 USA young women who were similar in age, socioeconomic status and educational level. We compared the performance of both instruments using Cronbach’s alpha, item-total correlations and analysis of item endorsement (floor and ceiling effect) for individual items. Criterion validity was assessed by correlating the US version of the RSS and Thai version of the RSS with 13 items extracted from the Beck Depression Inventory. A factor analysis on the instrument in each sample was done to compare the internal dimensions of the two instruments. Results revealed that the RSS performed in a similar manner in both Thai and USA women suggesting that hypothesized differences in the two cultures were not reflected in the structure of self-esteem in the participants. Translation difficulties with two items (7 & 8) in the Thai version of the RSS were consistent with tests of translated RSS versions in Chinese, Korean, Spanish and Iranian languages. Items on both versions loaded on a single factor suggesting that the internal structure appeared to be unidimensional. This finding was consistent with the design of the RSS as a unidimensional self-esteem instrument.

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Key words: Rosenberg self-esteem, psychometric equivalence, validity, young women

Introduction

Self-esteem, defined as the judgment of self-worth cast upon the self by the self, has been linked to a variety of health outcomes in Thai and USA women including depressive symptoms and depression. Currently ranked second among global health problems, depression is the number one cause
of lost productivity for women and is predicted to be the leading worldwide chronic health threat for women by 2020. Low self-esteem is associated with depression suggesting that through protection and enhancement of self-esteem and its precursors, nurses can help women prevent disabling depression and other negative health and mental health outcomes. The accurate measurement of self-esteem is important in the development and testing of nursing interventions developed for women who are vulnerable to depression.

The elements that a woman uses to determine her sense of self-worth may vary from culture to culture and will be reflected in the self-esteem measurement instruments developed in a particular culture. Therefore, before an instrument is used in a different culture and language, it should be carefully evaluated for its conceptual and linguistic “fit” with the new culture. Examining the psychometric equivalence of an adapted instrument and its original version may reveal cultural biases in the original as well as establish the utility of the instrument in the new culture. Such an examination may also guide refinements that make the adapted instrument more linguistically correct and culturally appropriate for the new users. This paper will undertake such an analysis by comparing the psychometric qualities of a Thai translation of the Rosenberg Self-esteem Scale (RSS) with the original English-language version in samples of young adult Thai women and women from the United States of America (US).

**Theoretical Framework**

The psychometric qualities of the two versions of the RSS were examined within the framework of the Interpersonal Theory of Nursing (ITN). Within this theory, self-esteem is viewed as arising in the context of the interpersonal relations of a person and is partly a product of appraisals from significant others. These positive and negative appraisals are used by parenting figures to shape the behavior of the child into socially desirable patterns for that culture. Self-esteem arises from these appraisals and is aligned closely with the behavioral ideals of a particular culture. Further, the concept of self-esteem implies that an internal process of evaluation has occurred. In order to determine one’s worth, one must draw a comparison between the self and something or someone else-and then make an estimation of how one is or is performing in relation to that object of comparison. Most likely, the ideal object used as a comparison will mirror core social ideals of the culture with which one identifies. As a consequence, the items that make up a self-esteem instrument will express the social and behavioral ideals of the culture in which the instrument is developed. If this instrument were used in a different culture with different social ideals, it might not be a valid measure of self-esteem. We sought to explore this question by comparing the RSS in two cultures.

**Background and Significance**

Kim, Han and Phillips (2003) outlined a procedure by which the equivalence of an instrument developed in one culture could be tested in another culture. This procedure uses three steps-establishing functional equivalence, developing a comparative theoretical framework, and establishing metric equivalence. Functional equivalence determines that the actions and activities associated with the concept are equal in both cultures. This step may begin with establishing that both cultures have an equivalent word for the concept. Second, a comparative descriptive framework is developed that proposes key similarities and differences between the two cultures. In this step, underlying dimensions that might make the meaning of the items or response to the items different in the two cultures are identi-
Validity of the Rosenberg Self-esteem Scale in Young Women from Thailand and the USA

The comparative descriptive framework for this analysis was drawn from Farruggia and colleagues' (2004) cross-cultural test of the equivalence of the Rosenberg Self-esteem Scale in samples of adolescents from four cultures-US, Czech Republic, China and Korea. They hypothesized that Western (US & Czech) adolescents would be “individualistic” and Eastern (China & Korea) adolescents would be “collectivist” and that these cultural dimensions would affect the measurement of their self-esteem. Collectivist cultures have been characterized as interdependent, that is, valuing group goals higher than personal goals and using cultural norms in making decisions how to behave. In evaluating behavior, a person from a collectivist culture would ask “How do I feel about my behavior or characteristic?” The self-esteem of people from individualistic cultures would reflect personal goals and self-satisfaction. Western cultures are considered individualistic with the US culture considered the most representative. Farruggia and colleagues evaluated the impact of these cultural dimensions on self-esteem, proposing that differences would be demonstrated as different total scores, item endorsement patterns, and internal factor structures on the RSS. The researchers predicted that Chinese/Korean (collectivists) total score on the RSS would be lower, that endorsement patterns of positive and negative items would be different and that rather than a single factor, the Eastern cultures would demonstrate a two-factor structure with positive and negative items loading on different factors. The results of their analysis showed that item performance was low for one item, # 8 (“I wish I could have more respect for myself”). This item had a very low item-total correlation in the Korean and Chinese respondents, suggesting that the meaning of “wishing”) was different for these respondents. Also, Korean and Chinese respondents were less willing to endorse positive statements and more willing to endorse negative statements. The confirmatory factor analysis of the internal dimensions of the RSS showed that a two-factor structure emerged with positive and negative statements representing different internal dimensions. However, this two-factor structure represented a better fit for all respondents, collectivist and individualist. Ultimately, Farruggia and colleagues concluded that the dimension of collectivism and individualism affected the RSS very little, as item endorsement patterns and factor structure on the instrument across the four cultures thought to differ on individualism and collectivism were more alike than different.

Individualist cultures have been characterized as independent, i.e., valuing personal goals higher than group goals and using personal feelings in making decisions about how to behave. In evaluating behavior, a person from an individualist culture would ask “How do others feel about my behavior or characteristic?” The self-esteem of people from individualistic cultures would reflect personal goals and self-satisfaction. Western cultures are considered individualistic with the US culture considered the most representative. Farruggia and colleagues evaluated the impact of these cultural dimensions on self-esteem, proposing that differences would be demonstrated as different total scores, item endorsement patterns, and internal factor structures on the RSS. The researchers predicted that Chinese/Korean (collectivists) total score on the RSS would be lower, that endorsement patterns of positive and negative items would be different and that rather than a single factor, the Eastern cultures would demonstrate a two-factor structure with positive and negative items loading on different factors. The results of their analysis showed that item performance was low for one item, # 8 (“I wish I could have more respect for myself”). This item had a very low item-total correlation in the Korean and Chinese respondents, suggesting that the meaning of “wishing”) was different for these respondents. Also, Korean and Chinese respondents were less willing to endorse positive statements and more willing to endorse negative statements. The confirmatory factor analysis of the internal dimensions of the RSS showed that a two-factor structure emerged with positive and negative statements representing different internal dimensions. However, this two-factor structure represented a better fit for all respondents, collectivist and individualist. Ultimately, Farruggia and colleagues concluded that the dimension of collectivism and individualism affected the RSS very little, as item endorsement patterns and factor structure on the instrument across the four cultures thought to differ on individualism and collectivism were more alike than different.
When the two primary investigators of this study explored the question of how well the Thai version of the RSS measured self-esteem, we considered the Farruggia study to be quite pertinent. Throughout history, the existence of both collectivist and individualist elements in Thai culture has made it unique among Eastern cultures\(^20\) making it difficult to predict whether these dimensions would be reflected in the function of the RSS in Thai respondents. Therefore, we decided to use the framework of individualism and collectivism and replicate Farruggia and colleagues’ item-level and dimensional analyses of the Thai and US versions of the RSS in samples of Thai and US women.

**Research Question**

Our research question was, “How similar is the validity of the Thangjitpukdeesakul version\(^21\) of the Rosenberg Self-esteem Scale and the US (original) Rosenberg Self-esteem Scale function in Thai and US women?”

**Methods**

**Samples**

This secondary analysis used two samples of women university students aged 18-24 years. The Thai sample consisted of 722 women, all Thai, who were in their first to fourth year of university attendance. The mean age of participants was 19.96±1.29. The US sample consisted of 377 women who were attending their first through fourth years of university study. The US sample was 84% White, 10% Black and 6% Other (Native American, Hispanic and Mixed or Undeclared) and the mean age was 19.24±1.66. Both original studies explored the relationship of self-esteem and depressive symptoms. Full descriptions of the original studies appeared in Seeherunwong\(^22\) and Beeber.\(^23,24\)

**Instruments**

Self-esteem: Self-esteem was assessed with the original English and translated Thai versions of the Rosenberg Self-esteem Scale (RSS). The RSS is a 10-item questionnaire with 5 positively-worded and 5 negatively-worded statements. The respondent uses a 4-point Likert-type response scale with 4 anchors (“Strongly agree” “Agree” “Disagree” “Strongly Disagree”).\(^25\) The RSS was developed in the 1960s and has been widely used with considerable evidence of validity.\(^25\) The early test-retest reliability was .85 in a sample of 28 college students.\(^26\) The RSS also demonstrated a Cronbach’s alpha of .88 in a sample of 257 undergraduate students\(^27\) and .83 in two studies of 189 and 411 adolescent females.\(^28,29\) The Thai version of the Rosenberg Self-esteem scale was translated by Thapanee Thangjitpukdeesakul for a Master’s thesis in Clinical Psychology at Mahidol University in Bangkok, Thailand. The translated version demonstrated a Cronbach’s alpha of .67 in a sample of 30 Thai juvenile delinquents.\(^21\)

Depressive Symptoms: The Thai Depression Inventory and the Beck Depression Inventory were used in this study. The Beck Depression Inventory (BDI) is a 21-item depressive symptoms inventory with established reliability and validity in measuring severity of symptoms. The BDI was introduced in 1961\(^30\) and revised in 1978,\(^31\) 1984,\(^32\) and 1996.\(^33\) It has been used in psychiatric and general population as well as college student samples. The BDI has demonstrated congruence with clinical measures such as the Hamilton Rating Scale for Depression and the Research diagnostic Criteria for affective Disorders.\(^34\) The BDI demonstrated a Cronbach’s alpha of .86 in a sample of 598 psychiatric patients,\(^32\) and .84 and .85 in two samples of 184 college students and 213 college students female respectively.\(^23,28\)
Validity of the Rosenberg Self-esteem Scale in Young Women from Thailand and the USA

The 20-item Thai Depression Inventory (TDI) was developed in 1999 by Lotrakul and Sukanich using translated items from the Beck Depression Inventory, the Zung Self-rating Depression Scale, the Hamilton Rating Scale for Depression and the Hospital Anxiety and Depression Scale. Items judged to be culturally-appropriate for Thai patients were chosen. The TDI demonstrated a Cronbach’s alpha of .86 in a sample of 50 Thai patients, .83 in a sample of 29 Thai women living and studying in the US, and .89 in a sample of patients who were diagnosed depressive disorders, aged from 20-60 years.

The developers of the Thai Depression Inventory (TDI) included 13 items from the Beck Depression Inventory, and consequently, the two instruments contain 13 items that are identical. Following an examination for the linguistic equivalence of these 13 items by the two bilingual Thai authors of this paper, the 13 equivalent items were extracted from both data sets for use in this analysis. The new scale demonstrated a Cronbach’s alpha of 0.75 in the Thai sample and 0.77 in the US which was judged to be sufficient for this analysis.

Procedures

The de-identified data sets were converted to a similar statistical analysis program (SAS) and examined for missing data and for equivalence. A small percentage (3%) of male participants in the Thai sample, and women participants who were older than 24 years of age (Thai sample - 2%; US sample - 5%) were excluded to make the samples more homogeneous.

Analysis

Demographic characteristics of the two samples were compared to verify the comparability of the two samples. We then compared the reliability of both versions of the RSS using the Cronbach’s alpha for each instrument. We compared the performance of individual items by examining the item-total correlations and the total Cronbach’s alpha with each item removed in the Thai and US samples. We analyzed whether Thai and US participants consistently endorsed all items or showed a pattern of choosing one or the other end of the scale. “Choosing the end of the scale” was operationalized as 70% of the participants endorsing the highest or lowest value for an item.

We compared overall instrument validity in the Thai and US samples by using a criterion validity analysis in which we correlated the abbreviated 13-item depressive symptoms scale with the Thai and US versions of the RSS. The hypothesized correlation was a negative one, i.e., higher RSS scores associated with lower depressive symptom severity scores. Further validity was explored through internal dimensional analysis by conducting a factor analysis of the Thai and US versions of the RSS in the Thai and US samples, respectively, to determine if the empirically derived structure approximated the hypothesized dimensions of the concept. Rosenberg had proposed that the RSS items represented a unitary concept. Farruggia and colleagues had found a two-dimensional structure comprised of the positive and negative items.

Results

Instrument Descriptive Statistics

The mean scores for the Thai and US versions were remarkably similar (Thai RSS mean = 30.29; US RSS mean = 31.38). The US RSS had a slightly larger standard deviation (4.60) than the Thai RSS (3.38), indicating slightly more heterogeneity in the distribution of the US scores. While a t-test comparing the two means was significant, t(593) =
-4.10, p < .001, this is most likely a function of the large sample size. There is little clinical utility in the one-point difference in the means.

**Total Instrument Reliability**

Internal consistency reliability was calculated for both the Thai and US versions of the Rosenberg Self-esteem scale. The Cronbach’s alpha for the Thai RSS (.79) was lower than the US RSS (.86) and slightly below the standard acceptable level of reliability (.80).27,38-44

**Item–Total Correlations**

The reason for the lower Cronbach’s alpha was revealed in the item-level analyses. Whereas all ten item-total correlations in the US version were acceptable (.41 to .69), eight of the items on the Thai RSS showed acceptable item-total correlations (between .47 and .60), with two items producing very low item total correlations, thus reducing the overall internal consistency of the Thai version. Item 7 of the Thai RSS, “I feel that I’m a person of worth, at least on an equal plane with others,” had an item-total correlation of .20 and item 8 “I wish I could have more respect for myself,” has an item-total correlation of .23. In the Farruggia study, item 8 had also shown a low item-total correlation, which was interpreted as difficulty in the translation of “wishing.” With the removal of either item 7 or item 8, the overall Cronbach’s alpha for the Thai RSS alpha increased from .79 to a more acceptable level of .81.

**Item Level Analysis**

The means on each item were compared in order to look for differences in item endorsement between the Thai and US versions. Differences in item means would reveal that one group had more difficulty endorsing positive or negatively worded items, as in the Farruggia analysis. The range in item means appeared larger in the Thai sample (Thai: 1.94-3.30; US: 2.65-3.53), but this was due to one item only, again, item 8 (the “wishing” item). With that one item removed, the Thai version had individual item ranges very close to the US version (2.91-3.37). There was no pattern of item means related to positively or negatively-worded items. The differences in US and Thai item means ranged from .01 to .75. Clinically, this would have very little detectable difference in the measurement of self-esteem. In both the Thai and the US samples, no items were endorsed at the extreme ends of the scale by 70% or more of the participants. This finding supported that neither sample had difficulty responding to positively or negatively-worded items.

**Validity**

The criterion validity of both instruments was examined by correlating the Thai RSS and the US RSS with the 13 concurrently administered depressive symptoms severity items. We hypothesized that in both the Thai and US samples, self esteem would correlate negatively with depressive symptoms. Both versions of the RSS correlated significantly and in the expected direction (Thai r = -.50, p < .0001; US r = -.51 p < .0001).

**Factorial Validity/Internal Structure**

Finally, the internal structure of the US and Thai versions of the RSS were examined using factor analytic techniques. In each sample, principal axis factoring resulted in one factor with an eigenvalue greater than 1.00 (4.00 and 3.11 in the US and Thai samples, respectively). Scree plots supported a one factor solution for each sample. In the US sample, all 10 items had factor loadings above .40 on the first factor and under .40 on the
Validity of the Rosenberg Self-esteem Scale in Young Women from Thailand and the USA

remaining factors. In the Thai sample, 8 of the 10 items had loadings above .40 on the first factor, and all 10 items had loadings below .40 on the remaining factors. The two items not meeting the .40 criterion were items 7 and 8 (the items with the low item-total correlations); their loadings were .25 and .28, respectively.

Because of the previous results found by Farruggia, we completed orthogonal and oblique rotations on both 2- and 3-factor solutions to further examine the structure of the Thai and US versions. In each case, the orthogonal and oblique rotations yielded very similar results. In the Thai sample, the positive and negative items factored into two separate factors, with items 7 and 8 factoring onto a third factor in the 3-factor solution. However, the loadings for items 7 and 8 remained weak in all solutions. In the US sample, the 3-factor solution also revealed a weak 2-item factor; in each case, the two primary factors were dissimilar to the Thai factors–there was no clear grouping of positive and negative items on factors as in the Thai version. Based on these results, it appeared to us that a 1 – factor structure was both acceptable and the most appropriate for allowing comparisons between samples. However, the results suggest that, like Farruggia and colleagues found, the interpretation of positive and negative statements was an underlying dimension that differed between Thai and US respondents.

Discussion

Using samples of female undergraduate students in Thailand and the United States this study compared the psychometric properties of a Thai (Thangjitpukdeesakul) version of the RSS with the original US version of the instrument. By using participants who were similar in socioeconomic status, education and acculturation, some of the factors that might have influenced self-esteem were controlled for by sample selection as supported by the small difference in overall scores of Thai and US women. Our data supported slightly less than adequate reliability for the Thai version of the RSS which improved with the removal of either items 7 or 8. This finding was congruent with Farruggia’s finding in Korean and Chinese respondents and in other studies which conducted in Chinese, Spanish, and Iranian samples. Consistently, item 8 (“I wish I could have more respect for myself”) showed the lowest item-total correlation. Thus, it appears that finding a comparable word or concept for “wishing” may be a problem. In this study, removal of either items 7 or 8 increased the overall Cronbach’s alpha for the Thai version of the RSS. However, losing an item on such a short instrument is not desirable and it would be preferable to work on front and back translation until an acceptable level of semantic congruence is reached. Another analysis of metric equivalence should be done after the new version has been created. Kim, et al. provide a good guide for this.

It appears that despite our question about the impact of individualist or collectivist characteristics that could hypothetically affect self-esteem, the two samples performed in a remarkably similar manner on the RSS. For the most part, data supported a single dimensional structure in both versions. However, there was a suggestion that negative and positive wording created a two-dimensional structure in the Thai version. This could be due to the sample being young adults rather than adolescents. There is some evidence that the internal dimensions of the RSS have been affected by the age of the respondents. In the literature studying in the dimensionally of RSS from 1976 to 2006, the RSS scale shows two
dimensions when RSS was used in adult populations\textsuperscript{47,48} and one dimension when it was used in adolescent populations.\textsuperscript{45,49-52} The scale was originally designed as a unidimensional self-esteem instrument for use in adolescents and it would be plausible that taking the instrument out of its intended population might change the internal dimensionality. We ultimately concluded that there was enough coherence in the data to support a single-dimensional structure in both Thai and US versions and that it is acceptable to use it as a unidimensional measure of self-esteem in both cultures.

