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EFFECT OF MASSAGE AND AROMATHERAPY ON STRESS AND PROLACTIN LEVEL AMONG PRIMIPAROUS Puerperal Mothers in Semarang, Central Java, Indonesia

Melyana Nurul Widyawati1,2*, Soeharyo Hadisaputro1, Anies1, Ariawan Soejoenoes1

1Doctoral Program of Medical Science and Health, Diponegoro University, Semarang, Indonesia
2Postgraduate Midwifery Program, Semarang Health Polytechnic, Semarang, Indonesia

*Corresponding author: Melyana Nurul Widyawati, S. Sit, M.Kes.
Postgraduate Midwifery Program, Semarang Health Polytechnic, Jl. Tirto Agung, Pedalangan, Banyumanik, Kota Semarang, Jawa Tengah, Indonesia (50268). Mail: melyana_n@yahoo.com

ABSTRACT

Background: Exclusive breastfeeding in Semarang during the past five years remains low. Only 20 to 64% of mothers were breastfed exclusively in 2010-2012. The incidence of postpartum blues was reported by 29.9% of mothers and most of them were primiparous.

Objective: This study aims to determine the effect of loving massage, aromatherapy, and a combination of loving massage and aromatherapy on stress levels, and changes in levels of prolactin in primiparous puerperal in Semarang.

Method: A true experimental study with a randomized pretest-posttest control group design. Cluster random sampling was used to select 12 health centers from the 37 health centers in Semarang. A random assignment with a sealed envelope was performed to divide study participants into four groups; loving massage group, aromatherapy group, and a combination group of loving massage and aromatherapy, and a control group. A total of 52 primiparous puerperal mothers was involved, with 13 mothers were distributed equally in each group.

Results: Loving massage, aromatherapy, and a combination of loving massage and aromatherapy effectively changed mother’s stress and prolactin levels. Effectiveness of each treatment assessed from the average difference in scores before and after treatment. Combination of loving massage and aromatherapy had proven as the most effective treatment in reducing stress levels (11.61 ± 6.76), and increasing prolactin level (83.13 ± 6.41 ng/ml).

Conclusions: Loving massage and aromatherapy shown to lower the levels of stress, and can increase the levels prolactin in postpartum primiparous. Therefore, it is recommended to provide loving massage therapy and aromatherapy to postpartum primiparous mothers.

Keywords: loving massage, aromatherapy, stress, prolactin
**INTRODUCTION**

United Nations Children's Fund (UNICEF) reported that started feeding on the first day after birth can reduce the risk of neonatal mortality up to 45%.\(^1\) In addition, exclusive breastfeeding was found effective in preventing infant mortality up to 13% - 15%.\(^2\) Nevertheless, having their first experience, primiparous mothers are susceptible to depression during the postpartum as a result of the complex pressures of high anxiety, lability feelings, and feeling of guilt. The postpartum mothers who are depressed tend to be too late to initiate breastfeeding or choose to stop breastfeeding and therefore, tend to have low prolactin levels, both in milk and in serum.\(^3\) Low levels of the prolactin hormone give unfavorable effects on milk production.\(^4,5\)

Postpartum women are also at risk for inflammation which naturally rise began in the last trimester of pregnancy and these changes will continue in the postpartum period. A study showed that mothers with postpartum depression experienced acute stress and inflammatory responses withstand failure, had higher levels of IL-6 and TNF-α higher in response to an acute stressor than postpartum mothers who are not depressed. They are also less sensitive to glucocorticoids which can usually resolve the inflammatory response system.\(^3\) The study also showed that aromatherapy massage therapy can reduce anxiety and stress, as well as beneficial to the immune system.\(^6\)

Given the evidence from previous studies, this research applied loving massage and aromatherapy mixture of jasmine and fennel oils which the result of local processing plants native to Indonesia. Studies reported that jasmine oil has a stimulating effect on the function of the nervous system, increasing positive emotions, and improve mood. Mood that is often erratic in postpartum mothers can be improved by inhaling jasmine oil. In addition, oil foeniculum vulgare/fennel/fennel oil contains antioxidants, can help reduce anxiety, increase the flow of milk, and it can be used as galactagogue to increase the supply of breast milk. Moreover, phytoestrogens contained in fennel can support the growth of breast tissue.\(^7\)