We felt that the use of the theoretical dimensions of collectivism and individualism helped us explore the use of the RSS with Thai respondents whose culture is different than the one in which it was developed. The lack of data supporting the hypothesized differences suggested that either the cultures are more alike than we supposed or that the similarity of the two samples in education and gender minimized these dimensions. It is possible that relatively recent changes in Thai society influenced the self-esteem of the participants. Thailand is positioning itself to become the global culture of individualism, human rights, and mercantilism.\textsuperscript{53} Thai people have more exposure to global influences and have changed the traditional ways of rearing their children. Thai children are being raised in an urban society where they have more opportunity for social interaction and acceptance by others. Such exposure helps them achieve personal recognition and develop adequate self-esteem. The Thai participants in this study were students who lived and studied in Bangkok, the capital city of Thailand and may have been similar to the US participants in their self-esteem development. Thus, we must be cautious in applying even well-established generalizations such as these without empirical evidence to support them. Finally, we noted the existence of at least eleven other Thai-language versions of the RSS currently cited in Thai scientific literature\textsuperscript{1, 3, 4, 54,61} with reported Cronbach’s alphas ranging from .68 to .90. At least six of these have adequate internal consistency (Cronbach’s alpha $\geq 0.80$).\textsuperscript{1,55-57, 60, 61} Further work is needed to compare these existing versions and declare which translation performs the best, as well as correct the translational or conceptual difficulties with items 7 and 8 in order to create a fully reliable and valid measure of self-esteem for Thai research.

References

Validity of the Rosenberg Self-esteem Scale in Young Women from Thailand and the USA


Validity of the Rosenberg Self-esteem Scale in Young Women from Thailand and the USA

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ค่าสำคัญ: แบบวัดความรู้สึกมีคุณค่าในตนเองของโรเซนเบิร์ก การเปรียบเทียบคุณภาพเครื่องมือ ความเที่ยงตรง ผู้หญิง
Struggling to Get Connected: The Process of Maternal Attachment to the Preterm Infant in the Neonatal Intensive Care Unit*

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Abstract: Hospitalization of preterm infants in the neonatal intensive care unit (NICU) is a crisis for mothers in developing an attachment process. The purpose of this grounded theory study was to explore how mothers in Thailand develop maternal attachment to infants born preterm and requiring NICU hospitalization. Fifteen Thai mothers whose preterm infants had birth weights less than 1,500 g, without congenital anomalies, and experiencing mechanical ventilation were interviewed and audiotaped. Four mother-preterm infant dyad interactions were observed and videotaped. The audiotape and videotape were transcribed for analysis. Textual data were analyzed through the constant comparative method. Findings indicate the basic social process of maternal attachment was "Struggling to Get Connected" through the crisis circumstance of preterm birth, composed of 4 phases of establishing the connections, disrupting of the connections, resuming to get connected, and becoming connected. The movement of actions/interactions of maternal attachment to the preterm infant in each phase depended on having concern for the baby, adjusting emotionally to the crisis, supporting connections, life experience, and health care system facilitating. Discussion included the cultural context. Understanding this process is of value in clinical practice and nursing education. Future direction of qualitative and quantitative investigation is recommended.

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Key words: maternal attachment, preterm infant, grounded theory

Introduction

Maternal attachment is a developmental process that begins during pregnancy and continues over the months following birth, in which the mother forms an enduring affection for and commitment to the child.\(^1,2\) It is crucial for parenting and subsequently leads to the child’s growth and development and its disruption may predispose to child abuse and neglect.\(^3\) In the case of preterm
Struggling to Get Connected: The Process of Maternal Attachment to the Preterm Infant

birth, the mother must deal with crisis events, uncertainty of the preterm infant’s health and the complex environment of the neonatal intensive care unit (NICU) that causes most mothers to experience stress. Also, hospitalization of preterm infants in NICU leads to a limitation of physical and emotional contact with the mothers, and the ongoing process of maternal attachment may thereby be delayed or become problematic. It is this phenomenon that forms the focus of this study. Attachment is a culture-specific phenomenon. As far as can be ascertained, no previous research has been conducted to describe the process of maternal attachment to preterm infants in NICU in Thailand. Therefore, the grounded theory method was used for this study. The results of the study provide a theoretical model that explains the developmental process of maternal preterm infant attachment in the NICU. Understanding the maternal attachment process should be helpful for nurses in facilitating mothers’ potential to develop their caring through attachment to the child, and their nurturing abilities. Child growth and development can be enhanced and the numbers of abused children can be greatly reduced.

Related Literature

The existing knowledge on maternal attachment during preterm infants’ hospitalization in NICU is limited. Most studies have been of cross-sectional design, studying phenomena of maternal attachment behaviors at a fixed point in time. Previous studies on the inference about the process of maternal attachment addressed the process of attachment after the infants had recovered from serious illness and remained in the nursery unit through 3 months after discharge and were specific to the observation of standard feeding. Among the existing qualitative studies, Bialoskurski, Cox, and Hayes described the nature of attachment in NICU in a borough of London using an ethnonursing approach. Cox and Bialoskurski combined a qualitative ethnonursing approach and quantitative study described the nature of attachment in NICU and explored some factors involved family and mother-infant attachment particularly the communication factors related to the attachment while the infant was being cared for in a NICU in a district general hospital in London. Both studies described the nature of maternal attachment in a specific group of mothers. Moreover, the population group studied in most studies was those mother-infant dyads comprising healthy mothers and relatively good infants. Although there was a study on maternal attachment behaviors in Thai mothers, it was a cross-sectional study, specific to the first visitation during preterm infant hospitalization in the neonatal unit, and the condition of the preterm infants was relatively good. No research has been conducted to describe how the mothers develop maternal attachment to the preterm infant in NICU in Thailand. Therefore, the objective of this study was to gain more understanding of the actual process of maternal attachment from the mothers’ perspective. Because little was known about this phenomenon and the study aimed to explore the attachment process occurring in the lives of mothers, grounded theory was particularly appropriate for the study. It could generate the substantive theory grounded from data gathered from mothers’ perspectives and experience that constantly explained the studied phenomenon.

Methodology

Grounded theory, a comparative research methodology used for developing theory that is grounded in data that are systematically gathered and analyzed through the research process, was used in this study in which the maternal attachment
behaviors to their preterm infants were collected and interpreted from the mother’s perception and symbols related to their responses to the infants within their social context. The question addressed in this research was “How do mothers develop maternal attachment to their preterm infants during hospitalization in the NICU?”

This study was approved by the Ethical Review Committee for Research Involving Human Subjects at Chulalongkorn University and at the studied hospitals. The study was conducted in the NICU of a public university hospital and a central hospital located in Songkhla province in southern Thailand. The hospital NICUs admit the critical ill newborns who are born in these hospitals or are referred from other hospitals. The two hospitals are similar in their functions including health care service and medical education even if a little different in organization. The structure and functioning of the NICUs are also similar.

The purposively sampled mothers were Thai, living together with their partners/ husbands and their preterm infants with gestational age less than 37 weeks by Ballard scores assessment, birth weight less than 1,500 grams, no congenital anomaly, requiring mechanical ventilation and being hospitalized in the hospital NICU. Initially, three mothers who met the criteria were selected. Subsequent theoretical sampling guided recruitment. Thus, a total of 15 mothers with preterm infants were included in this study. Mother ages ranged from 16 to 41 years. Twelve mothers were Buddhist and the rest were Muslim. Ten mothers graduated from high school or lower while the rest had education at the diploma or bachelor levels. Six mothers were housewives, six were employees and the others were government officer, trader, and para-rubber gardener. Twelve mothers reported low family income per month (less than 10,000 baht/month). Almost all (n=14) lived in Songkhla province. Eight mothers did not know the causes of their preterm birth while the rest did because of health problems during their pregnancies. The babies were born at 26-33 weeks of gestation with birth weight between 740 and 1,400g. Their postnatal age was 2-33 days. The baby’s birth order in the family was equally the first, the second and the third. Each baby’s diagnosis was preterm baby with respiratory distress syndrome. Seven of them were also diagnosed with birth asphyxia. All babies were being hospitalized in the NICU, ten in the central hospital and the rest in the university hospital and were experiencing or had experienced respiratory support with a mechanical ventilator. Ten of them were born and hospitalized in the study hospitals and five were referred from other hospitals.

Data collection methods were interviews and observation to ensure data triangulation during June 2005 to August 2006. The mothers who met the criteria and willing to give informed consent were interviewed. Field note taking and audio-tape recording were used during the interview. Each interview lasted from 60 to 90 minutes. The first formal interview consisted of semi-structured open-ended questions aimed at eliciting information related to feelings, attitude and practices regarding the attachment of the mothers to their infants during hospitalization in NICU. Enhancing the creditability of the data findings, the second formal interview took place for member checking with 5 participants who were available in the late stage of data collection when a tentative theory had been developed to check the accuracy of the statements representing the overall perceptions and experiences of mothers in developing maternal attachment to the preterm infants in the NICU. To obtain additional data, the interaction of
4 mother-infant dyads was observed by the researcher during the mother’s visitation in the NICU for 15-25 minutes and video-tape recorded with the participant’s permission. The researcher then interviewed the participants in the context of the observed interaction from the video-tape in order to learn more about the meaning of the actions/interactions they presented and to check the validity of their responses. The interview data were audio-tape recorded. In addition, information related to demographic data and prenatal, birth, and perinatal history of the participants as well as medical health problems of the babies and their treatments was gathered from the participants and the infants’ hospital record.

The audio-tape recorded interviews were transcribed verbatim by the researcher. Textual data were analyzed using coding techniques, constant comparative analysis, memos and diagram writing throughout the analyzing process. Data analysis and data collection proceeded simultaneously. The first three interviews were analyzed then theoretical sampling was used until the data were saturated and the substantive theory was developed. To obtain dependability and confirmability, the analysis process and the accuracy of the findings were thoroughly checked with the advisors and the qualitative research experts.

**Findings**

The basic social process of maternal attachment to the preterm infant in the NICU described by the Thai mothers in this study was “Struggling to Get Connected” composed of 4 phases of establishing the connections, disrupting of the connections, resuming to get connected and becoming connected. The movement of actions/interactions of maternal attachment to the preterm infants in each phase that sequentially were being close to the fetus, withdrawal contacting, seeking closeness, mutual mother-baby interacting and committing to mothering, depended upon having concern for the baby, adjusting emotionally to the crisis, supporting connections, life experience and health care system facilitating, as shown in Figure 1.

**Figure 1** Struggling to get connected: The process of maternal attachment to the preterm infant in the NICU
Establishing the connections, the first phase of the process, began after the mother accepted her pregnancy and lasted until she had preterm birth. The determinant of this phase was “Being close to the fetus” that was a mother’s feeling of being inseparably physically and psychologically in contact with her baby during pregnancy. Accepting the pregnancy, the beginning of the connection between mother and baby, most mothers gave their babies the value as “baby is my heart” by caring for self for enhancing the baby’s growth, development and safety and by transmitting love to the baby by talking and touching through the abdominal skin for encouraging and communicating their love to the baby. Supporting connections, particularly from their husbands, was helpful for mothers in this phase. During this period, maternal attachment to the baby was gradually developed after its beginning. As a mother stated:

“While in my womb, he usually moved... When he moved, I stroked my abdominal skin and talked him. I felt that he was healthy. I was glad and loved him.”

Disrupting of the connections, the second phase of the process, began after mother had preterm birth and lasted until she first visited her baby in the NICU. In this phase, the baby was urgently separated from the mother to be hospitalized in the NICU that limited the mother’s contact with her babies. During this period, the connections between mothers and baby were disrupted after having been gradually developed during pregnancy. The determinant of this phase was “Withdrawal contacting” as mothers had minimal contact to their babies. Minimal contacting can be described by three properties of minimal touching at birth, seeing the baby momentarily, and delayed first seeing baby in NICU. At birth, most mothers had minimal touching at their babies and only seeing the baby momentarily before they were moved away to the NICU for intensive care because of their health condition and the need for emergency care. After seeing their babies, most mothers were worried and anxious. In addition, during the baby’s early hospitalization, several mothers delayed first seeing baby in NICU (the delay ranged from one to three days or over a week postbirth) depending upon the distance between the hospitals where the mother and the baby were hospitalized, the mother’s health condition, traditional postpartum practice and the husband’s support One mother addressed:

“I saw him just a moment, how small he was. After delivering, he was moved to the other room...Then, I did not see him until next morning... I was anxious and worried about him.”

Resuming to get connected, the third phase of the process occurred when mothers began to resume their connection with the babies when visiting them in the NICU after they had been disrupted postbirth. Mothers began to resume the connections by seeking closeness to the baby, then, having mutual interacting with baby. Adjusting emotionally to the crisis situation, having concern for the baby, supporting connections, life experiences of the mothers, and health care system facilitating played significant roles for mothers in resuming the connections. After achieving the resumption of the connection, mothers were committed to mothering.

Seeking closeness was the physical and psychological experience of the mother endeavoring to come into contact with the baby, when the mother interacted closely to the baby during her visiting. Seeking closeness, the mother felt emotional
Struggling to Get Connected: The Process of Maternal Attachment to the Preterm Infant

distress and was concerned about the baby’s life, wanted to hold, embrace, take care and provide love and warmth to the baby and wanted the baby to know her feelings toward him and to feel warm, safe and close to her. Both mother and babies felt warmer when close together. Seeking closeness can be described by four subcategories: Visiting, visual contacting, vocalizing, and physical contacting.

Visiting the baby in the NICU influenced the quality of attachment. The more frequent the visits and the longer time spent during visiting, the greater the attachment between mother and baby. The frequent visit also decreased the mother’s worry. Most mothers delayed the first visit (usually at the second day post birth), visited once every day during the mothers’ hospitalization, and occasionally visited after discharge depending upon traditional postpartum practice, no allowance from husband, long distance from home to the hospital, and the high cost of transportation. During visiting, mothers spent a short period of time (10 - 30 minutes) with their babies because of the critical condition of baby’s health, the feeling of worthlessness and the lack of privacy to stay longer. During visiting, most mothers wanted to take care for their baby but firstly they could only see, talk and touch them, and wanted them to perceive their sensation. At each visit when the babies were improved mothers were glad and encouraged, but when babies got worst or were in pain, they were sad.

“If I visited him everyday, the worrying about him will decrease. If not, I would think of him and worry about him very much.” It [visiting] made me love him more. I’d like him to know that I’d taken care for him thoroughly and I will not leave him.”

Visual contacting, a mother’s behavioral interacting by looking at or having eye contact with the baby, can be described by the two properties of seeing baby with uncontrollable emotional balance and seeing for knowing the baby. Seeing baby with uncontrollable emotional balance, most mothers reacted emotionally and firstly could see the baby for a short period of time because of their concern for the baby’s appearance and health condition and the NICU environment. Worrying and being upset after first seeing the babies, mothers frequently went to see them in order to learn more about them. Seeing for knowing the baby, mothers looked at their baby’s face, hands, legs, or entire body and observed the baby’s behaviors. Upon seeing their babies were normally developed or were improved mothers were pleased, felt love for and close to the baby. One mother stated:

“When I first saw him, I was frightened very much because he was too small and he did not breathe like the other normal children...I can’t calm down myself...I visited him for a moment...I went out and suddenly cried.”

Vocalizing is a mother’s behavior interacting by talking with her baby. Most mothers would like to talk to encourage their babies to fight, stay well or get better soon after birth. Talking for encouraging, most mothers either talked in their mind or aloud and also touched their babies even though at first they only talked without touching. Talking to their babies, some mothers also wanted the baby know their feelings toward them. When the baby responded to their talking, the mothers were encouraged to further their interaction, were pleased and felt love for the baby.
Physical contacting is a mother’s behavioral interacting by skin-to-skin contact with her baby comprising touching, stroking, holding, and embracing. Physical contacting can be described by three properties of delaying first touching, touching with tender loving, and consistent touch in crisis. Delaying first touching, mothers began to touch their baby at the second or later day postbirth depending upon their concern for the baby, mothers’ understanding about asepsis, nurse facilitating, and supporting. After enhancing their knowledge and being encouraged by nurses or their husband, mothers were more confident to touch and wanted to hold and embrace the babies. Firstly, mothers began touching with tender loving by gently touching the baby’s hands and fingers, then their head and face for a short period. After first touching, most mothers usually touched their babies at every visit except when they were in pain or in critical condition. Consistent touch in crisis, describes mothers liking to hold and embrace their baby. When their baby responded to the mothers’ touching, mothers were happy, felt love, warm and close to the baby while the baby felt warm, safe and also close to the mothers. As a mother addressed

“I didn’t touch him. I’d never touch him. He was small. I was afraid. I did not have courage to touch... I was afraid of infection or...harming him” “I first touched him at the second visit when a nurse told me that I could after hand-washing.”

Mutual mother-baby interacting is the interaction between mother and her baby in which the baby’s responding to mother’s interaction elicits mother’s response and reinforces the mother in recognizing and taking care for her baby. Mutual mother-baby interacting can be described by the three subcategories of baby behavioral responding, recognizing the baby, and taking care for baby.

During seeking closeness, mutual mother-baby interacting occurred when the baby’s health condition was improved in which they could respond to the mother’s interacting. Baby behavioral responding facilitated and reinforced the mother to further their pleasurable relationship. During interacting with the baby, mothers began inspecting and recognizing the baby as an individual even though they were small. Recognizing the baby, mothers were glad, felt love and would like to take care for them. In taking care for the baby, mothers were at first incompetent in taking care for the small baby. Rather, after nurses’ facilitating and the babies were improved, they eagerly began taking part in caring for the baby. Additionally, before the baby was discharged from hospital, the mother wanted to take care for him by herself. However, desiring to take care by herself began for some mothers after the baby was discharged.

“[Firstly] I didn’t have courage to do anything... I had no skill to take care or even diapering him. I only touched and told him to get well soon” “I had to come early in the morning because a nurse will allow me to hold my baby for a moment while cleaning an incubator” “I wanted to take care for him by myself and give him my breast feeding...and take care for him with love after taking off the feeding tube.”

Becoming connected, the final phase of the process occurred when mother became committed to mothering during interacting with her baby. In this phase, the mother was pleased by the mother-baby interacting before planning for the future for her baby and exploring her mother’s role. The determinant of this phase was “Committing to mothering”, that is,
Struggling to Get Connected: The Process of Maternal Attachment to the Preterm Infant

A mother promised to nurture her baby in order to endure or maintain the nature of the relationship with her baby. Having concern for the baby, supporting connections and life experiences were the conditions that influenced the mother's commitment. Committing to mothering can be described by the three subcategories of being pleased by mother-baby interacting, planning for the baby and exploring the mother's roles.

Being pleased by mother-baby interacting during taking care for their babies, most mothers usually told the babies of their desires to nurture them in order to achieve the tentative goals of being safe and comforted, having normal growth and development, being well and having a good mother-baby relationship in which the mother planned for her baby. Planning for the baby led mothers explore their mother's roles for the baby including protecting the baby from harm or infection, providing care for baby's safety and comfort, enhancing growth and development, encouraging the baby to achieve well being, and facilitating mother-baby relationships.

In the process of struggling to get connected, several conditions, including having concern for the baby, adjusting emotionally to the crisis, supporting connections, life experiences and health care system facilitating, involved the movement of actions/interactions of maternal attachment phase-by-phase in order to get connected with the baby.

Having concern for the baby is a mother engaging her interest or perceiving her baby throughout her pregnancy and after birth. Most mothers were usually concerned about the appearance of the baby (being small, gender, crying, being normal, and having defects), health conditioning of the baby (being alive, developing of complication, and improving of health) and the baby being well. Having concern about the baby being small and fragile, the gender not as they had expected, the baby's defect or the complications their baby had developed, most mothers were sad, frightened, disappointed, worried, upset and afraid to touch and take care for the baby. Emotional supporting and support of belief were helpful for mothes' concerns. In contrast, when the babies grew up well, were improved, safe, comfort and became well, most mothers were glad, felt comfort, facilitating their touching, holding and taking care for their baby and this subsequently enhanced the maternal attachment to the babies.

Adjusting emotionally to the crisis is an emotional state in which the mother reacts to the crisis situation related to her pregnancy or her baby. Most mothers reacted emotionally to the baby's characteristics, health condition, well-being, and the environment by worrying (a feeling of being uneasy or troubled by what will happen to the baby's life or if the baby will suffer), being upset (a feeling of pity for her baby's pain and suffering), being sad (a feeling of sorrow or sorry for her baby's hopelessness or uncertainty of being sick), being guilty of her fault (a feeling of having done something wrong to the baby or having hurt the baby during pregnancy or after birth), being fearful (a feeling of alarm or trouble caused by awareness or expectation of danger), frightening (a feeling of suddenly being afraid of what might happen to her pregnancy or her baby's life), and being helpless (a feeling of lacking power or strength to help her baby). Supporting connection and communicating with health care providers assisted mothers in adjusting their emotion to the crisis and interacting with the baby, and subsequently facilitated the development of maternal attachment to the baby.

Supporting connections is a way for maintaining mother physical, psychological and spiritual stability whenever she was worried, stressed or in trouble.
related to the crisis events of preterm birth and hospitalization of the preterm baby in the NICU. Support from their husband, their own parents, nurses and health care insurance as well as support of belief were helpful. The provision of supporting connections to the mothers differed among significant others including informational supporting, emotional supporting, instrumental supporting, appraisal supporting and supporting of belief (“Praying” to the Buddha or the sacred thing, “Takbatre” [offering food to the monk], “Making a vow”, belief in “The Rule of Karma”). Supporting connections can be provided to mothers throughout their pregnancy and their babies’ hospitalization both in NICU and at home. Supporting connections were helpful for mothers in deciding to accept the pregnancy while some mothers could enhance their knowledge, calm down and feel relaxed, encouraged or confident in interacting, taking care, committing to mothering so that the maternal attachment to the baby was facilitated.

Life experiences are a mother’s having gone through an event related to her pregnancy or preterm birth. The mother may have experience with a preterm infant, herself or through her husband, her own mother, a neighbor and other children. Mothers usually had some experience about preterm baby, interaction with baby and had experienced her own parent’s attachment. Experiencing about preterm baby (length of stay in the hospital, baby being kept in incubator, baby with complication, and survival/death of the baby) mothers were worried or needed more encouragement; if not, mothers were sad, upset, and felt guilt, despair, hopelessness or accepted it as their fate when the babies were born prematurely. Experiencing about interaction with the baby (mother interacting with the baby, interacting between her husband, nurse and the baby), mothers could understand the baby’s response and his perception and were more confident in their interaction. In case of having experience with their children by not interacting with them, mothers learned that their attachment had never occurred. In addition, experiencing with her own parent’s attachment was helpful for most mothers to love or develop attachment with their baby and also to understand the feeling of motherhood.

Health care system facilitating is the care which the health care system provided to the mother, baby, and family in order to achieve the desired outcome of good mother-baby relationship, optimized parental skill, and discharge into an intact family. It can be described by three subcategories of health care providing, health care communicating and environmental care facilitating. Health care providing is the attribute of care provided to the mother, baby and family throughout their pregnancy and after birth particularly during the baby’s hospitalization in the NICU. Nurses’ facilitating interaction and taking care for the baby in the NICU, providing information on the baby’s health condition and closely caring for the babies, enabled mothers to feel appreciative and be confident in the care given, their worries were decreased and their feeling of love for the baby facilitated. However, urgent care for the babies at birth before moving them away to NICU that most mothers were less able to interact with them or lack of sufficient information, caused mothers to worry. For health care communicating, most mothers usually communicated directly face-to-face or by telephoning to access their baby’s health information while health care providers explained, suggested or educated the mother by providing appropriate information. After communicating, mothers had better understanding and enhanced knowledge, were more relaxed and felt love for the baby. However, some mothers were uncomfortable, anxious or felt uncertainty after knowing the baby’s
Struggling to Get Connected: The Process of Maternal Attachment to the Preterm Infant

complication or baby’s health uncertainty. Finally, *environmental care facilitating*, the equipment, rules for practice, place, time and the appliance provided to the mothers and their baby involved mother’s physical and emotional contact to baby. Mothers were anxious, worried, could not accept and were limited in interacting with their babies. However, when the equipment attached with the baby was removed, the mother was glad.

**Discussion and Conclusion**

The substantive theory of maternal attachment to the preterm infants in the crisis situation of hospitalization in the NICU emerged in this study was “Struggling to get connected.” It explained the basic social process whereby the mothers progressed in their physical and psychological connection with their preterm babies with difficulty. No previous study had explicitly mentioned this process. Previously, Klaus and Kennell³ described 9 steps of the process of maternal attachment to the normal term baby that differed from this study, which addressed the crisis situation. Gay²¹ and Lobar and Phillip²² described attachment as an interactional process between mother and baby after birth beginning with the acquaintance stage and developing towards attachment that differed from this study in which the maternal attachment was initially developed during pregnancy and gradually developed after birth even though it was disrupted at birth. However, the interaction between mother and baby was needed before the reciprocal relationship and the bonding occurred in this and all studies.³, ²¹, ²²

Many previous studies on maternal attachment to the preterm infant found that mothers showed a delay in establishing attachment¹¹⁻¹³ that was consistent with the finding in this study. Most mothers delayed interacting with the babies after birth. Being separated from their baby immediately at birth and prolonged separation after birth, baby’s characteristics and health condition, emotional grief of mothers and NICU environment were the conditions limiting mother-baby interacting.

In this study, the substantive theory of “Struggling to get connected” was synthesized through the perspective of mothers. Therefore, it could provide more comprehensive understanding about the maternal attachment to the baby at high risk while mothers were emotionally adjusting to the crisis. In addition, the substantive theory of “Struggling to get connected” has explained the relationships among the actions/interactions of the mothers and the conditions related in the studied phenomena that may need to support mothers to get normal connection to the baby.

“Struggling to get connected” was the process the mothers followed to strugglingly develop their interaction with the baby and interact with others in order to get connected to their baby while hospitalized in the NICU. The goal of “Struggling to get connected” was to resume the affected maternal attachment to the baby that was disrupted at birth or delayed during early hospitalization in the NICU to become a normal attachment as quickly as possible. Therefore, mothers attempted to continuously develop their actions/interactions to continue their attachment to the baby in order to normally attach to their baby in a short period. In the process, the mothers moved their actions/interactions of attachment sequentially through 4 phases under the conditions involved in order to develop their attachment to the baby (as shown in Figure 1). In this theoretical model, the actions/interactions of maternal attachment to the baby were moved depending on the interaction of the mother, baby and the environment. It is an interactive model that can support the Mercer’s interactive model approach to an at-risk situation particularly when the baby was born prematurely.²
In the study, it was noted that mothers used the term “love” interchangeably with “attachment” and gave its meaning as the mother’s feeling or emotional tie to her baby. Attachment to the baby, mothers wanted to stay close with their babies and always thought of and worried about them whenever they were apart from them. Attaching to babies, most mothers wanted to interact with their babies by touching, seeing, talking, and visiting and wanted to closely take care and affectively nurture their babies. This was consistent with the definition addressed in previous study that maternal attachment was an emotional tie the mother formed and committed to her infant through their interaction and could persist through time and be manifested by specific mother’s behaviors. An interesting finding not previously reported in the literature is that maternal attachment to the preterm baby occurred simultaneously with the feeling of worry over the uncertainty of baby’s life. Thus, mothers had to emotionally struggle in developing their attachment to the baby.

Importantly, many conditions influencing maternal attachment to the baby that were found in this study were consistent with the findings of previous study such as the prematurity or the appearance and the behaviors of the baby, mother’s anxiety, life experiences particularly experience with their own parent attachment, support from their husbands and health care system facilitating. The interesting findings found in Thai culture that were not previously reported in the literature were the support of beliefs including “Praying,” “Takbatre,” “Making a vow,” and “The rule of Karma.” Mothers used to emotionally support or cope with their problem and that subsequently enhanced their interaction with the baby; the “traditional postpartum practice” that mothers were not allowed to go outside for a month postbirth prevented mothers to early interact with their baby; and “Kreng jai attitude,” the nature of Thai people that limited mothers in communicating with health care providers and in interacting with the baby. In addition, the tradition of visiting hospitalized baby in Thai Muslim mothers who usually go along with many their relatives was found to limit them to stay longer with the baby because of the time and the number of visitors limitation. These were suggested to be used as strategies to assist mothers in developing their attachment to the baby. However, even difference in visiting, both Thai and Muslim mothers were alike in the development of maternal attachment to the baby.

Preterm birth and hospitalization of the preterm baby in the NICU was a crisis experience for mothers and their families. Mothers needed to be supported in their emotional grief and concern for the baby and be facilitated in developing attachment to the baby. In Their families needed to be prepared to assist and support mothers while nurses needed to understand, support and provide effective health care to the babies, mothers and families in order to diminish mother’s emotional grief and to facilitate the development of maternal attachment to the baby. Thus, the mothers themselves, their families and nurses had to work together in order to assist mothers to effectively pass through this crisis situation and move their actions/interactions of attachment to the baby phase-by-phase in the process of “Struggling to get connected.” Further qualitative research in different groups of mothers is needed to complete and find more categories and quantitative research is needed to develop/test the model/variables that emerged in this study.
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References


ก้าวจะรักและสุขพันภัฒน์: การพัฒนาความรู้สึกรักโครงการพันภัฒน์ของมาตรการต่อชุมนุมเครื่องกล้ามหูอุปถัมภ์ในการบริบาลการแรกเกิด

รัชฎาวรรณ โอภาสทิพย์ฤทธิ์, วีณา รัชยาทิพย์, แอมมี รัชตระคิด

บทคัดย่อ: การพัฒ้านามะในหน่วยบริบาลการแรกเกิดของบุตรที่คลอดก่อนกำหนดเป็นภาวะวิกฤตสำหรับมารดาในการพัฒนาความรู้สึกรักโครงการพันภัฒน์ของบุตรมนุษย์วัยยุนชัยส์สั้นอายุน้อยกว่า 1,500 กรัม ไม่เพียงความพิษภัยแต่ลักษณะและทัศนคติที่มารดาในหน่วยบริบาลการแรกเกิดของโรงพยาบาลจังหวัดสระแก้ว เกิดปริมาณข้อมูลโดยวิธีการสังเกตการณ์การคลอดก่อนกำหนด แบบสังเกตการณ์สิ่งมั่นคง จำนวน 15 คน และสังเกตพฤติกรรมของมารดาต่อการมีปฏิสัมพันธ์กับบุตรของมารดาต่อชุมนุมเครื่องกล้ามหูอุปถัมภ์จำนวน 4 ราย การวิเคราะห์ข้อมูลโดยทางวิทยาศาสตร์ของต่างประเทศ ทำให้เกิดข้อมูลเกี่ยวกับการสังเกตการณ์การสัมผัสและบริบทวิวัฒนาการมีปฏิสัมพันธ์ที่มีประสิทธิภาพและสามารถให้ข้อมูลผลการวิเคราะห์ข้อมูลพบว่า กระบวนการพัฒนาความรู้สึกรักโครงการพันภัฒน์ของบุตรในชุมนุมเครื่องกล้ามหูอุปถัมภ์ อาจมีต่อ 1) ระยะเตรียมพัฒนาความสัมพันธ์ 2) ระยะสัมพันธ์ลูกหลาน 3) ระยะพัฒนาความสัมพันธ์ และ 4) ระยะพัฒนาความรู้สึกรักโครงการพันภัฒน์ระหว่างมารดาและบุตรพันภัฒน์ ประกอบด้วยการเปลี่ยนแปลงในระยะระยะของการพัฒนาความรู้สึกรักโดยสังเกตว่า การตระหนักถึงการวิวัฒนาการพัฒนาสมรรถนะต่อการวิวัฒนาการพัฒนาสมรรถนะ การสนับสนุนทางสังคม การมีประสบการณ์ชีวิตและการวิวัฒนาการด้านสุขภาพ การมีการต้องการจุดเริ่มต้นของบริบททางวัฒนธรรม ประโยชน์ของการพัฒนาการปฏิบัติการพยาบาลการศึกษาพยาบาล และการพัฒนาการวิจัยเชิงปริมาณและดุลยภาพในอนาคต

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264
Development and Validation of a Measurement Model for a Total Quality Management Sustainability Scale (TQMSS) as Perceived by Professional Nurses in Accredited Hospitals*

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Abstract: The purpose of this study was to develop a Total Quality Management Sustainability Scale (TQMSS) and to investigate its reliability and validity. The researcher used both qualitative and quantitative methods. Initially, a scale was developed by integrating the literature review with individual interviews with 10 Thai experts with experience of TQM (Total Quality Management) in hospitals. Later, steps were followed in order to assess the construct validity of the scale. A questionnaire was then administered to 2,565 staff nurses randomly selected from 13 accredited hospitals. Data analysis was conducted on the 2,165 usable returned questionnaires. The reliability of the instrument, calculated by the Cronbach Alpha Coefficient, was 0.96. The content validity index of the TQMSS was 0.88. The construct validity was analyzed by exploratory factor analysis (EFA).

The components of the TQMSS consisted of eight factors made up of 65 items with a total variance of 53.27%. The eight factors were: (1) education and training, (2) leadership, (3) drivers, (4) a continuous quality improvement culture, (5) support and recognition of the organization, (6) interaction and relationships among staff, (7) cooperation and participation, and (8) monitoring the results. Cronbach’s alpha test of large samples was computed to test internal consistency, which was 0.97.

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Key words: total quality management sustainability, in patient unit, accredited hospitals

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Development and Validation of a Measurement Model

Introduction

The purpose of this article is to describe the development and psychometric evaluation of a scale designed to assess total quality management sustainability. We describe the methodology and results of the study, then discuss the strengths and weaknesses of the new instrument.

Total quality management holds great promise for achieving such objectives as improving healthcare quality and productivity. Quality improvement (QI) using the Hospital Accreditation (HA) approach is a concept and practice that yields beneficial results to patients, customers, hospital personnel, the hospital, the Faculty of Medicine, society and the country as a whole. Using quality improvement processes in organizing the performance of nursing departments in hospitals which participated in the HA project resulted in better performance than in non-participating hospitals. Later, Lohityothin found that there was a positive relationship between TQM and the effectiveness of patient units. The overall risk management performances of head nurses who were trained in safety programs in hospitals that participated in the HA program was higher than those with no such training. Moreover, nurses who had continued with the QI work over a four-year period reported more activity making use of research literature compared with those who had discontinued the QI work. The nurses who kept up the QI work also reported more frequent participation in research-related activities, particularly in implementing specific research findings in practice.

However, sustaining the momentum of the process of improvement has proved very difficult, and eventually initial improvements made in the focus areas may be eroded and they may revert back to their original pre-improvement level. Khannguan found that staff practiced quality improvement discontinuously and separately, and not in relation to their job. Many hospitals slow down TQM activities after accreditation. The Institute of Hospital Quality Improvement & Accreditation (HA-Thailand) has found that 12 of 20 hospitals could not pass re-accreditation two years after being accredited. Also, there are many quality activities that are likely to decline within 6-12 months after passing accreditation. Additionally, Sutherasan and Aungsuroch found that the longer the time lapse after accreditation, the greater the decline in TQM activities at accredited hospitals.

Foster and colleagues found that TQM is likely to fail or run out of steam 18-24 months into the undertaking. Green and Plsek reported American hospitals were unable to sustain innovations in step with their changing environments. This difficulty in maintaining and further spreading process improvement has led many companies and hospitals to look for ways to sustain process improvement after accreditation. A number of previous studies revealed that there were a few indicators used to assess sustainability of TQM, especially in Western and European countries.

There is a lack of knowledge in Thailand about Total Quality Management sustainability as perceived in patient units at accredited hospitals. According to an integrative review of TQM research in Thailand, no study has been conducted related to TQM sustainability relating to nurses at accredited hospitals. Currently, national health policies focus on quality in hospitals; thus the indicators of TQM sustainability in patient units at accredited hospitals could be useful as a guide for quality management. TQM sustainability usually implies that the state, circumstances and the processes of an organization enable it to adapt to change in the environment in order for it to maintain or prolong the TQM that has been put in place to improve quality.
Background

There are many different concepts as to what can be used as measures and indicators of sustainable TQM. In the various descriptions, definitions, and uses of TQM sustainability in research and theoretical literature, TQM sustainability usually implies the ability of organization to adapt to change in the environment to maintain or keep up or prolong TQM activities that already exist for a time while improving quality. It is perceived as conditions that maintain some degree of improvement after a process improvement activity or obtaining quality certification while enhancing and improving quality.