Postpartum period is recognized as vulnerable to affective disorders, especially depression postpartum. In contrast, the prevalence and clinical stress levels and milk production during the postpartum period have not received much attention for research. Data show that the obsessive-compulsive disorder, stress and anxiety disorders were higher in postpartum women than in the general population.\(^8\) Loving massage and aromatherapy are expected to help postpartum mothers to gain the feeling of relaxation and increased comfort that can affect the increase in milk production as well as maternal and infant immune system. The interaction that occurs between these therapies have mutually synergistic effect as between the two can be mutually augmented by the therapeutic work without adding to the ill effects or reduce them.

This study aims to determine the effect of loving massage, aromatherapy, and a combination of loving massage and aromatherapy on stress levels, and changes in levels of prolactin in primiparous puerperal in Semarang, which was expected to increase the coverage of exclusive breastfeeding. The novelty of this research can be observed from the nature of the treatments given: (1) loving massage technique, which had never been studied before is a massage technique modification designed by the researchers in this study. The technique combines massage with effleurage techniques,
petrissage, acupressure, and love kneading with the concept of holistic body-mind-spirit connection through touching; (2) a mixture of aromatherapy fennel and jasmine had never been studied before; (3) a combination of massage with aromatherapy loving fennel and jasmine have not been investigated before.

METHODS

It was a true experimental study with a randomized pretest-posttest control group design. Cluster random sampling was employed to select 12 health centers from the 37 health centers in Semarang. A random assignment with a sealed envelope was performed to divide study participants into four groups; loving massage group, aromatherapy group, combination of loving massage and aromatherapy group, and a control group.

The subject of this research was postpartum primipara mothers who agreed to receive the treatment, and has met the inclusion and exclusion criteria of the study. The subjects were given the treatment, each treatment is divided into 4 groups, loving massage group, aromatherapy group, combination of loving massage aromatherapy group, and a control group.

Loving massage treatment using sunflower oil was given with a duration of 50 minutes each time once a week for four weeks at the beginning on the 7th day after birth, up to four weeks postpartum. Aromatherapy treatment fennel/ fennel and jasmine / jasmine (each 3 drops in 100 ml of water) was given by inhalation using a diffuser for 30 minutes. Aromatherapy inhalation was given every week for four weeks at beginning on the 7th day after birth, up to four weeks postpartum.

The combination treatment of loving massage and aromatherapy fennel / fennel and jasmine / jasmine was given as a combination of massage with a duration of 50 minutes, using sunflower oil with additional aromatherapy fennel / fennel and jasmine / jasmine (each 3 drops in 100 ml sunflower oil) once a week for four weeks. Total giving massage four times beginning on the 7th day after birth, up to four weeks postpartum. The control group was given standard treatment in the postpartum care service, including the examination of signs - vital signs, diagnose the perceived complaints (fever, shortness of breath, abdominal pain, severe headache, blurred vision, breast pain, swelling in the breasts, sore nipples, swelling in hands, swelling in the face, swelling in the limbs, severe bleeding, vaginal discharge that smells), nutrition, defecation, micturition, and breastfeeding patterns. Blood sampling in the control group performed at the same time as the treatment group.

Likewise, the stress levels of mothers in the control group were also measured using the same methods on the 7th day postpartum and 28 days postpartum.

Prolactin serum was measured using DRG Prolactin ELISA, and laboratory analyzes were performed at the GAKY Laboratory of Medical Faculty of Diponegoro University Semarang. Measurement of prolactin levels in the treatment and control group was performed on the 7th day of postpartum at 10.00 am, and after obtaining the treatment at 11:00 am. Different test analysis between treatment groups were analyzed
by One Way Anova, by setting up p value > 0.05.