The TQM sustainability model of Zairi\textsuperscript{13} determined the sustainability indicators of TQM in an organization as follows: (1) drivers, (2) stages of evolution; and (3) sustainable performance, which includes learning and innovation and a culture of continuous improvement. Dale and others\textsuperscript{14} offer an audit tool designed to investigate the issues impacting on sustaining total quality management (TQM), and the way whereby the tool can be used. This tool is primarily intended for use by a skilled interviewer who is knowledgeable about TQM. However, it cannot be used as a self-assessment tool, and it depends on the level of openness and trust in the company. It concentrates on the following categories: 1) internal and external environment, 2) management style, 3) policies, 4) organizational structure, and 5) process of change. Ovretveit\textsuperscript{15} also used the above conditions, and suggested that leaders designing a system of quality sustainability should consider which of the categories are important, as identified by research. The concepts developed as indicators of quality sustainability consisted of an 18-item checklist. This helps to assess the degree to which an organization has taken the necessary actions for sustaining quality, and has the processes and structures required for this. Klaus and Thomsen\textsuperscript{16} have obtained a clear picture of what managers can do to sustain the TQM process over a long period of time, so that quality becomes a way of life and a way of managing the organization. They suggested eleven items which can be used to sustain the TQM process after the first 12 months. The Kock Model\textsuperscript{17} identified ten key components in health care provider units which, if put into operation, can help sustain staff commitment and maintain initial momentum. From the research and literature review it can be seen that there are many factors that make up TQM sustainability, including those based on Zairi,\textsuperscript{13} Dale and others.\textsuperscript{14} These include change theory and innovation adoption theory.\textsuperscript{18} In summary, the main components of TQM sustainability are: (1) using the internal and external environment as drivers, (2) orientation and dynamic operation, (3) holding the QI gains made, (4) learning and innovation, and (5) fostering a culture of continuous improvement.

Related Literature

Health personnel need to rearrange their working time in order to work on quality improvement. TQM sustainability relates to the issue of the sustainability of changes in work processes. Persons may adapt their behavior and participate in change during the course of an effort focused on improvement. Rogers\textsuperscript{18} proposed that individuals pass through a series of stages in deciding whether to adopt an innovation, namely: Knowledge, persuasion, decision, implementation and confirmation. The last stage involves seeking further confirmation about the innovation, leading to whether it is retained or discontinued. The “confirmation” decision is, in different ways, likely to be important if people wish
Development and Validation of a Measurement Model
to continue to use quality methods. Rogers\textsuperscript{18} also suggests that diffusion is the process whereby an innovation is communicated among members of a social system. Once an innovation is adopted, and then put into routine use, it is considered to have reached the state of infusion.

Systems theory points out that changing one part of a system will have an effect on other parts. A system is a set of elements or components that affect one another within an environment which forms a larger pattern, one that is different from any of the parts.\textsuperscript{19} Systems thinking is seeing the connections. This may show how problems are caused by a number of interacting influences, or how patient outcomes are produced by many different interacting practitioners.

Few empirical studies focus on TQM sustainability in organizations. Saithanya\textsuperscript{20} studied maintaining a quality system, using a case study of a plastic injection factory. The following were found to be the major factors which affected the maintenance of the quality system; internal quality audits, performance indicators, corrective actions, management reviews and training. Redman and others\textsuperscript{21} also examined the key factors in the sustaining of TQM. In this case organizations were dealing with the continuing restructuring of the industry, and the associated redundancies that made winning and maintaining employee commitment a priority. Later, Ying-Jung Yeh\textsuperscript{22} studied three factors that most strongly predicted employees’ TQM practices, and which make TQM sustainable. These were: A standardized organizational structure, interpersonal support of the organization, and employees’ self-efficacy. In addition, Œvetveit and Aslaksen\textsuperscript{23} found that only hospitals that involved top and middle management and doctors in TQM programs, with project teams reporting and facilitating, were able to maintain quality improvement. Khanngun\textsuperscript{8} found that staff did not practice TQM continuously; they did it separately and not in relation to their jobs. They focused on education for improving knowledge of quality improvement, and on producing documentation, but had problems in the evaluation of actual programs. According to Wallin et al.\textsuperscript{5}, most nurses (80-90\%) had a positive attitude to research. However, those who had continued their quality improvement work over a four-year period reported more activity in reading and using research literature compared with those who had discontinued their QI work.

Development of the Instrument

A theoretical model for assessing TQM sustainability was developed from a review of literature. Using research reports and published and unpublished literature, the followings components of TQM sustainability were identified: The internal and external environment as drivers, orientation, holding the gains, learning and innovation, and fostering a culture of continuous improvement.

The next step was to conduct qualitative interviews with 10 Thai quality management experts to develop a practicable model. Using the literature review as a guide, a list of specific questions was drawn up and used for the interviews. The interview questions were reviewed by one measurement and two content experts. Conclusions drawn from the interview data were given to experts to review again. Each interview was ended when the saturation point was reached. During the expert interviews, the researcher elicited definitions, dimensions, and examples of the essentials of TQM sustainability. Content analysis, as described by Waltz, Strickland, and Lenz,\textsuperscript{24} was used to discover themes that identified issues related to TQM sustainability.
Content validity was determined by three researchers. After consultation, appropriate themes were identified. The experts were asked to describe situations from their practice that they thought brought about the sustainability of TQM. Each expert was interviewed once for one to two hours and the interview was tape-recorded.

As a result of the interviews, TQM sustainability is defined as the condition and the process of an organization to adapt to change in the environment in order to maintain or keep up or prolong TQM that already existed for a time while improving quality. The definition of the concept presented by experts who were interviewed is similar to the existing definitions proposed in the literature review. A total of 7 components of TQM sustainability were derived from the expert interviews and literature reviewed using the procedure described above. The seven components are drivers, culture, interaction and cooperation, support & recognition, leadership, monitoring and results, and education & training. These components are reasonably related to the literature review.

The next step was item pool generation. The items necessary for TQM sustainability were developed from a table grid summing up the interview data, using the qualitative matrix method. First, the summary of the qualitative interviews was organized under the categories and sub categories used in the table grid (Table 1). These items were generated as a large pool of items.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Sub-categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Drivers</td>
<td>Competitiveness, Survival, accreditation, Leader Policies, Performance review, Celebrate successes, Mission vision value driven, Develop a policy, A journey, Mindset on CQI, New pilot projects, Purposes goal policies guideline clearly Internal survey external survey, TQM unit located in organization structure, New QI projects, Clear objective &amp; policies, Determining key performance manager, QA system used data and have quality activities, Clear policies and goals, QI plan of unit match policies, Positive reinforcements clear vision and continuous core policies</td>
</tr>
<tr>
<td>Internal &amp; External change</td>
<td></td>
</tr>
<tr>
<td>Force structural Change</td>
<td></td>
</tr>
<tr>
<td>2 Culture</td>
<td>Mature, Embedded Core value, Committed to CQI system/process, Embedded in daily activities, Staff understand, Everyone responsible, Value on CQI: heart &amp; mind, Awareness &amp; commitment of staff/team, Understand the same, Dedication of staff, Commitment &amp; participation, Do by understanding, Routine work, Rooted in routine work by themselves, Staff wake up &amp; feel challenge, Continuous improving, Mindfulness in QI, Knowledge &amp; understanding, QI integrated in routine work, believed &amp; awareness of patient need good attitude with CQI, give important accept other opinion, system thinking, understanding TQM, culture of accepting others</td>
</tr>
</tbody>
</table>
### Development and Validation of a Measurement Model

<table>
<thead>
<tr>
<th>Categories</th>
<th>Sub-categories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3 Interaction</strong>&lt;br&gt;/cooperating&lt;br&gt;Multidisciplinary team&lt;br&gt;All participate</td>
<td>Communication Team Work &amp; job Communication, PCT Cross functional team, Cooperate with Other departments, Person to person, Team to team, Policies &amp; practices, Information distributed &amp; communicated, Teamwork &amp; staff Q Mgt center as multidisciplinary, Communicate to all staff, Promote all to participate opinion, Community of practice, Good relationship among staff, unit, team assigning, TQM to new generation, participation in thinking and practicing</td>
</tr>
<tr>
<td><strong>4 Reward &amp; Recognition</strong>&lt;br&gt;Tied to appraisal incentive&lt;br&gt;Celebration / Recognition&lt;br&gt;Supporting Resources: people, equipment, time, expert, IT&lt;br&gt;Workload</td>
<td>Linked to quality activities, Appraisal system of individual improvement connected organizational value, Money/ career advancement be tied commitment to CQI, Staff achievements, Support mind &amp; morale, Recognition, Incentive, Without command, Recognition linked to performance, Incentive for quality activities, Positive reinforcement, incentive link the results, Workload included QI Facilitators for suggestion &amp; give knowledge, Make simple, Goals related to TQM supported by policies, IT Give knowledge to staff, Policy &amp; goals clear, personnel’s moral and willpower, staff ability in using technology decrease workload</td>
</tr>
<tr>
<td><strong>5 Leadership</strong>&lt;br&gt;Philosophy/model Communication&lt;br&gt;Commitment Participation Assignment motivation</td>
<td>Philosophy of CQI, Commitment, Daily actions support, Concern, TQM, Give suggestions, Follow results continuously., Focus &amp; clarify policies supporting and drive continuously, Do without command, Commitment all levels, Give important &amp; understand, Support TQM activities, Part of daily work, Walk around, Improve with staff suggestion, Model of CQI, Communicate goals of quality management, all Commitment to TQM, 40 % of staff Assign TQM duties</td>
</tr>
<tr>
<td><strong>6 Monitoring</strong>&lt;br&gt;Indication Benchmarks maintaining</td>
<td>Outcomes congruent with QI policies, Outcome indicators related to customer satisfaction, complaints, incident report, CQI projects, Continuous monitoring, Internal audit every 6 months, passed accreditation, Evaluation system, Results of working performance appraisal or evaluation system for teamwork, Evaluate quality service, Benchmark with other units and outside, staff loyalty to organization, evaluate quality service, communicate results, client satisfaction, staff enjoy working</td>
</tr>
<tr>
<td><strong>7 Education</strong></td>
<td>Refresh, Continuity, training all time, sharing best practice, Learning climate, Knowledge sharing, Participate learning, Staff awareness, understanding of TQM, Continue to train all levels, Knowledge sharing among staff, units and cross units, continuous self-development, Training CQI to new generation, Leadership development for staff, Ways to knowledge sharing study visits, System thinking</td>
</tr>
</tbody>
</table>
The researcher generated 9-19 items for each subscale. These were: Subscale 1 (Drivers) consisting of 19 items, Subscale 2 (Culture) consisting of 18 items, Subscale 3 (Cooperation/Interaction) consisting of 9 items, Subscale 4 (Reward and recognition) consisting of 8 items, Subscale 5 (Support) consisting of 8 items, Subscale 6 (Leadership) consisting of 13 items, Subscale 7 (Monitoring and results) consisting of 13 items, and Subscale 8 (Education) consisting of 12 items. The first draft of the list for TQM sustainability consisted of 100 items. When developing categories from the data themselves by using an inductive approach, premature closure can be avoided by sharing the rationale for the categories with a trial audience.\textsuperscript{26} For this reason, the first draft of the scale was peer reviewed by four PhD students at the School of Nursing, Indiana University. They considered the duplication of items, and the alignment with the matrix, and they also made recommendations for editing. Twenty one items were deleted and the wording of five items was modified. The TQMSS version 2 consisted of 79 items. The TQMSS was designed to measure the level whereby TQM was sustained in patient units using the five-point Likert scale of strongly agree to strongly disagree. Scoring was from 1 (strongly disagree) to 5 (strongly agree).

The researchers next dealt with content validity. Ten Thai experts reviewed the first version of the TQM Sustainability Scale. These included: Five persons with experience as coordinators of TQM in accredited hospitals, three persons with expertise in TQM in education, and two experts in research and statistics. Scores from the relevance scale were computed for the Content Validity Index (CVI) using a formula described by Waltz, Strickland & Lenz.\textsuperscript{24} Eight items from 79 items were judged by the experts as not relevant (1) and somewhat relevant (2), which resulted in a CVI score of 0.88.

The next phase of instrument development was evaluation of the psychometric properties of the instrument. An analysis of reliability was conducted. The scale was tested with 30 staff nurses working in Sonklanakarind Hospital who were similar to those for whom the instrument was designed. The nurses completed the instrument and then they were asked to review the clarity of the language and format, the ease of understanding, the appropriateness of the length of the instrument, and to make suggestions. This was done to determine the clarity, the feasibility of the study, and the adequacy of the instrument for the research tasks, to eliminate bias and to resolve possible problems when administering the instruments. Cronbach’s coefficient alpha was used to determine the internal consistency and reliability of the individual subscales and the total scale. The coefficient alpha was .9682. The estimates of internal consistency for the TQMSS were high compared with the standard of 0.03 to 0.70 set by Nunnally\textsuperscript{25} for newly developed research tools. DeVellis\textsuperscript{26} recommends that when the overall reliability is > 0.90, shortening the scale should be considered. After the review, the researcher decided to delete 3 items: S1, I5 and D3. The final TQMSS version consisted of 76 items. Possible subscales within the group of items were explored.

**Instrument Testing**

The target population consisted of 17,663 staff nurses in 1,516 patient units from 66 government accredited hospitals.\textsuperscript{27} When applying factor analysis, the number of subjects needed is usually assessed in relation to the number of variables being measured.\textsuperscript{28} Munro\textsuperscript{29} proposed that a ratio of at least 10 subjects for each item is desirable to generalize from a sample to a wider population. Tinsley and Tinsley\textsuperscript{30} suggested a ratio for factor analysis of about 5-10 subjects per item. In this study, the maximum number of items for measuring perceived TQM sustainability was 79. Three measurement models were developed and validated so the sample
size in each model was 790. Therefore, the minimum sample size in this study should have been 2370. Given the limited number of patient units, the sample size was 13 hospitals which consisted of 514 patient units and 2,565 subjects. The questionnaires were distributed to the 2,565 sampled registered nurses, and 2,225 were returned (an 86.74% return rate). Of this number, 60 (2.34%) were incomplete. Thus, 2,165 (84.41%) completed surveys comprised the study sample.

**Data collection** Before data collection was undertaken, approval was sought from the Institutional Review Board (IRB), Chulalongkorn University, and approval was obtained from the directors of the hospitals sampled. All subjects were informed about the purpose and the methods of the study and their confidentiality was assured.

**Data analysis** Statistical analysis was carried out as follows. Internal consistency was assessed by calculating the Cronbach’s $\alpha$ coefficient. The relationships between each item and its corresponding subscale, and the relationships between eight categories of the TQMSS were evaluated by using the Pearson correlation coefficients. An exploratory factor analysis principal component method was performed on the inter-correlations between the means of the TQMSS items. To extract the number of factors, an eigenvalue $\geq 1$ was used as the extracting criterion. The items with a loading value of 0.40 or over were kept.

**Results**

Among the 2,165 sampled, the majority graduated with a bachelor in nursing degree (86.10%), and the rest held a masters’ degree (13.80%). Ages ranged from 20 to 59 years with an average age of 37 years (SD=9.05). The length of work experience ranged from 1 to 37 years with an average of 10 years (SD=14.57). Just under half of the subjects worked in surgical (28.70%) and medical wards (16.70%), and 54.60 % worked in the following units: Emergency rooms, intensive care units, operating rooms, the obstetric-gynecology service, geriatric wards, oncology wards, and out patient departments. Most of them were working as staff nurses (84.20%) and some were heads of wards (14.20%).

**Reliability** The results of internal consistency analysis for each dimension and its subscales are presented in Table 2. The total internal consistency of Cronbach’s $\alpha$ was 0.97, and the dimensions of Cronbach’s $\alpha$ ranged from 0.80 to 0.95.

| Table 2 Cronbach’s coefficient alpha reliabilities for the resulting eight factors and the TQMSS total score and statistics (n= 2,165) |
|---|---|---|---|---|
| Factor | n | M | SD | Alpha |
| I. Education and Training | 12 | 42.21 | 7.68 | .952 |
| II. Leadership | 13 | 48.70 | 8.35 | .932 |
| III. Drivers | 8 | 33.74 | 4.00 | .869 |
| IV. Continuous quality improvement culture | 8 | 29.45 | 4.64 | .856 |
| V. Interaction & participation | 7 | 28.56 | 3.65 | .863 |
| VI. Support and recognition | 6 | 20.10 | 3.83 | .863 |
| VII. Cooperation & participation | 6 | 22.88 | 3.54 | .882 |
| VIII. Monitoring the results | 5 | 19.09 | 3.41 | .804 |
| TQMSS total score | 65 | 245.03 | 31.32 | .973 |
Construct validity An investigation of the TQMSS factor structure was conducted to determine whether there was empirical support pertaining to separate factors and to identify any items that might be removed from the questionnaire. Principal component analysis (PCA) was undertaken on 76 items of the fourth version of the TQMSS to estimate the maximum number of factors that might be of value. An initial estimate of the number of factors was provided by the commonly employed Eigenvalue. This was a greater than one criterion which indicated support for an 8-factor solution. Then, the scree test of eigenvalues plotted against factors was examined. This examination suggested that only seven or eight factors should be retained. The decision as to the number of factors to be retained was based on a combination of methods (e.g., eigenvalue >1.0, scree plot), as well as conceptual clarity, interpretability and theoretical salience of the rotated factors, and the simplicity of the structure.

The results of exploratory factor analysis with varimax rotation indicated that Barlett’s test of sphericity was significant ($\chi^2=101047.3$, $p=0.000$), and KMO value was 0.98. The factor loadings were from 0.30 to 0.77. Items should preferably load greater than 0.40 on the relevant factor and less than 0.40 on all other factors. Of the 76 items, 11 items were dropped from subsequent analyses because they loaded lower than 0.40. The results of factor analysis are shown in Table 3. In all, 65 items remained and all had factor loadings greater than 0.40. The eight components were retrieved, which together accounted for 53.27 % of the variance explained, with an eigenvalue from 1.30 to 9.11. Amount of variance for Factor 3-8 is less than 10 % of variance. In the overall scale Cronbach’s alpha was 0.97 with the dimensions of Cronbach’s alpha from 0.80 to 0.95. After each analysis, all remaining items were evaluated for any observed low factor loadings, complex loadings, and/or reduced reliabilities. All items could be included in each factor.

Table 3 Items, factor loadings, percent of variance, eigenvalue, and commonalities of the measurement model of TQMSS for overall accredited hospitals (n=2,165)

<table>
<thead>
<tr>
<th>Item number and description</th>
<th>Factors loadings</th>
<th>Communalties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1:12 Education and training</strong></td>
<td><strong>Eigenvalue 9.108</strong></td>
<td><strong>% of Variance 11.984</strong></td>
</tr>
<tr>
<td>TQMSS74 There are many ways of knowledge sharing related to TQM.</td>
<td>.772</td>
<td>.753</td>
</tr>
<tr>
<td>TQMSS75 Staff use system thinking for problem solving.</td>
<td>.742</td>
<td>.717</td>
</tr>
<tr>
<td>TQMSS76 Staff have easy access to TQM resources.</td>
<td>.724</td>
<td>.687</td>
</tr>
<tr>
<td>TQMSS69 Most staff participates in sharing and learning about TQM.</td>
<td>.715</td>
<td>.732</td>
</tr>
<tr>
<td>TQMSS72 Most staff engages in continuous self-development.</td>
<td>.711</td>
<td>.725</td>
</tr>
<tr>
<td>TQMSS73 Some staff go to study and visit other places to improve the quality of care.</td>
<td>.702</td>
<td>.602</td>
</tr>
<tr>
<td>TQMSS68 There is a positive learning climate in my organization.</td>
<td>.698</td>
<td>.717</td>
</tr>
<tr>
<td>TQMSS70 All levels of staff understand TQM.</td>
<td>.694</td>
<td>.688</td>
</tr>
<tr>
<td>TQMSS67 Sharing of best practices occurs at regular intervals.</td>
<td>.669</td>
<td>.684</td>
</tr>
<tr>
<td>TQMSS71 New staff are trained in TQM.</td>
<td>.662</td>
<td>.612</td>
</tr>
<tr>
<td>TQMSS66 All levels of staff have continuing training related TQM.</td>
<td>.614</td>
<td>.508</td>
</tr>
<tr>
<td>TQMSS64 Most staff enjoy working in the organization.</td>
<td>.492</td>
<td>.628</td>
</tr>
</tbody>
</table>
### Development and Validation of a Measurement Model

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<tr>
<th>Item number and description</th>
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<th>Communalties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 2: Leadership</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TQMSS52 Leaders monitor TQM work performance continuously</td>
<td>.735</td>
<td>.772</td>
</tr>
<tr>
<td>TQMSS53 Leaders provide clear TQM policies.</td>
<td>.696</td>
<td>.738</td>
</tr>
<tr>
<td>TQMSS50 Leaders give suggestions related to quality improvement.</td>
<td>.693</td>
<td>.716</td>
</tr>
<tr>
<td>TQMSS46 Leaders are good role models for TQM.</td>
<td>.652</td>
<td>.663</td>
</tr>
<tr>
<td>TQMSS49 Leaders support daily actions of staff related to quality activities.</td>
<td>.651</td>
<td>.681</td>
</tr>
<tr>
<td>TQMSS55 There is continuous monitoring of outcome indicators in the organization.</td>
<td>.634</td>
<td>.658</td>
</tr>
<tr>
<td>TQMSS48 Leaders motivate staff to include quality improvement in their work.</td>
<td>.645</td>
<td>.686</td>
</tr>
<tr>
<td>TQMSS47 Leaders walk around and make improvements from staff suggestions.</td>
<td>.629</td>
<td>.691</td>
</tr>
<tr>
<td>TQMSS51 Leaders monitor TQM results continuously.</td>
<td>.587</td>
<td>.404</td>
</tr>
<tr>
<td>TQMSS44 Leaders participate in the TQM program.</td>
<td>.526</td>
<td>.611</td>
</tr>
<tr>
<td>TQMSS43 Leaders communicate goals related quality management.</td>
<td>.505</td>
<td>.614</td>
</tr>
<tr>
<td>TQMSS54 Outcomes of TQM are congruent with organizational goals.</td>
<td>.482</td>
<td>.309</td>
</tr>
<tr>
<td>TQMSS56 Leaders communicate outcome indicators and the results to all staff.</td>
<td>.425</td>
<td>.266</td>
</tr>
<tr>
<td><strong>Factor 3: Drivers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TQMSS 7 Incorporating TQM requirements in performance reviews makes quality improvement more consistent.</td>
<td>.750</td>
<td>.685</td>
</tr>
<tr>
<td>TQMSS 6 Hospitals pass accreditation based on their continuing TQM.</td>
<td>.695</td>
<td>.597</td>
</tr>
<tr>
<td>TQMSS 5 Organizations that always improve are more likely to survive than their competitors.</td>
<td>.685</td>
<td>.590</td>
</tr>
<tr>
<td>TQMSS 8 Celebration of TQM successes enhances sustainability of improvements.</td>
<td>.683</td>
<td>.613</td>
</tr>
<tr>
<td>TQMSS 4 Continuing starting new TQM projects drives the organization to always improve.</td>
<td>.632</td>
<td>.507</td>
</tr>
<tr>
<td>TQMSS 9 TQM managers use data for encouraging quality improvement.</td>
<td>.574</td>
<td>.585</td>
</tr>
<tr>
<td>TQMSS 3 In order for TQM to be sustained, the organization needs a director-level leader of TQM.</td>
<td>.507</td>
<td>.570</td>
</tr>
<tr>
<td>TQMSS10 Core TQM policies continue even after leadership change.</td>
<td>.467</td>
<td>.526</td>
</tr>
<tr>
<td><strong>Factor 4: Continuous Quality Improvement Culture</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TQMSS12 Commitment related to TQM is imbedded in the organization’s culture.</td>
<td>.639</td>
<td>.634</td>
</tr>
<tr>
<td>TQMSS14 Everyone values TQM when compared to their other work.</td>
<td>.601</td>
<td>.596</td>
</tr>
<tr>
<td>TQMSS18 Staff wake up and feel challenged to perform TQM.</td>
<td>.560</td>
<td>.625</td>
</tr>
<tr>
<td>Item number and description</td>
<td>Factors loadings</td>
<td>Community loadings</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------------</td>
<td>------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>TQMSS19 TQM is embedded in staff’s minds.</td>
<td>.552</td>
<td>.627</td>
</tr>
<tr>
<td>TQMSS15 All levels of staff understand the TQM process.</td>
<td>.534</td>
<td>.405</td>
</tr>
<tr>
<td>TQMSS13 TQM is most effective when tied to the organization’s core values.</td>
<td>.488</td>
<td>.571</td>
</tr>
<tr>
<td>TQMSS11 Quality management policies and goals are clear.</td>
<td>.460</td>
<td>.536</td>
</tr>
<tr>
<td>TQMSS17 Staff are empowered to perform TQM by themselves.</td>
<td>.455</td>
<td>.337</td>
</tr>
</tbody>
</table>

Factor 5: 7 Interaction and relationships among staff
Eigenvalue 4.046
% of Variance 5.324

<table>
<thead>
<tr>
<th>Item number and description</th>
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<th>Community loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>TQMSS31 Good relationships among staff, units and teams foster improved TQM.</td>
<td>.714</td>
<td>.650</td>
</tr>
<tr>
<td>TQMSS27 Successful TQM requires linking from person to person or team to team.</td>
<td>.694</td>
<td>.657</td>
</tr>
<tr>
<td>TQMSS29 Successful TQM empowers all staff to participate and offer their opinions to improve patient care.</td>
<td>.692</td>
<td>.676</td>
</tr>
<tr>
<td>TQMSS30 A community of practice is essential for successful TQM.</td>
<td>.657</td>
<td>.610</td>
</tr>
<tr>
<td>TQMSS16 TQM is everyone’s responsibility.</td>
<td>.510</td>
<td>.479</td>
</tr>
<tr>
<td>TQMSS28 Quality management leadership focuses its work at the multidisciplinary team level.</td>
<td>.483</td>
<td>.551</td>
</tr>
<tr>
<td>TQMSS36 All staff can access information technology (IT) support for TQM.</td>
<td>.404</td>
<td>.516</td>
</tr>
</tbody>
</table>

Factor 6: 6 Support and recognition of organization
Eigenvalue 3.945
% of Variance 5.191

<table>
<thead>
<tr>
<th>Item number and description</th>
<th>Factors loadings</th>
<th>Community loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>TQMSS35 Your organization supports enough people, equipment, time, to achieve TQM goals, experts and information technology</td>
<td>.645</td>
<td>.659</td>
</tr>
<tr>
<td>TQMSS38 Your organization tries to decrease staff workload in support of TQM.</td>
<td>.626</td>
<td>.531</td>
</tr>
<tr>
<td>TQMSS34 Positive reinforcement for quality activities is offered frequently.</td>
<td>.597</td>
<td>.646</td>
</tr>
<tr>
<td>TQMSS33 Your organization supports the mind and morale of all staff.</td>
<td>.587</td>
<td>.633</td>
</tr>
<tr>
<td>TQMSS37 Staff have ability to use technology for TQM.</td>
<td>.512</td>
<td>.536</td>
</tr>
<tr>
<td>TQMSS41 Staff make TQM simple.</td>
<td>.486</td>
<td>.542</td>
</tr>
</tbody>
</table>

Factor 7: 6 Cooperation and participation
Eigenvalue 3.712
% of Variance 4.884

<table>
<thead>
<tr>
<th>Item number and description</th>
<th>Factors loadings</th>
<th>Community loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>TQMSS24 Staff work as multidisciplinary teams, cross-functional teams and/or patient care teams to improve the quality of care.</td>
<td>.630</td>
<td>.656</td>
</tr>
<tr>
<td>TQMSS25 More than 90% of staff, regardless of discipline, participate in the TQM program.</td>
<td>.625</td>
<td>.649</td>
</tr>
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Development and Validation of a Measurement Model

<table>
<thead>
<tr>
<th>Item number and description</th>
<th>Factors loadings</th>
<th>Communalties</th>
</tr>
</thead>
<tbody>
<tr>
<td>TQMSS26 More than 90% of staff cooperate with other departments to improve the quality of care.</td>
<td>.612</td>
<td>.674</td>
</tr>
<tr>
<td>TQMSS23 All levels of staff accept others’ opinions related to quality improvement.</td>
<td>.567</td>
<td>.643</td>
</tr>
<tr>
<td>TQMSS22 All levels of staff have good attitudes related to TQM.</td>
<td>.544</td>
<td>.664</td>
</tr>
<tr>
<td>TQMSS21 All levels of staff are constantly aware of patient needs.</td>
<td>.535</td>
<td>.543</td>
</tr>
</tbody>
</table>

Factor 8: 5 Monitoring the results

Eigenvalue 2.486
% of Variance 3.271

<table>
<thead>
<tr>
<th>Item number and description</th>
<th>Factors loadings</th>
<th>Communalties</th>
</tr>
</thead>
<tbody>
<tr>
<td>TQMSS58 An internal audit of TQM occurs every six months.</td>
<td>.662</td>
<td>.541</td>
</tr>
<tr>
<td>TQMSS59 The evaluation system for the organization and the staff includes results of current TQM processes.</td>
<td>.572</td>
<td>.703</td>
</tr>
<tr>
<td>TQMSS61 The organization compares its results across units and with those outside the organization.</td>
<td>.557</td>
<td>.659</td>
</tr>
<tr>
<td>TQMSS60 The quality service and system evaluation includes teamwork performance.</td>
<td>.513</td>
<td>.401</td>
</tr>
<tr>
<td>TQMSS62 Staffs use the result data for work improvement.</td>
<td>.483</td>
<td>.651</td>
</tr>
</tbody>
</table>

Discussion

The TQM Sustainability scale (TQMSS) developed in this study represents an effort to generate a measure of TQM sustainability in patient units which has not previously been developed for Thailand. This measuring instrument focused on the organizational level as a critical topic and it used individual perceptions. The main purpose of this study was to develop valid and reliable measures to explore the components of the TQMSS for patient units in accredited hospitals.

The CVI of TQM Sustainability was 0.88%. This reflected a high agreement among experts that items used in this instrument were relevant to the objectives of the instrument. Since there is no previous study regarding content validity of TQM sustainability, the high CVI of the TQM sustainability may be the result of the assessment and revision of the instrument by experts, all of whom are experienced in real-life situations.

The results of this study demonstrated the construct validity of the TQMSS after using exploratory factor analysis with a total sample score (n=2,165) because the instrument was newly created by the literature review and the qualitative data. The results of exploratory factor analysis suggested that an eight factor model of TQM sustainability should include: (1) education and training, (2) leadership, (3) drivers, (4) a continuous quality improvement culture, (5) support and recognition of the organization, (6) interaction and relationship among staff, (7) cooperation and participation, and (8) monitoring the results. The items’ factor scores were all above the recommended value of 0.40. This result was consistent with the three previous structural models of TQM sustainability.
that were developed. In addition, as these factors were congruent with the qualitative stages, it was hypothesized that the TQMSS had 7 underlying dimensions. This was also comparable with theories relating to change and the adoption of innovation. Finally, it supports many studies. Factor 1 (Education and training), as shown in Table 3, consists of 12 items with factor loadings ranging from .492-.772, which are strong. Education and training in TQM supports the subcategories of the qualitative study. It also supports many studies regarding TQM in hospitals. Francois et al.’s study found that more trained staff also participated in quality improvement work groups than control department staff. Saithanya also reported that the management review and training the personnels to understand their work can maintain the quality system. Factor 2 (Leadership) consists of 13 items with factor loadings ranging from .425-.735. The appropriate items in this cluster support the subcategories of the qualitative study. It also supports other studied. A study by Taylor and Wright found that Deriving success from TQM has also been shown to be significantly associated with (i) the time since adoption, (ii) the inclusion of quality objectives in the strategic planning process, and (iii) the need for senior managers to take charge of TQM and to ensure that the majority of employees are involved in its implementation.

Factor 3-8 also support many studies. Zelealem and Getachew emphasized short-term profitability, lack of resources, business planning and vision are among the main obstacles to the adoption of a formal TQM program. Resource and reward were significantly correlated with participative management behavior leading employees’ participation. Appropriate rewards must also be provided and these should be aligned with the quality performance indicators. TQM success has resulted from employee involvement. Furthermore, job involvement has a positive, significant relationship in predicting job performance of professional nurses. Saithanya studied the major factors which affected the maintenance of quality systems are: Internal quality audit, performance indicators, corrective actions, management reviews and training. The internal quality audit includes planning, conducting, reporting and evaluating. The results of the exploratory factor analysis in this study, therefore, supported the construct validity of the TQMSS that was developed.

After the components were factored, their reliability was assessed. Cronbach’s alpha procedure, therefore, was employed to estimate the internal consistency reliability. The Cronbach’s alpha for the total TQMSS was above 0.97. For its sub-dimensions, the alpha ranged from 0.80 to 0.95 which met the criteria of 0.70 recommended by Nunnally & Burnstein. This was found at both the first and the second administration of the instruments to the subjects.

Strength of relationships and positive relationships among the eight factors were also found. There were statistically significant correlations at a level of .01 between all of the Factors. The inter-correlation among the eight factors indicated that all factors were positively associated with each other. These factors were also positively associated with TQM sustainability.

In addition, hypothesis testing was used to examine the construct validity of the TQM Sustainability Scale, the demographic variables, and the results.

The TQMSS developed through this study could be used to determine the level of sustainability related to TQM in patient units. The implication of this study for nursing administrators is that this TQMSS could be utilized for planning the use of resources and processes, such as manpower, budgeting and
the organizational system. This could prevent a decline in the impact of TQM. Nurse Managers could use the TQMSS to assess the level of sustainability of TQM in their units before and after quality improvement processes are put in place. It would help them to determine the direction needed for improving and supporting their work. Nursing students could learn about this model in their courses. They could help to further develop it so that it would guide them in practice after completing their studies.

This TQMSS will be very useful for researchers who are interested in describing and applying the components that make up TQM sustainability in similar settings and populations. Other researchers could test these results in diverse cultural settings or by using other related methodologies. This could be done with similar groups or different groups, using processes such as confirmatory factor analysis (CFA). These processes could lead to the development of a theory of TQM sustainability. Finally, the research design was cross-sectional and the sample was limited to the nurses working in government accredited hospitals. Therefore, this sample is not representative of all accredited hospitals. The results may not apply to other populations.

**Conclusion and Recommendations**

The TQMSS model developed in this study had robust psychometric properties that should be useful in assessing the sustainability of TQM processes in hospitals. It features eight dimensions including: (1) Education and training, (2) Leadership, (3) Drivers, (4) A Continuous Quality Improvement Culture, (5) Support and recognition by the organization, (6) Interaction and relationships among staff, (7) Cooperation and participation, and (8) Monitoring the results. However, other methods of assessing the psychometric properties of the TQMSS model are recommended, such as known group validation and the multi-trait-multi-method approach.

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การพัฒนาและทดสอบแบบสารตัดการคัดกรองผู้ของการบริหารคุณภาพทั้งองค์การตามการขับรู้ของโรงพยาบาลในประเทศปัจจุบันโรงพยาบาลที่ได้รับการรับรองคุณภาพ*

สมณัย ศิริราชเสนี, ฤทธิ์ ผุด, ลิลลี สุระโภ, ประจุสิงห์, แพร์ ฟิชเชอร์

บทคัดย่อ: การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อพัฒนาและทดสอบแบบสารตัดการคัดกรองผู้ของการบริหารคุณภาพทั้งองค์การ ในโรงพยาบาลตามการขับรู้ของโรงพยาบาลวิชาติพิษ โรงพยาบาลที่ได้รับการรับรองคุณภาพ การดำเนินการวิจัยมี 2 ขั้นตอนหลักคือ ขั้นที่หนึ่งการพัฒนาแบบสารตัดการคัดกรองผู้ของการบริหารคุณภาพทั้งองค์การ จากการทบทวนวรรณกรรมและการสัมภาษณ์ผู้เชี่ยวชาญและผู้มีประสบการณ์เกี่ยวกับการบริหารคุณภาพโรงพยาบาล ทั้งในระดับประเทศ ระดับโรงพยาบาล ระดับบริษัท และระดับปฏิบัติการ ขั้นตอนที่สอง สร้างแบบสารตัดการคัดกรองและทดสอบแบบสารตัดการคัดกรองของการบริหารคุณภาพทั้งองค์การ กลุ่มตัวอย่างที่ใช้ในการวิจัย คือโรงพยาบาลวิชาติพิษที่ได้รับการรับรองคุณภาพ 13 แห่ง จำนวน 2,565 คน เลือกโดยวิธีสุ่มแบบหลายขั้นตอน เก็บรวบรวมข้อมูลโดยใช้แบบสอบถาม ขั้นตอนที่สามในการวิจัย คือการลง sond การบริหารคุณภาพทั้งองค์การ เครื่องมือที่ใช้ในการวิจัยคือ แบบสารตัดการคัดกรองผู้ของการบริหารคุณภาพทั้งองค์การที่ผู้วิจัยสร้างขึ้น วิเคราะห์ข้อมูลโดยใช้วิเคราะห์ค่าสถิติเชิงบวกและวิเคราะห์ค่าสถิติเชิงลบ ส่วนทางสถิติผลิตผล พบว่า นักหนักองค์ประกอบขององค์ประกอบที่ 8 ตัว มีค่าเป็นบวก ขนาดตัวเลข 0.399-0.632 ซึ่งถือว่ามีขนาดใกล้เคียงกัน โดยองค์ประกอบที่มีค่านักหนักองค์ประกอบสูง คือ การศึกษาและการฝึกอบรม ของผู้นำ เนื่องจากผลการวิเคราะห์การรับรองคุณภาพอย่างต่อเนื่อง ปฏิบัติพ้นที่และเล็งเห็นภาพระหว่างบุคลากรการสนับสนุนและการยอมรับจากองค์การ การร่วมมือและการมีส่วนร่วมของบุคลากร และการติดตามผลลัพธ์สามารถอยู่ในระดับที่น่าพอใจ โดยใช้วิธีสิ่งประดิษฐ์อัพพลายของเครื่องบวก ได้ค่าความเที่ยงเท่ากับ 0.99

วารสารวิจัยทางการ Baldwin พ.ศ. 2550; 11(4) 265 - 280

คำสำคัญ: การคัดกรองผู้ของการบริหารคุณภาพทั้งองค์การ ในโรงพยาบาลที่ได้รับการรับรองคุณภาพ

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Development of A Program for Enhancing Nurses’ Capacity to Wean Patients from Mechanical Ventilation*

Nitaya Pinyokham, Warunee Fongkaew, Chawapornpan Chanprasit, Terri Simpson

Abstract: The aim of the present study is to develop a program for enhancing nurses’ capacity to wean patients from mechanical ventilations. Participatory action research (PAR) was used as methodological approach. Nine critical care nurses from three medical critical care units at a university-affiliated hospital in Northern Thailand were empowered to be a core working group to develop this program by the collaboration of 4 administrators and 25 other CCNs. Data were collected using multiple methods. Program development, comprised of six steps, addressed the CCNs’ needs related to weaning problems. The result showed that the program increased the CCNs’ knowledge, clinical skills, and confidence for actively participating in decisions related to weaning. In addition, the core working group gained research experience, knowledge concerning weaning, and awareness of the necessity of consistent self-development to enhance their knowledge and nursing skills. It is recommended that administrators collaborate with their core working group to regularly update their nursing staff. CCNs, particularly Masters prepared nurses, should strengthen their expertise to the level of advanced practice nurses (APNs), thereby increasing effectiveness in weaning patients off ventilators.