The therapists were midwives who have been trained in providing treatment for primiparous puerperal mothers. Data collection in the experimental group was retrieved by researchers, assisted by nine midwives certified competent as enumerators who previously given special training for four days. Ethical approval of this study was obtained from Medical Faculty Research Ethics Committee Diponegoro University Semarang.

RESULTS

Respondents’ characteristics

The respondents of this research were postpartum primipara mothers who agreed to receive the treatment, and met the inclusion and exclusion criteria of the study. They were women at reproductive age 20-35 years old and primiparous.

Table 1 Respondents’ characteristics

<table>
<thead>
<tr>
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<th>X2</th>
<th>X3</th>
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<td>15.4</td>
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<td>8</td>
<td>61.5</td>
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<td>3</td>
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<td>7.7</td>
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<td>100</td>
<td>13</td>
<td>100</td>
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<td>6</td>
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<td>61.5</td>
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<td>23.1</td>
<td>6</td>
<td>46.2</td>
</tr>
<tr>
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<td>53.8</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>100</td>
<td>13</td>
<td>100</td>
<td>13</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1 shows that more than half (57 percent) of primiparous mothers were at the youngest age group (20-25). Among the intervention and control groups, mothers at the second groups (given aromatherapy intervention) have the highest proportion of younger mothers than others. Mothers at the third and control group are more likely to be older primiparous.

In terms of education, the vast majority of respondents (63 percent) attained secondary education. The proportion of mothers who completed secondary level at all groups is also equally distributed that most mothers have similar educational background. Nevertheless, it should be noted that more mothers in the third and control group (15
and 23 percent, respectively) completed only first secondary.

Aside from education, socio-economic background of mothers in this study can be seen from their occupation. Table 1 shows that most mothers in the intervention and control group shared similar characteristics in terms of their occupation. The vast majority (55 percent) of respondents were housewife and private employee (35 percent). Looking at the proportion distribution of occupation among four groups, it can be seen that group three and control group have higher proportion of housewife compared to the first and second group.

Other basic characteristic that relevant to be considered for this study is Body Mass Index or BMI. Generally, most mothers (44 percent) were categorized as having normal BMI. Nevertheless, it should be noted that about a third of mothers were obese. When comparison made among the four groups, it showed that more mothers in the third group were obese.

Stress level

The study found, among primipara mothers who received loving massage treatment, all of them (13 persons) reported medium to severe stress level (acute, chronic), as shown in Table 2. After applying loving massage treatment, the proportion of mothers who reported acute and chronic stress declined, from 30.8 percent to 15.4 and 7.7 percent respectively.

Similarly, of 13 mothers who received aromatherapy, about a third were experiencing medium stress level, whilst the other 60 percent experienced acute and chronic stress level. After the treatment, the proportion of mothers who had severe stress symptoms was significantly decreased to “not stress” (46 percent), medium (30 percent), and acute (15 percent). There were only 7 percent of mothers in aromatherapy treatment who were reported in chronic stress level.

Prior to treatment, more mothers in the third group (combined loving massage and aromatherapy) showed severe stress level than the first two groups. More than half (53 percent) of the subject reported acute stress level while 30 percent was reported at medium stress level and another 15 percent was in chronic condition. After the treatment, the majority of mothers in this group (53 percent) reported no symptoms of stress, whilst 30 percent experienced medium stress level. There were only 7 percent of mothers in this group reported acute stress level.

Among mothers in the control group, the proportion of mothers who experienced stress showed no significant difference before and after the treatment.

Prolactin levels

Table 3 shows the mean difference in prolactin level of mothers in the intervention group. Prior to the intervention, the mean level of prolactin was varying; 197.65 ng/mL in loving massage group; 209.70 ng/mL in aromatherapy group; 195.35 ng/mL in combined aromatherapy and massage, and 181.35 ng/mL in control group.