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Key words: action research, weaning off ventilator, nurses’ capacity

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Background and Significance

As soon as a ventilated patient is stabilized, weaning from a ventilator should be initiated. Unnecessary delays of withdrawing mechanical ventilation (MV) as well as weaning failure can result in ventilator related complications of increased cost, longer hospital stays, and death. Thus, the weaning process must be balanced between the risks of premature and delayed weaning of patients from the ventilators. Moreover, the weaning process is not easy for ventilator dependent or long-term ventilated (LTV) patients since about 40 to 60 percent of the total ventilation duration is allocated to the weaning process. Critical care nurses (CCNs) are the most important health care providers in caring for patients throughout the weaning process. Making decisions related to the weaning process rests within the realm of nursing responsibilities. This independent decision-making was found to increase when nurses were familiar with the patient’s conditions, and possessed the knowledge and skills in weaning which come from the nurses’ experience in their clinical practice. Most factors that relate to nurses’ capacity in decision-making in the weaning process require advanced knowledge of the field of critical care whereas the ability to make more complex decisions is linked to the potential of the nurse’s knowledge and capacity. However, a pilot study involving five CCNs who were working in three medical intensive care units at the research setting where the current study was conducted, found that the CCNs’ main problems about weaning included insufficient nursing knowledge and clinical skills as well as a lack of confidence to share their ideas about patients’ condition with physicians. These CCNs felt that their work environment was not truly interdisciplinary because nurses had few opportunities to participate in the decision-making for weaning patients. They believed that they had been well-prepared and well-trained by their institute but gained less information support from physicians.

Several authors concluded that nurses as a professional group have been oppressed by hospitals, physicians and administrators. Fulton presented evidence that nurses are an oppressed group by means of gender, class and occupation. Nurse scholars have explicated critical theory in relation to the practice of nursing, the role of nurses in society, and the fact that most nurses are women, and the relation between nurses and those who are oppressed. Nurses exhibit the working class characteristic of vulnerability as shown by doubts of their own knowledge and ability and have unshakeable belief in doctors’ omnipotence. In this study, CCNs were aware of problems about weaning, however, they were unable to solve the problems as a group by themselves. According to the principle of critical-emancipatory interests or emancipatory knowledge which centers on “self knowledge” or “self- reflection,” it helps to explore phenomena by judging the contextual effects of power, knowledge and values.

Participatory action research (PAR), a practice of Critical Theory, was selected as the methodology for this study since it allows researchers to empower participants to change situations by collaborating with them to identify collective problems about weaning, and the core working group to establish a program for enhancing nurses’ capacity in weaning a patient off the ventilator.

Conceptual Framework and Related Literature

This study employed PAR as a methodological framework for enhancing nurse participants to develop a program for enhancing the weaning process by improving collaboration among CCNs.
The program developing process composed of identifying the current potential weaning problems, and collaborating in the program developing process for solving the problems about weaning in their own settings through the four moments of PAR. Doing so would offer CCNs power to empower themselves. The power of the group was defined as the capacity of the group to achieve its goal. Group power is a resource that all nursing groups can use to improve the practice environment and the quality of care delivered. The PAR approach would raise CCNs’ awareness and allow for self-learning through reflection. The principles of participation and collaboration, empowerment, knowledge, and social change were used to identify a thematic concern through discussion and reflection. The core-working group was thus empowered to plan and to act in creating social change through a program for enhancing the capacity of the nursing staff in weaning a patient off a ventilator. A change in knowledge related to practice was affected and observed using appropriate research tools. The group critically examined the results and then used the new knowledge, to incorporate into practice. This involvement of the CCNs potentially can enhance a sense of ownership over the resulting changes and sustainable performances in their clinical setting.

Research Design

Participants and Setting

This study is a participatory action research with emphasis on emancipation and empowering in design. Participants included 38 CCNs from three medical critical care units (MICUs) including 9 members of a core working group, 4 administrators, and an additional 25 CCNs. The core working group was recruited to participate based on volunteers with at least three years experience of working at the MICU and qualifications as leaders or change agents to serve as mentors in their units. The working group was empowered to develop a program for enhancing CCNs’ capacity in weaning patients off ventilators by collaboration among nurse administrators and 25 CCNs.

The research settings were three medical intensive care units (MICUs) at a University Hospital in northern Thailand. The researcher is one of faculty members who supervised student nurses in the MICUs for about 20 years.

Methods of Data Collection

Data collecting methods were devised in order to engage research participants in critical conversations and to attain as deep an understanding as possible of what the participants had spoken out about their work. The various strategies used in this study included conducting focus groups, engaging in participant observations, conducting a workshop, and facilitating group meetings.

Research Process and Protection of Human Subjects

The study was conducted after receiving approval from the ethics committee of the institutes in which the study was executed. The study’s objectives, procedures, benefits, and rights to withdraw were explained to all participants. After receiving written informed consent, the data collection procedure was begun. The steps of the research process were as follows:

1) Establish commitment and identify the core working group to develop a program for enhancing nurses’ capacity in weaning off ventilator

After obtaining nurse administrator approval and explaining objectives and benefits of the study to staff, 38 CCNs of three MICUs including a nurse supervisor, three head nurses, and 34 nursing staff committed to collaborate in the study on a
voluntary basis. Of these staff, 10 CCNs were recruited as a core working group who collaborated as a program developers. The criteria used to recruit the core working group were provided to the head nurses because they best knew all subordinates in respect of their work performance and their qualifications as leaders or change agents and/or suitability to serve as mentors on the units. However, the researcher considered the information obtained from all three head nurses and then exercised her own judgment. Each eligible core member was approached individually by the researcher and invited to practice. After raising their awareness by discussing about actual problems about weaning, their roles as valuable personnel of the units, and the needs of seeking solutions, all of them made a commitment to be a core working group in this study. The nurse supervisor and three head nurses as gate keepers helped the researcher to gain access and build trust with CCNs in MICUs. Twenty-five other CCNs were willing to cooperate with the core working group to develop the program. All of these participants were required a written consent form.

2) Explore issues to identify the problems of weaning, and devise potential strategies and suggestions for solving the problems

The researcher conducted three focus group discussions with 25 CCNs to identify potential weaning problems and strategies and suggestions for solving the collective problems. The reflection process was used by means of semi-structured, open-ended questions to elicit stories and interpretations from the research participants. These questions facilitated the participants to think about and discuss the weaning methods used, nurses’ roles in weaning, strengths and weaknesses of care provided for patients during weaning in their wards, changes that were needed to improve nursing care, and their opinion on how these CCNs could improve the weaning process successfully. Data gained from this step were analyzed by content analysis, and then verified through a reflection process among six focus group attendees.

3) Analyze weaning problems and devise potential strategies and suggestions for solving problems through the reflection process

The researcher arranged a workshop for the core working group and administrators on weaning problems and solutions. A series of three semi-structured, open-ended questions was used to elicit problems about weaning from the point of view of these key participants, possible nurses’ roles in solving these problems, and a plan to solve the problems effectively. The final consensus was established in the workshop. All participants in the workshop recognized that the problems about weaning affected their work and their patients collectively. So, they agreed that these problems should be solved by increasing their knowledge about weaning and the necessary knowledge for weaning patients effectively for all CCNs.

After attending the workshop, the core working group made a commitment to work on developing and implementing the program with the researcher’s facilitation and support from their administrators. Detailed descriptions were developed, which related to the issues of developing a program for enhancing nurses’ capacity to wean patients off the ventilator.

4) Develop a program for enhancing nurses’ capacity in weaning off the ventilator

Specifically, this step aimed to answer the research question regarding what program can be devised for enhancing nurses’ capacity in weaning off the ventilator. The researcher facilitated the first group meeting among the core working group members. The conclusions from the workshop were reviewed. This allowed the core working group to discuss their ideas and give recommendations.
to clear their minds as to whether useful findings have emerged from the recent workshop. After attaining consensus on the problems, members were encouraged to reflect about the needs of the program’s development. The researcher also educated the core working group about the program’s development by informing them the activities of each research step briefly in order to prepare them for being program developers. During the first group meeting, the core working group elected a chairperson and shared responsibilities to facilitate the program developing process. They planned to arrange group meetings on an alternate weekly basis to develop a tentative program and discuss their ideas about the program’s contents. The researcher assisted to search resources for the core working group to study. As a facilitator, the researcher’s activities in this step were empowering by educating, reassuring, supporting, encouraging, helping and providing resources for developing the program. However, one of 10 members withdrew from the working group for personal reasons while others felt unconfident about taking role as program developers. They complained that they had heavy workload and difficulty in reading the materials written in English. They also had limited spare time and felt exhausted after work. Thus the researcher took a one month and a half break to seek a solution. This break also allowed the participants of the core working group to reflect about their participation in the research project as well.

This problem was raised in the following meeting to allow discussion among the nine remaining members of the core working group. After the discussion, they were willing to continue their role as program developers. Accordingly, the researcher devoted herself to work more closely with participants on the research setting. However, all members of the core working group asked the researcher to confirm the correctness of their understanding about the reading materials in English. They also divided into three subgroups with the aim of sharing responsibilities to prepare content of the program based on their expertise. During this step, the researcher visited the members of the core working group regularly in order to encourage and appraise the program’s progression. She also performed participant observations twice a week.

With the core working group’s collaboration, a tentative program was formulated based on data which contained key features all stakeholders desired. All weaning problems and suggestions were carefully discussed, and then the core working group identified the most important problems. Nevertheless, the core working group suggested inviting an expert who had studied weaning protocols to present his/her findings. Ultimately, the program’s contents were formulated in five key points containing important information for weaning a patient from the ventilator. Their head nurses took part in making comments about the program content. The strategies for the program implementation were designed so that it was feasible for all CCNs of each MICU to attend. Four group meetings were arranged to achieve this process.

Five key points of the tentative program included: 1) nursing guidelines for weaning a patient from a ventilator, 2) best practice for tracheal suctioning, 3) weaning modes and the successful discontinuation from ventilators, 4) essential scientific knowledge for enhancing nurses’ decision making (ventilator dependence and evidence-based guidelines for weaning), and 5) nursing assessment for effective weaning (arterial blood gas interpretation). The conference technique was the main method that the core working group used to implement the program with the objectives of providing current knowledge and techniques about weaning. Complementary methods were demonstration and board presentation.
5) Implement a program for enhancing nurses’ capacity in weaning off the ventilator

An organized action plan for the program implementation was determined. A group meeting was arranged before the conference to discuss the content of each topic so that the core working group, especially those who would conduct the session, could gain confidence. The schedule of the program implementation was compared to the unit’s plan to synchronize with other activities of the units. This allowed more people to attend the conferences.

Before each conference session, the core working group who led each conference got together, discussed, and then rehearsed the conference for better understanding and to ensure the successful implementation of the program. Participatory learning and partnership were used in this process. From February to June 2005, the core working group held nine conference sessions by using PowerPoint presentations and handouts as the materials to facilitate the audience’s understanding. All sessions were designed so most nurses could attend every conference.

All lessons learned from this session were reflected upon and discussed openly by the core working group’s members who led each conference with the intention of improving outcomes. The evaluations from their audiences were presented to all members of the group. This reflection provided information that could be useful for improving the program. The reflection session was conducted after each conference session in order to review the success of each conference.

6) Evaluate a program for enhancing nurses’ capacity in weaning off the ventilator

This step was aimed at evaluating the results of the program to enhance nurses’ capacity in weaning patients off the ventilator. The evaluation was carried out rigorously to gain information from the core working group, other 25 CCNs, and their administrators. Research instruments consisted of a demographic data sheet, questionnaire, guidelines for participant observations, guideline questions for group discussions and a workshop. The focus group discussions were arranged about one month and six months after the program implementation had been completed to track the applicability and sustainability of the knowledge gained from the program implementation. Credibility of evaluation was established by prolonged engagement in the field with participants, triangulation of information from multiple data sources, and feed back and reflection procedures that allowed participants to check and verify the accuracy of information recorded. The program was reviewed and refined based on the participants’ suggestions. The final draft of the program was prepared for presentation to all the stakeholders of MICUs.

**Trustworthiness**

The strategies used to accomplish the validity of this study were criteria for developing the effective evaluation of qualitative research claimed by Guba and Lincoln. These strategies are credibility, transferability, dependability and confirmability. Credibility was met by prolonged engagement and persistent observation, triangulation, and member-checking as suggested by Lincoln and Guba. The researcher worked in this setting for more than a year (from June 2004 to September 2005) and involved persistent observation. Multiple methods of data collection or triangulation were used to compare a variety of data sources and methods in order to confirm the accuracy of the findings including focus group discussions and workshop, group interviews, written comments and suggestions, participant observation, reflection records of participants in the core working group, and keeping
a research diary. The researcher performed member checks to make sure that the research findings were true to their experience the overall report with the participants before sharing it in final form. Transferability of the study was assured by providing sufficient information to permit judgments about contextual similarity to meet. To address concerns related to the dependability of the collected data, the researcher used overlap methods to glean information from all stakeholders in order to compensate the weakness of one by the strength of another. Confirmability was verified by the researcher keeping a journal in which reflections were recorded on a regular basis. In addition, the doctoral advisory committee constituted the primary auditors.

Results

The results of this study were presented in two parts including results of the identification of the weaning problems and the program implementation. Part I: Results from identifying weaning problems and potential strategies for solving the problems to guide program development

The findings of this section are divided into two parts including problems related to weaning patients from ventilators, suggestions and strategies for solving the weaning problems.

Problems related to weaning

The results from identifying weaning problems were obtained from three focus group discussions with 25 other CCNs. From the discussions, the participants identified issues that concerned them as barriers to weaning patients from ventilators and these were divided into three main problems as follows:

1) Lack of knowledge

1.1 Lack of current knowledge about ventilator weaning. A number of nurses lacked the necessary knowledge about weaning procedures and did not know about current evidence-based practice and guidelines for successful weaning off patients from ventilators. This was partially due to insufficient scholarly activities related to ventilator discontinuation and lack of opportunities to attend training courses or conferences. In addition, in-service education for new CCNs or any other professional conferences were nonspecific to weaning.

1.2 Lack of ability for assessing patient’s readiness to weaning and weaning toleration. Some CCNs said that they did not have enough knowledge about interpreting arterial blood gas readings for using this data to make decisions about the weaning process. They said that they can interpret roughly but do not understand the causes of blood gas disorders.

1.3 Lack of knowledge about mechanical ventilator function related to weaning. The CCNs stated that junior nurses often lacked detailed knowledge about mechanical ventilator use, especially for weaning purposes. Also, the new models of ventilators caused frustration for nurses as well.

1.4 Lack of knowledge about weaning protocols. CCNs stated that they had not yet gained enough information about using weaning protocols although the medical staff was conducting a study to compare the efficacy of protocol-driven weaning compared to physician-directed weaning in their settings.

2) Insufficient clinical skill related to wean off ventilators, especially performing tracheal suctioning. The CCNs said that suctioning procedure is of paramount significance for every intubated patient. However, some of their colleagues performed suctioning uncaringly and inappropriately. One staff nurse reported being reprimanded by medical staff regarding an overly rapid rate of resuscitation bag inflation during a suctioning procedure.
3) Lack of confidence to actively participate in decisions related to weaning. The CCNs reflected that this problem might be caused by a few factors. First, they perceived that a number of physicians do not recognize nurses’ opinions about patients’ condition. The decision to wean patients from ventilators always depended on physicians’ judgments rather than on the team opinion. Secondly, it might be due to lack of knowledge among CCNs as mentioned above. Due to both reasons, they lacked confidence to share their concern about patients’ condition with physicians which resulted in unsatisfactory weaning outcomes.

From the workshop, the core working group and their administrators identified weaning problems through a reflection process. All problems identified by this group were parallel to those identified by the nursing staff. The two issues that were found with the CCNs but were not identified by the core working group and their administrators were lack of current knowledge about ventilator weaning and ability for assessing patient readiness to wean and weaning toleration. However, the core working group and their administrators were in agreement that these issues could be addressed with further training.

Suggestions and strategies for solving weaning problems.

The analysis and tabulation of data to compare the similarities and differences of the problems and suggestions for solving weaning problems of CCNs and the core working group and administrators revealed that the two groups of participants shared the same concerns and ideas about weaning. Their strategies for solving the problems suggested that the both groups were of the same mind, that is, using complementary knowledge related to ventilator weaning to enhance nurses’ capacity. The suggested sources of knowledge and methods for implementation were similar.

Suggestions for solving the problems concerning ventilator weaning recommended by all CCNs were related to the issues about needing complementary knowledge to maximize their capacity to provide the best practice for weaning patients from ventilators. The recommendations included 1) nursing guidelines for weaning a patient from a ventilator, 2) knowledge about ventilator settings (especially new generation equipment), 3) weaning protocols, 4) tracheal suctioning and bagging techniques, and 5) arterial blood gas interpretation.

Part II: Results of the program implementation

The researcher conducted evaluation sessions which offered noteworthy results as follows: Reflection from the core working group. The core working group reflected their experiences gained from being in the core working group which can be divided into three parts as follows:

1) Experience learned from being in the core working group. Being part of the core working group, they gained experience in doing nursing research, learned how to develop their capacity in planning and decision-making in the weaning process through seeking knowledge, and learned how to work as a team. They became conscious that consistent self-development is necessary for enhancing their capacity and the development of nursing practice. They also agreed that this kind of research can enhance the closeness between the education and practice.

2) Their ideas regarding knowledge gained from being a core working group. All of them were in agreement that they gained new knowledge as well as had opportunities to refresh their existing information about weaning patients from ventilators. They also gained more understanding about evidence-based practice and its application for improving the quality of care. One of them
said that she learned to organize her thoughts systematically. This inspired her to want to know more new knowledge. She articulated that this is the way to apply new knowledge into practice. They thought that the additional knowledge could increase their ability to participate in decision-making about weaning. So, they can confidently discuss patients' conditions with medical staff during the weaning process. The core working group said that knowledge gained from all key points was very interesting because it can be immediately applied to practical use. This is necessary to initiate quality care for patients and implement collaborative weaning plans more effectively.

3) The application of knowledge for practical use. In the core working group's point of view, all key points of knowledge for enhancing nurses' capacity to wean are very useful because most of their colleagues became more confident about providing care and carrying out nursing activities during weaning procedures. In addition, they learned how not to concentrate on the method of weaning itself but how the method is applied.

Reflection from the administrators. The administrators appreciated the core working group for active cooperation with the research activities because the program resulted in increasing these nurses' awareness and knowledge for improving weaning practice. They noticed that some members of the core working group applied knowledge gained from the conferences to their practice immediately and used knowledge of the program's content for preparing new incoming nurses and other lower level MICU personnel. The administrators observed that their nursing staff showed more self-confidence when they provided care for weaning patients.

Reflection from 25 other CCNs. The 25 other CCNs' opinions regarding the content of the program provided them with current knowledge, clinical skills, and confidence for actively participating in the decisions related to weaning are described below:

1) Improving knowledge about nursing care related to weaning patients off ventilators. The results revealed that CCNs gained current knowledge from every key point of the enhancing program. They were improved in interpreting ABG readings. This ability is very important for assessing and monitoring a patient with respiratory problems and to determine the sufficiency and success of treatments. The content about weaning modes educated them about all weaning modes, the evidence-based findings, ventilator settings, and assessment of a patient's response to weaning. This provided them both a review of what they knew and gave them new knowledge about weaning modes. This enlightened them about the use of aggressive modes and gradual modes to wean patients based on evidences.

2) Improving clinical skills relating to performing tracheal suctioning. Most CCNs were impressed with knowledge gained from the key point “Best practices for tracheal suctioning,” which gave them comprehensive knowledge about this procedure. They expressed that this key point gave them advantages including: 1) personnel have improved their performance significantly and applied the best practices, and 2) CCNs themselves, practical nurses, and nurse aids have learned and understood the same principles. In addition, the research team created a technique to measure the volume obtained from resuscitation bagging performed by each personnel. So, they have more confidence when performing tracheal suctioning and bagging techniques after attending this conference.
session. Most importantly, they felt that the patients receive more consistent and accurate care than before. They have also monitored each other when performing a tracheal suctioning procedure and advised peers against incorrect performance.

3) Gaining confidence for actively participating in the decisions related to weaning. Knowledge from the key point about pathophysiology of ventilator dependence and weaning recommendations provided them the facts about the causes of ventilator dependency, detailed knowledge about evidence and recommendations about weaning for establishing confidence to discuss with physicians about patients’ weaning readiness. They also gained updated guidelines for monitoring a patient’s signs and symptoms during weaning. Hence, they seem to have gained acceptance from physicians and that leads to increased chances of involvement in decision making for weaning patients. CCNs said that the program provided them with new knowledge and opportunities for CCNs to refresh what they had previously learned and could be applied to practice.

Discussion

All members who were involved gained benefits from PAR as a methodologic approach to enhance weaning through empowering nurses. The involvement also made the program a success and resulted in improving knowledge, clinical skills, and gaining confidence with participation in the weaning process among the CCNs in their clinical settings. This is due to PAR being a form of research which “seeks to improve the quality of people’s organizational, community and family lives,” by using collaborative approaches to inquiry or investigation that provides people with the means to take systematic action to resolve specific problems.” From Chesler’s recommendation, PAR is a research paradigm when nurses want to acknowledge local talent, develop lay leadership, and empower groups or communities to reach their potential. Not only did 25 other CCNs gain knowledge and skills but also the engagement in the PAR project of the core working group enhanced their potential as leaders of their units who would lead their colleagues to create better nursing outcomes. The task in these circumstances is to provide a climate that gives people a sense that they control their own lives, and to support them as they take systematic action to improve their circumstances. PAR also creates a sense of ownership in the process.

Through the reflection process used during focus group discussions and the workshop, participants encountered opportunities to review their experience of providing care for patients during weaning. CCNs not only felt they lacked knowledge but also perceived a lack of invitation to participate in decision making. These problems signaled that they were aware of the needs of knowledge and skills to fulfill their capacity and autonomy. Some authors equate autonomy with power, because most nurses work in bureaucratic institutions in which an ability to act independently is linked to the authority vested in the position one holds in the hierarchy. From these situations, all weaning problems indicate that these CCNs were powerless and oppressed. During focus group discussions, CCNs expressed some reasons for lack of current knowledge and clinical skills related to weaning that can imply that their organization or administrators might develop strategies to promote a collective decision-making environment. For example, nurses in the focus groups felt excluded from physician decisions about weaning; administrative strategies could be developed to promote interdisciplinary rounds so
nurses can provide input about the patient’s readiness to wean. This truth and empowerment should be concerned as an umbrella concept of professional development in nursing. It is thus necessary for nurses to seek ways for improving nurse-physician collaboration because collaboration is the healthcare exhortation of this era. It improves patient care, enhances job satisfaction, boosts productivity, and helps to contain costs. Combined with autonomy, decision-making ability and professional development opportunities, these factors are major determinants of the work place environment.

The program for enhancing nurses’ capacity to ventilator weaning core content and methods which emerged from this study includes the content (five key points relevant to weaning) and methods for disseminating the program. The content of the program is consistent with suggestions by the World Federation of Critical Care Nurses (WFCCN) and Burns. Although this program is not exactly a preparation program for completely new CCNs, it works as a supplementary one for CCNs who are already prepared to some degree; it contains the necessary topics that are in agreement with the general concept of the aforementioned organization and authors. More importantly, the content of this program was approved by most units’ members. Hence, the program is currently appropriate for the CCNs in these critical care settings. For the methods of dissemination of the program, the core working group used conference as the main method which was one of few suggested strategies in the research procedure to implement the enhancing program because it was the most feasible and appropriate strategy to allow all or most staff nurses to participate. They expected that their colleagues could join during their free times or a one-hour period of time during working hours. So, they designed the program to have no effect on staff nurses’ routine work hours because they always had someone on duty, 24 hours each day. Hence, this approach might be the most cost-effective strategy for them in this situation.

**Conclusion and Recommendations**

The PAR process and the researcher’s facilitation empowered the core working group to develop an educational program with full participation of almost members of the organization throughout the program development process. The results of this PAR study reveal that CCNs’ collective problems about weaning patients from ventilator were lack of current knowledge, clinical skills and confidence to actively participate in decisions related to weaning. The program was formulated based on data which contained key features from all stakeholders desired in such a program including contents and methods that aimed at solving their collective weaning problems. All CCNs who participated in the program for enhancing nurses’ capacity to wean patients off ventilators gained benefits from the collaborative process and contents of the program. The core working group enhanced their research experience and learned how to develop their capacity for planning and decision-making concerning weaning through seeking knowledge independently. They became conscious that consistent self-development is necessary for enhancing their capacity and the development of nursing practice. The administrators agreed that the program benefited their units in term of increasing nurses’ awareness, knowledge for improving weaning practice, and showing more self-confidence when providing care for patients. Finally, the other 25 CCNs gained knowledge, improved their clinical skills, and gained confidence for actively participating...
Development of A Program for Enhancing Nurses’ Capacity to Wean Patients from Mechanical Ventilation

in decisions related to weaning. It would be advantageous if administrators collaborate with the core working group and enhance Masters-prepared nurses to become advanced practice nurses (APN) in order to keep improving their knowledge and clinical skills independently by updating the enhancing program periodically as appropriate. Doing so would strengthen the core working group’s ability to build up self-directed learning and lead scholarly activities for disseminating knowledge into practical use in their clinical setting. The program should be tested before applying in different clinical facilities with similar context and weaning problems.

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การพัฒนาโปรแกรมเพื่อสรางเสริมศักยภาพของพยาบาลในการหย่าเครื่องช่วยหายใจ

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บทคัดย่อ: วัตถุประสงค์ของการศึกษาค้นพบเพื่อพัฒนาโปรแกรมสําหรับเสริมศักยภาพของพยาบาลในการหย่าผู้ป่วยจากเครื่องช่วยหายใจ โดยใช้วิธีการวิจัยเชิงปฏิบัติการแบบมีสํวนรวมพยาบาลผู้ป่วยวัยทุกข์จํานวน 9 คนจากหอพยาบาลฤทธิ์ธารูป 3 หอผูป่วยโรงพยาบาลมหาวิทยาลัยในจํงหวัดภาคเหนือของประเทศไทยได้รับการเตรียมการจัดการเพื่อให้เป็นกลุ่มแกนนำเพื่อพัฒนาโปรแกรมด้านความสามารถของผูป่วยอีก 4 คน และพยาบาลผูป่วยวัยทุกข์อีก 25 คน วิธีการรวบรวมข้อมูลประกอบดวยวิธีร่วมกัน กระบวนการพัฒนาโปรแกรมตามความต้องการของพยาบาลประกอบด้วย 6 ขั้นตอน ผลการศึกษาพบว่าโปรแกรมที่สร้างขึ้นให้พยาบาลสัมผัส มีความรู้และทักษะทางคลินิกเกี่ยวกับการหย่าเครื่องช่วยหายใจเพิ่มขึ้น และมีความเชื่อมั่นในการมีส่วนร่วมการด้านสิ่งที่เกี่ยวกับการหย่าผู้ป่วยจากเครื่องช่วยหายใจเพิ่มขึ้น นอกจากนี้กลุ่มแกนนำยังได้รับประสบการณ์เพื่อยึดที่การทำงานวิจัย มีความรู้เกี่ยวกับการหย่าเครื่องช่วยหายใจเพิ่มขึ้นและเกิดความมั่นคงที่ความมั่นใจในการพัฒนาตนเองอย่างสม่ําเสมอเพื่อสร้างเสริมความรู้และทักษะทางการพยาบาล ดังนั้นผูวิจัยควรจะรวมมือกับพยาบาลเพื่อความรับผูปฏิบัติการพยาบาลขั้นสุ่งเพื่อเพิ่มประสิทธิภาพของการหย่าผู้ป่วยจากเครื่องช่วยหายใจ

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Supportive-Educational Program: Using Bioscientific Multimedia to Enhance Clinical Problem Solving Skill in General Nurse Practitioner Students

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Abstract: The purpose of this study was to test the effectiveness of supportive-educational program using bioscientific multimedia on bioscientific knowledge, critical thinking disposition, critical thinking skill, and clinical problem solving skill in general nurse practitioner students. This multimedia was developed based on 5Es inquiry cycle concept for increasing bioscientific understanding about neurological system, anatomy, and physiology of special sensory organs. A randomized experimental pre-test post-test static group comparison design was used to determine the influence of the different teaching methodologies. The sample of 60 students were pretested and randomly assigned into two groups, control (n=29) and experimental (n=31) groups, by using the computer program. Both groups were taught theoretical content through lecture, demonstration, but only the experimental group received additional bioscientific multimedia. Results revealed that the bioscientific knowledge between the experimental and control groups was significantly different at 8-week and 16-week periods. In the experimental group, the bioscientific knowledge increased at the 8-week period and maintained at the 16-week period after enrollment (p<.001). Critical thinking disposition, critical thinking skill, and clinical problem solving skill was not different between two groups as a result of the bioscientific multimedia. However, significant difference in critical thinking disposition was found across time in both groups (p<.05). Critical thinking disposition was also found to be correlated with the clinical problem solving skill (r=0.66, p < .01).

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Key words: bioscientific multimedia, clinical problem solving skill, critical thinking ability, 5Es inquiry cycle

Introduction

The current health care environment reflects societal patterns of constant change and complexity. The rapid growth of knowledge and technology related to health and illness calls for nurses who are able to solve problems and make crucial decisions. The general nurse practitioner students need to develop a set of thinking skill or clinical problem solving skill that enables them to collect an appropriate
Supportive-Educational Program: Using Bioscientific Multimedia

There is an increase in four variables - bioscientific knowledge, critical thinking skill, critical thinking disposition, and clinical problem solving skill from the experimental group (students receiving bioscientific multimedia as supportive-educational program) more than the control group (students not receiving bioscientific multimedia as supportive-educational program).

Literature Review

Clinical problem solving and bioscientific knowledge

The art of caregiving requires knowledge, skill, and expertise while major factor affecting practice is the ability to solve problems. In fact, the nursing process is a problem solving process that is also the most commonly cited component for many nursing programs.7 In the clinical setting, nurses distinguish relevant and irrelevant data, detect missing information required to understand the situation, formulate and test hypotheses, and make necessary revisions of hypothesis and intervention. With this approach, they need to transfer the theoretical knowledge such as bioscientific and pathophysiological knowledge and psychomotor skill development from the classroom to the clinical setting.

Until recently, there is a clear evidence that computer assisted instruction (CAI) in form of multimedia can promote learning and satisfaction in the user. Most multimedia tools assist the learner in achieving cognitive domain skills and also in mastering psychomotor behaviors and changing attitudes.8, 9

Neo and Neo defined multimedia as the combination of various digital media types such as text, images, sound, and video into an integrated multi-sensory interactive application or presentation to convey a message or information to a learner.10, 11 It is a self-paced or individualized instruction that
allows the learner to move at his or her own speed. It is also interactive, stimulating many senses of the learners, and enabling the end users of the application to control the content and flow of information.\textsuperscript{12}

Furthermore, cognitive theorists believe that learning is an internal event in which the information is encoded, stored and later retrieved. An information-processing model of memory illustrates how information is incorporated and retrieved in four stages, viz, paying attention to environmental stimuli, information processing by the senses (visual, auditory, motor manipulation), transforming the information (encoded) into short-term memory after which it is either disregarded and forgotten or stored in long term memory. Long-term memory involves the organization of information by using a preferred strategy for storage. The last stage involves the action or response that the individual makes on the basis of how information is processed and stored.\textsuperscript{13} For these reasons the bioscientific multimedia should be appropriate media for enhancing students’ bioscientific knowledge understanding and retaining in long term memory. Then, the students can generate linkage between old and new information for critical thinking in clinical practice. Not only knowledge, but also the relevant practice experience along with understanding of illness situation contributes to an accurate clinical problem solving skill.\textsuperscript{5,6}

**Critical thinking (CT)**

Critical thinking (CT) is an essential skill for nurses who practice in complex health care system. There have been a variety of meanings attributed to this concept including Facione and Facione definition. It is defined as a purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation and inference as well as the explanation of the rationale upon which the judgment is based.\textsuperscript{14}

Critical thinking can be seen as having two components which are critical thinking skill: A set of information and belief generating and processing skills and critical thinking disposition, that is, the habit based on intellectual commitment of using those skills to guide behavior.\textsuperscript{15} Various strategies have been used to assess critical thinking in nursing. One of the most appealing in the use of standardized test that promises an easily-administered reliable and valid measure of critical thinking skill and/or critical thinking disposition is the California tools critical thinking that consisted of two instruments, California Critical Thinking Skill Test (CCTST) and California Critical Thinking Disposition Inventory (CCTDI).

In brief, bioscientific multimedia was used as a tool of supportive-educational program to improve students’ bioscientific literacy in the dimension of understanding, memory retaining to enhance clinical problem solving skill and also critical thinking ability would be concerned.

**Methodology**

A randomized experimental design was used in this study. The sample included 60 students in Nursing Specialty in Nurse Practitioner Program (Primary Medical Care), Department of Nursing, Faculty of Medicine Ramathibodi Hospital in the academic year 2005.

**Sampling**

This study was a result of a four-month research. All students were randomly selected and assigned into control (n=29) and experimental (n=31) groups. Both groups attended classes using the traditional teaching methods including lecture, videotape, and demonstration during theoretical sessions. To the experimental group was added the bioscientific multimedia during theoretical study
Supportive-Educational Program: Using Bioscientific Multimedia

period while the control group could study from other resources depending on their need.

After theoretical study, all students practiced in the clinical settings, including Eye Ear Nose and Throat Out Patient Division, Faculty of Medicine Ramathibodi Hospital and Eye OPD at Pranangkoa Hospital. Their clinical problem solving skills were evaluated by clinical teaching instructors with double blind technique.

**Instruments**

1. A bioscientific multimedia was developed based on a constructivist teaching and learning or inquiry approach 5 Es inquiry cycle including five phrases: engagement, exploration, explanation, elaboration, and evaluation. The belief of constructivist teaching concept, originally credited to Bybee (2002), is learning occurs as learners are actively involved in a process of meaning and knowledge construction as opposed to passively receiving information. Learners are the makers of meaning and knowledge. Constructivist teaching fosters critical thinking and creates motivated and independent learners.

This multimedia lesson called, “Amazing neurological System,” comprises of five chapters: 1) neurological network, 2) introduction of neurological system, 3) special sensory organs and response such as seeing, hearing, taste and olfaction 4) brain and learning ability, and 5) neurological system information.

In each Chapter, the content was developed based on the steps of 5Es inquiry cycle concept as follows:

1.1 Engagement or lesson introduction: The learner was asked arousing questions to create interest, and then led them get into an exploration to develop a concept for which they had some background knowledge. This introduction part was to engage the learner, arouse curiosity and set a direction for lesson.

1.2 Exploration: In this part, the learner was immersed in exploration of the concepts. He/she worked with one another to explore ideas through reading, listening, and interacting with web page content.

1.3 Explanation: This portion is the major component of the lesson. The sequence of specific questions in this part was most important because it would relate to the new knowledge that was identified as the intention of the lesson. This was the place to reflect on stages of learning moving from concrete to abstract, from the known to the new.

1.4 Elaboration: This part is the closure that was important to retention of information and concepts. It was appreciate here to move the learner toward possible applications for what was learned.

1.5 Evaluation: At the end of each chapter, the learner takes the test for reflecting the stated purpose or objective, then they could immediate feedback to himself/ herself.

The multimedia lesson was validated by three experts, its item objective congruent (IOC) ranged from 0.66 to 0.93. It was also evaluated for user’s satisfaction and its’ quality by participated students by using multimedia assessment form of NECTEC (National Electronics and Computer Technology Center). The result revealed that the average score (mean = 285.77, SD = 12.79) was higher than the cut off point (250) according to NECTEC.

2. The bioscientific knowledge test was used to assess students’ bioscientific knowledge. It was twenty items, four multiple-choice questions of related bioscientific knowledge test in the dimension of understanding about anatomical and physiological content that needed for the E.E.N.T.
clinical problem solving practice. The item objective congruent (IOC) technique was utilized to validate this test, all items’ average scores ranged from 0.5 to 0.75. Then, the test was tried out by 30 fourth year nursing students. Internal consistency reliability estimates Kuder-Richardson 20 was adequate (KR-20 = 0.71), difficulty and discrimination index were 0.20-0.95, 0.20-0.68, respectively.