After the treatment, among those who received loving massage, the mean prolactin level elevated from 197.65 to 248.79 ng/mL. Of mothers who received aromatherapy, prolactin level was slightly increased from 209.70 to 200.68 ng/mL whilst combination of loving massage and aromatherapy resulted in an increment of prolactin level from 195.35 to 278.48 ng/mL. Mothers in the control group showed a decreased in prolactin level from 181.35 to 168.54 ng/mL.

The highest increase in the average level of the prolactin hormone difference occurs in the combination group loving
massage & aromatherapy (83.13 ± 6.41 ng/mL) followed by loving massage treatment group (69.14 ± 6.60 ng/mL), aromatherapy (-9.01 ± 1.38 ng/mL), and finally the control group (-12.81 ± 5.14 ng/mL). This suggests that the combination treatment loving massage & aromatherapy was the most effective way to increase prolactin levels for primiparous puerperal.

**Table 2** Stress level of postpartum primipara mothers before and after treatment

<table>
<thead>
<tr>
<th>Group</th>
<th>Stress level</th>
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<th>After treatment</th>
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</thead>
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<td></td>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
</tr>
<tr>
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</tr>
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<td>38.5</td>
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</tr>
<tr>
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<td>15.4</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
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<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Mean difference</td>
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<td></td>
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<tr>
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<td>7.7</td>
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<tr>
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</tr>
<tr>
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<td>p-value</td>
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<td>3</td>
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<td>27.85</td>
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<td></td>
<td>Mean difference</td>
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<td>p-value</td>
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### Table 3: Prolactin level differences of postpartum primipara mothers before and after treatment

<table>
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<th>Group</th>
<th>N</th>
<th>Prolactin level (ng/mL)</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>Loving Massage</td>
<td>13</td>
<td>Before treatment</td>
<td>197.65</td>
<td>48.79</td>
<td>120.28</td>
<td>258.30</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>After treatment</td>
<td>248.79</td>
<td>87.16</td>
<td>106.86</td>
<td>386.67</td>
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<tr>
<td>Aromatherapy</td>
<td>13</td>
<td>Before treatment</td>
<td>209.70</td>
<td>80.28</td>
<td>65.26</td>
<td>317.77</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>After treatment</td>
<td>200.68</td>
<td>102.69</td>
<td>54.33</td>
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<tr>
<td>Loving Massage &amp;</td>
<td>13</td>
<td>Before treatment</td>
<td>195.35</td>
<td>68.52</td>
<td>128.12</td>
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<tr>
<td>Aromatherapy</td>
<td>13</td>
<td>After treatment</td>
<td>278.48</td>
<td>58.93</td>
<td>176.78</td>
<td>377.21</td>
</tr>
<tr>
<td>Control</td>
<td>13</td>
<td>Before treatment</td>
<td>181.35</td>
<td>60.48</td>
<td>52.38</td>
<td>259.83</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>After treatment</td>
<td>168.54</td>
<td>73.22</td>
<td>36.08</td>
<td>272.59</td>
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</table>

### DISCUSSIONS

Statistical analysis showed that loving massage that was given four times in 4 weeks with a duration of 50 minutes each session significantly influenced the reduction of stress levels with average differences (± SD) 10.54 ± 6.27 whilst in the second group, mothers who were given aromatherapy intervention with diffuser for 30 minutes also showed a decreased in the stress level of 11.46 ± 8.52 in average. In the third group, primiparous puerperal mothers who received a combination of interventions loving massage and aromatherapy showed a significantly decrease in their stress level with an average difference of 11.61 ± 6.76. Unlike mothers in the intervention group, mothers in the control group experienced only a slight difference in their stress level during the study period.

The decrease in stress levels was found highest in the combination group loving massage and aromatherapy. It can be understood because the stimulation of pressure receptors is innervated by vagal afferent fibers, which ultimately lead to the limbic system, including the structure of the hypothalamus that is involved in the regulation of the autonomic nervous system and the secretion of cortisol.