3. The critical thinking assessment tools were adapted from Facione and Facione’s California Critical Thinking Tools (CCTST, CCTDI) (1996) which were translated by Thanaporn Yamsuda (1999). The CCTST is the short problem statements and scenarios, following by the multiple choice questions, 30 items totally. The scenarios and questions were discipline neutral and had appropriate wording for Thai nursing students. It measured three core skills: Analysis, evaluation and inference, and reliability estimated .70 (KR-20 = 0.70), difficulty and discrimination index were 0.20-0.87, 0.23-0.94, respectively.

The CCTDI was a 75-item, likert scale questionnaire with “agree-disagree” responses which conducted Cronbach’s alpha for overall instrument was 0.77. It measured 7 traits of disposition: Truth-seeking, open-mindedness, analyticity, systematicity, critical thinking confidence, inquisitiveness, and maturity.

4. Clinical Problem-Solving Skill in Nursing Scale (CPSSNS) was developed based on competency needed of the Thai nursing council by Nurse Practitioner Specialty Committee (Primary Medical Care Program, Ramathibodi Nursing School, 2005). It was used to assess clinical problem-solving skill in clinical practice at Eye, Ear, Nose and Throat Outpatient Department (OPD). This tool consisted of 31 items regarding the problem-solving process related to nursing practice. The responses to this scale were rated on Likert-type scale, ranging from “always” to “never,” that reflect perceptions of one’s own behavior while caring for patients. Item ratings were summed to obtain a total score with a potential score range of 31 to 124. The higher scores indicated higher perceived clinical problem solving skill. Reliability test revealed that Cronbach alpha coefficient was .85.

**Conceptual Framework**

The conceptual framework in this study was based on an integration of the Cognitive Learning Theory, Bybee’s 5Es inquiry cycle and Facione and Facione’s Critical Thinking concept as illustrated in Figure 1. This 5Es inquiry cycle approaches encourage students to develop their own frames of thought through critical and logical thinking. Colburn and Clough also recommend the 5Es inquiry cycle as an effective means to help students enjoy science, understand content, and apply scientific processes as well as concepts to authentic situations needed for clinical problem solving. Thus, using CAI based on the 5Es inquiry cycle concept can enhance student’s understanding, critical thinking, and problem solving skill.
Supportive-Educational Program: Using Bioscientific Multimedia

Data Collection Procedure

By using computer program, the participants were randomly assigned into either control or experimental group. At baseline before theoretical sessions, bioscientific knowledge and critical thinking including critical thinking skill (CTS), and critical thinking disposition (CTD) were collected from the participants in both groups using self administered questionnaire. During theoretical sessions, the participants in experimental group received the Amazing Neurological System Multimedia three times for five chapters. After theoretical sessions were completed, the students were post-tested at 8 weeks and 16 weeks after enrollment. In addition, at the end (16 weeks after enrollment), clinical problem solving behavior was observed and evaluated by a clinical instructor.

Results

There were 60 participants, including control group (n = 31) and experimental group (n = 29) participated in this study. Almost all participants (98.4%) were female, with mean age of 37.17 ± 5.98 years. Most of them (67.6%) had baccalaureate degree, worked as nurses with average years of experience at 14.97 ± 5.87 years (Table 1). The participants rated that the most important type of media needed by them was Interactive multimedia (85.0%). Table 2 showed the difference between the two groups in mean score of critical thinking skill and disposition inventory.
Table 1 Demographic data of the sample (n = 60)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experimental Gr. (n=31)</th>
<th>Control Gr. (n=29)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
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<td></td>
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</tr>
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<td>-</td>
</tr>
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</tr>
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<td>ER (Emergency Room)</td>
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<td>OPD (Out-patient department)</td>
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<td>Nursing school</td>
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<td>11.7</td>
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<td>Lecturer</td>
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<td><strong>Need for media (n= 60)</strong></td>
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<td>Video</td>
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<td>5.87</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>37.17</td>
<td>5.98</td>
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</table>

mean SD Range
Table 2  A comparison of mean score for critical thinking skill and disposition inventory (n=60)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experimental Gr. (n=31)</th>
<th>Control Gr. (n=29)</th>
<th>t</th>
<th>p-value</th>
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<td><strong>Critical Thinking Skill</strong></td>
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<tr>
<td>* analysis (CTS1)</td>
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<tr>
<td>Pre-test</td>
<td>3.71</td>
<td>3.69</td>
<td>0.06</td>
<td>0.95</td>
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<tr>
<td>Post-test1</td>
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<td>3.83</td>
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<td>0.97</td>
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<tr>
<td>Post-test2</td>
<td>3.68</td>
<td>3.66</td>
<td>0.06</td>
<td>0.95</td>
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<tr>
<td>* evaluation (CTS2)</td>
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<td></td>
<td></td>
<td></td>
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<td>0.09</td>
<td>0.92</td>
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<td>4.41</td>
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<td>* inference (CTS3)</td>
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<td>Pre-test</td>
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<tr>
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<td><strong>Total (TCTS)</strong></td>
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<td>13.76</td>
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<tr>
<td>Post-test2</td>
<td>13.81</td>
<td>13.72</td>
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<td>0.91</td>
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<td><strong>Critical Thinking Disposition Inventory</strong></td>
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<tr>
<td>* truth-seeking (CTD1)</td>
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<tr>
<td>Pre-test</td>
<td>44.42</td>
<td>4.597</td>
<td>-0.76</td>
<td>0.45</td>
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<tr>
<td>Post-test1</td>
<td>44.16</td>
<td>4.455</td>
<td>-0.64</td>
<td>0.53</td>
</tr>
<tr>
<td>Post-test2</td>
<td>45.32</td>
<td>4.652</td>
<td>-0.59</td>
<td>0.59</td>
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<tr>
<td>* open-mindedness (CTD2)</td>
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<tr>
<td>Pre-test</td>
<td>54.71</td>
<td>55.69</td>
<td>0.59</td>
<td>0.56</td>
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<tr>
<td>Post-test1</td>
<td>54.74</td>
<td>54.38</td>
<td>0.22</td>
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<tr>
<td>Post-test2</td>
<td>55.35</td>
<td>54.48</td>
<td>0.57</td>
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<tr>
<td>* analyticity (CTD3)</td>
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<tr>
<td>Pre-test</td>
<td>46.19</td>
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<td>Post-test1</td>
<td>49.38</td>
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<td>Post-test2</td>
<td>49.10</td>
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<td>* systematicity (CTD4)</td>
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<tr>
<td>Pre-test</td>
<td>48.13</td>
<td>48.83</td>
<td>0.74</td>
<td>0.94</td>
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<tr>
<td>Post-test1</td>
<td>48.97</td>
<td>48.21</td>
<td>-0.69</td>
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<tr>
<td>Post-test2</td>
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<td>50.17</td>
<td>-0.45</td>
<td>0.66</td>
</tr>
<tr>
<td>* critical thinking confidence (CTD5)</td>
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<tr>
<td>Pre-test</td>
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<td>40.72</td>
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<tr>
<td>Post-test1</td>
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<td>* inquisitiveness (CTD6)</td>
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<td>Post-test2</td>
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<td>-0.43</td>
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<td>* maturity (CTD7)</td>
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<tr>
<td>Post-test2</td>
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<td>38.65</td>
<td>-0.43</td>
<td>0.68</td>
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<tr>
<td><strong>Total (TCTD)</strong></td>
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<tr>
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<td>327.00</td>
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<td>Post-test2</td>
<td>331.61</td>
<td>334.97</td>
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Results from the two-way analysis of variance with repeated measures on one factor revealed that there was significant difference in bioscientific knowledge across time between these two groups as shown in Figure 2. Table 3 illustrated that there was an effect of intervention, time, and interaction effect of intervention and time on bioscientific knowledge. Posthoc test using Bonferroni showed that there was a significant change in bioscientific knowledge between baseline and 8 weeks after enrollment (p < .001), and baseline and 16 weeks after enrollment (p < .001). However, no significant difference was found between bioscientific knowledge at 8 weeks and 16 weeks after enrollment.

![Mean score chart](chart)

**Figure 2**  Changing of bioscientific knowledge score over time

**Table 3** Two-way ANOVA with repeated on one factor for Bioscientific knowledge  (n = 60)

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>Sum of square</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Within subject</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>422.018</td>
<td>2</td>
<td>211.009</td>
<td>49.405</td>
<td>.000</td>
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<tr>
<td>Time * Group</td>
<td>86.351</td>
<td>2</td>
<td>43.175</td>
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<tr>
<td>Error</td>
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<td>116</td>
<td>4.271</td>
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<td></td>
</tr>
<tr>
<td><strong>Between subject</strong></td>
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<tr>
<td>Group</td>
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<td>156.166</td>
<td>22.500</td>
<td>.000</td>
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<tr>
<td>Error</td>
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<td>58</td>
<td>6.941</td>
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</table>
As shown in Table 4, results indicated a significant difference in critical thinking dispository overtime ($F_{2,116} = 3.150, p = .047$). However, effects of intervention and interaction of time and intervention on critical thinking dispository were not statistically significant. In contrast with critical thinking dispository, there was no significant difference in critical thinking skill across time (Table 5). Moreover, effects of intervention and interaction of time and intervention on critical thinking skill were not statistically significant. In addition, clinical problem solving score was not different ($t = -.30, p = .77$) between control ($M = 85.97, S.D. = 2.59$) and experimental groups ($M = 85.76, S.D. = 2.39$).

**Table 4** Two-way ANOVA with repeated on one factor for critical thinking disposition (n = 60)

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>Sum of square</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>p-value</th>
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<tr>
<td>Within subject</td>
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<td>Error</td>
<td>119607.225</td>
<td>58</td>
<td>2062.194</td>
<td>.274</td>
<td>.761</td>
</tr>
</tbody>
</table>

**Table 5** Two-way ANOVA with repeated on one factor for critical thinking skill (n = 60)

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>Sum of square</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>3.081</td>
<td>2</td>
<td>1.541</td>
<td>.274</td>
<td>.761</td>
</tr>
<tr>
<td>Time * Group</td>
<td>5.148</td>
<td>2</td>
<td>2.574</td>
<td>.458</td>
<td>.634</td>
</tr>
<tr>
<td>Error</td>
<td>652.174</td>
<td>116</td>
<td>5.622</td>
<td>.274</td>
<td>.761</td>
</tr>
<tr>
<td>Between subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.653</td>
<td>1</td>
<td>.653</td>
<td>.041</td>
<td>.841</td>
</tr>
<tr>
<td>Error</td>
<td>928.208</td>
<td>58</td>
<td>16.004</td>
<td>.274</td>
<td>.761</td>
</tr>
</tbody>
</table>
Table 6 showed results from Pearson correlation analysis. Clinical problem solving skill correlated with critical thinking disposition at baseline (r = .66, p < .01) at 8 weeks (r = .61, p < .01) and 16 weeks (r = .26, p < .05) after enrollment.

Table 6 Correlation coefficient among variables (n= 60)

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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</thead>
<tbody>
<tr>
<td>Bioscientific knowledge</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1. Baseline</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. at 8 weeks</td>
<td>0.15</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3. at 16 weeks</td>
<td>0.11</td>
<td>0.45**</td>
<td>0.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critical Thinking Skill</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Baseline</td>
<td>0.12</td>
<td>0.10</td>
<td>0.19</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. at 8 weeks</td>
<td>-0.08</td>
<td>-0.03</td>
<td>0.08</td>
<td>0.43*</td>
<td>1.00</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6. at 16 weeks</td>
<td>0.09</td>
<td>0.13</td>
<td>0.20</td>
<td>0.29*</td>
<td>0.41*</td>
<td>1.00</td>
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<tr>
<td>Critical Thinking Disposition Inventory</td>
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<td></td>
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<tr>
<td>7. Baseline</td>
<td>0.05</td>
<td>-0.07</td>
<td>-0.01</td>
<td>0.30*</td>
<td>0.21</td>
<td>0.20</td>
<td>1.00</td>
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<tr>
<td>8. at 8 weeks</td>
<td>0.08</td>
<td>0.17</td>
<td>-0.04</td>
<td>0.61*</td>
<td>0.24</td>
<td>0.26*</td>
<td>0.64**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. at 16 weeks</td>
<td>0.01</td>
<td>-0.13</td>
<td>-0.05</td>
<td>0.12</td>
<td>0.13</td>
<td>0.15</td>
<td>0.63*</td>
<td>0.13</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>10. Clinical problem solving scores</td>
<td>0.11</td>
<td>0.19</td>
<td>0.18</td>
<td>0.02</td>
<td>-0.11</td>
<td>0.05</td>
<td>0.66**</td>
<td>0.61**</td>
<td>0.26*</td>
<td>1.00*</td>
</tr>
</tbody>
</table>

* p<0.05, ** p<0.01, ***p<0.001
at 8 weeks and 16 weeks = at 8 weeks and 16 weeks after enrollment

Discussion

Results revealed that the bioscientific knowledge at baseline was significantly different from that at 8 weeks and 16-weeks after enrollment in the experimental group (Figure2). A possible reason is that the bioscientific multimedia stimulated teaching and learning environment, leading to increased knowledge through active cognitive process. In addition, the participants in the experimental group expressed that they could review the media by themselves and were able to gain more deeper understanding of the content. Moreover, they reported that they were satisfied with the media used in this study.

However, critical thinking disposition, critical thinking skill, and clinical problem solving skill was not different as a result of the bioscientific multimedia. It is probably explained that the 16-week period may not sufficient for changes. Developing critical thinking and clinical problem solving skill requires time, especially when practice is involved. It is essential that the students interact with information from various sources, relate the information with prior knowledge, synthesize information, and create knowledge. In addition, not only the knowledge increased by use of the multimedia, but also past learning experience is the
Supportive-Educational Program: Using Bioscientific Multimedia

An important factor affecting the development of critical thinking and clinical problem-solving skill. The clinical problem-solving skill within nursing, a practice discipline, involves more than the application of theoretical knowledge. The relevant practice experience and understanding of illness situation and experience in a particular patient are required. Experience results in more accurate clinical problem-solving skill. Moreover, education factors such as teachers’ attitude, knowledge, and practice, as well as methods employed by the teachers are also crucial factors. The media used in this study included only bioscientific component. Media that integrate anatomy, physiology, and clinical knowledge may be needed.

In terms of critical thinking disposition, no significant difference was found between participants in control and experimental groups. However, significant difference in critical thinking disposition was found across time. Critical thinking disposition, including truth-seeking, open-mindedness, analyticity, systematic, critical thinking confidence, inquisitiveness, and maturity, are the basis of critical thinking and clinical problem-solving skill that contribute to patient care and outcome. The promotion of critical thinking disposition should be taken into account.

Limitation and Recommendation

A limitation in this study is the short period of time whereas developing critical thinking and clinical problem-solving skill requires time. In addition, the media used in this study included only bioscientific knowledge.

A future study could be conducted for a longer period. A research study with an emphasis on patient outcome is also recommended. The results indicated that the bioscientific multimedia is effective to enhance knowledge, therefore it is recommended as a media to promote learning process in nursing education. In clinical practice, critical thinking and problem-solving skill should be promoted and collaborate with other health profession.

Acknowledgements:
The authors are grateful to Dr. Yuwadee Luecha, Dr. Pintip Ruenwongsa, and Dr. Thanaporn Yaemsuda for sharing their expertise and to all participants for their cooperation.

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การเสริมความรู้ด้านวิทยาศาสตร์ชีวภาพโดยการใช้สื่อประสมเพื่อเพิ่มทักษะการแก้ปัญหาในคลินิกของนักศึกษาสายยานแม้ว ปฏิบัติทั่วไป

จุฑารักษ์ ภัทธ์ธีรทิพย์, นภวรรณ เปียกช่อ, สุทธิ์ ลัทธิธรรม, ณัฐวรรณ ศิริคุณ, ภูมิชัย ภูมินทร์

บทคัดย่อ: การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อทดสอบประสิทธิภาพของการเสริมความรู้ด้านชีวภาพโดยการใช้สื่อประสมต่อความรู้ด้านชีวภาพ คุณลักษณะและทักษะการคิดอย่างมีวิจารณญาณ และทักษะการแก้ปัญหาในคลินิกของนักศึกษาสายยานแม้ว ปฏิบัติทั่วไป สื่อประสมที่พัฒนาขึ้นได้ลักษณะแนวคิดเกี่ยวกับการเรียนรู้แบบสืบเสาะหาความรู้ 5 ชั้นตอน เพื่อเพิ่มความรู้ความเข้าใจเกี่ยวกับระบบประสาทถัดจากนักวิทยา, สร้างวิทยาของนักวิทยาวิธีสังเกตและนำมาทดลองได้โดยทำวิจัยเปรียบเทียบเพื่อเปรียบเทียบผลของการสอนที่แตกต่างกัน กลุ่มตัวอย่างเป็นนักศึกษาสายยานแม้ว ปฏิบัติทั่วไป 60 คนแบ่งเป็นกลุ่มทดลอง 31 คน กลุ่มควบคุม 29 คน โดยการสุ่มตัวอย่างคอมพิวเตอร์ทั้งสองกลุ่มเรียนรู้ได้วิธีรูปแบบข้อมูล สำธิค โดยกลุ่มทดลองได้เรียนเพิ่มเติมจากสื่อประสมผลการศึกษาพบว่ากลุ่มทดลองมีคะแนนความรู้ทางชีวภาพเพิ่มขึ้นสูงกว่ากลุ่มควบคุมในสัปดาห์ที่ 8 และ 16 หลังการทดลองเป็นอย่างมากที่สุดที่ทางทางสังเกต และในกลุ่มทดลองมีแนวโน้มมีการโต้ตอบความรู้ทางชีวภาพเพิ่มขึ้นจากกลุ่มทดลองอย่างมีนัยสำคัญทางสถิติ (p<.001) ระดับกุมทักษะการคิดอย่างมีวิจารณญาณและทักษะการแก้ปัญหาในคลินิกได้เพิ่มขึ้นจากการใช้สื่อประสมอย่างไรก็ตามผลการศึกษาพบว่า คุณลักษณะการคิดอย่างมีวิจารณญาณ มีความแตกต่างกันตามเวลาที่เปลี่ยนไป และมีความสัมพันธ์กับทักษะการแก้ปัญหาในคลินิกอย่างมีนัยสำคัญทางสถิติ

วารสารวิจัยทางการพยาบาล 2007; 11(4) 295 - 308

คำสำคัญ: สื่อประสมที่เสริมความรู้ด้านชีวภาพ ทักษะการแก้ปัญหาในคลินิก คุณลักษณะ และทักษะการคิดอย่างมีวิจารณญาณ การเรียนรู้แบบสืบเสาะหาความรู้ 5 ชั้นตอน

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Thai J Nurs Res • October –December 2007

308