The combination of loving massage and aromatherapy effect was even more significant when it was seen from the decline in the number of respondents who experience severe stress. The combination of massage and aromatherapy mechanism reduced the hormones of stress, namely cortisol and aromatherapy, and stimulated the production of endorphins that provides the relaxing effect to reduce stress more than in a massage or aromatherapy treatment only.

Aromatherapy used in this research was the essential oil of fennel and jasmine. Jasmine essential oil stimulates the body to release endorphins which are natural painkillers and mood enhancer, thus making the body becomes relaxed. The mechanism of reduction in stress levels may be related to modulation of the sympathetic and parasympathetic nervous systems. Aromatherapy can reduce the activity of the sympathetic nervous system.
and increase the activity of the parasympathetic nervous system which can lead to relaxation of the body and reduce stress levels.\(^\text{10}\)

In the control group, stress levels of the mothers were also decreased, although in a very minimal level. The result was in accordance with studies that reported mothers who do not work at risk of postpartum depression is 10 times greater than working mothers.\(^\text{3}\) All respondents are primiparas that in this case the adjustment to the new role is more difficult than in multiparous. In the absence of specific interventions in women both with regard to both physical and psychological, the mother will tend to be more easily stressed.\(^\text{11}\) According to the results, the hypothesis of loving massage, aromatherapy, and the combination of loving massage aromatherapy can lower stress levels in primiparous puerperal is acceptable.

On the other hand, the combination of massage and aromatherapy proved to have the most significant effect, since it affects through three channels body systems simultaneously, namely a combination of receptors mechanical physically through massage directly on the skin, the mechanism of aromatherapy through the skin which is absorbed by the epidermis, and the working mechanism of aromatherapy to stimulate the olfactory receptors in the nose through neurotransmitters stimulate parts of the brain.\(^\text{6,12}\)

According to the results, the hypothesis of loving massage, and the combination of loving massage aromatherapy can increase prolactin levels in primiparous puerperal is acceptable, but the hypothesis of aromatherapy can increase prolactin levels in primiparous puerperal is rejected. Aromatherapy had no significant effect in increasing prolactin levels was possibly due to the lack of physical stimulation. Studies found, in order to stimulate prolactin level, stimulation through mechanical receptors physically through massage directly on the skin is needed because stimulation via receptors olfactory allegedly less impact on increasing prolactin.\(^\text{6}\) This requires further research related to comparative effectiveness of mechanical stimulation and stimulation via receptors olfactory to increase prolactin.

The results of this study correspond to the result of similar study on postpartum mothers by Pamuji in 2014\(^\text{13}\) regarding the effect of a combination of woolwich massage methods and endorphin massage. The study found, the treatment given may increase the prolactin hormone levels and the volume of milk.\(^\text{13}\) Various studies also found that stimulation to release prolactin also can be done with breast massage, nipple cleaning, and breastfeeding early and regularly.\(^\text{14,15}\) The prolactin hormone stimulates cells in the alveoli to produce milk. The more of the prolactin hormone, the milk production increases. Among breastfeeding mothers, prolactin will be decreased under stress, psychic influence, anesthesia, and surgery.\(^\text{16,17}\) In this case, the psychological condition of nursing mothers determines the success of exclusive breastfeeding. Since stress condition can inhibit the production of prolactin hormone, therefore several holistic therapies that provide relaxation sensation to mothers can be suggested: massage therapy, acupuncture, yoga, exercise, relaxation, hypnosis, music therapy and aromatherapy.\(^\text{18,19}\)

Limitations of this study were related to the threat of internal validity:

(1) Bias history. That it is possible some respondents at the primiparous puerperal period have frequently obtained massage therapy prior the intervention that may affect the dependent variable. Therefore, the changes in the dependent
variable are not entirely due to treatment or experimentation, but also influenced by the previous experience of the study subjects in terms of massage and aromatherapy.

(2) Selection bias. In this case, it is related to the selection of members of the experimental group and the control group. In other words, the changes in the dependent variable not only because of the effect of treatment, but also due to the influence of education, BMI, age, occupation.

It should be noted that both limitations have actually been sought to be controlled, and the selection of respondents was expected to be ideally matched to each group. Given the above constraints, the researchers have attempted to examine the confounding variables and determine the criteria for inclusion as tightly as possible. Therefore, the results shown in this paper can be assumed as the result from treatments that have been given.

CONCLUSION
Loving massage and aromatherapy were proven as an effective method to reduce stress levels either separately or in a combination. The study noted aromatherapy only could not increase prolactin levels. A combination of loving massage and aromatherapy is recommended to significantly reduce stress and increase prolactin hormone, which eventually will increase milk production.

Declaration of Conflicting Interest
There is no conflict of interest to be declared in this study.

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Authorship Contribution
All authors contributed equally in this study.

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FACTORS AFFECTING HAND WASHING PRACTICE AMONG ELEMENTARY SCHOOLS STUDENTS IN INDONESIA

Nazliansyah¹*, Susheewa Wichaikull², Kanokwan Wetasin²

¹Diploma Nursing Study Program, Politeknik Kesehatan Kementrian Kesehatan Pangkal Pinang, Bangka Belitung, Indonesia
²Kasetsart University, Boromarajonani College of Nursing Nopparat Vajira, Bangkok Thailand

*Corresponding author:
Nazliansyah, S.Kep.NS, MNS
Diploma Nursing Study Program, Politeknik Kesehatan Kementrian Kesehatan Pangkal Pinang
Jl. Melati Kabupaten Belitung, Kepulauan Bangka Belitung 33684, Indonesia
Email: anazfadhlan@gmail.com

ABSTRACT
Background: Hand washing is the most effective method of preventing the transmission of diseases through hands.

Objective: To identify relationships between gender, availability of hand washing facilities, perception of barriers toward hand washing compliance and subjective norm in implementing hand washing practice among students of public elementary school in Belitung district, Indonesia.

Method: A cross-sectional research study was used in this study. Of 309 participants were recruited in 11 public elementary schools from 3 sub districts that has been implemented the hand washing program in Belitung, Indonesia. Purposive sampling method was used to select the participants. This study was used a self-administered questionnaire with minimal interference in order to minimize bias and by emphasizing to the students that this is not an examination.

Results: The results showed that 71.8% of the students were not hand washing properly. It also showed that availability of hand washing facilities and gender were not related with hand washing behavior. In regards of barrier perception toward hand washing compliance also showed that was not related to hand washing practice among elementary schools’ students. However, subjective norm (χ² =4.459, p < .05) was related to hand washing practice among elementary schools’ students.

Conclusion: Subjective norm has a significant relationship to hand washing behavior. Thus, health care provider could develop specific intervention programs based on TPB to promote subjective norm among elementary schools’ students since this norm or perception of norm can motivate hand washing behavior among the students effectively.

Keywords: perception, hand washing, elementary schools, student, related factors
INTRODUCTION

Sixty-two percent and 31% of all deaths of children in Africa and Southeast Asia, respectively, are caused by acute respiratory infection. In addition, the absenteeism among school children due to acute respiratory infection and diarrhea is a major problem in the developing countries. As one of the developing countries, Indonesia also faces these problems and has experienced the impact of the widespread of infection caused by acute respiratory infection and diarrhea.

The NHBR research finding 2013 also reported that Bangka Belitung province with significantly high of incidence of acute respiratory infection and diarrhea in Sumatera region. Belitung, one of the districts located within Bangka Belitung province, currently faces this common problem with acute respiratory infection and diarrhea. In 2013, Health Department of Belitung District revealed that the number of incidences of acute respiratory infection and diarrhea were 33,296 and 1,652 respectively. Environmental Health Risk Assessment (EHRA) reported that in 2014, approximately 23.5% of population living in Belitung district had fallen ill with acute respiratory infection and diarrhea. A study of EHRA in 2014 was revealed that 20% of the households in Belitung were not using soap while washing hands before having meals and after visiting toilets.

Acute respiratory infection and diarrhea are also commonly transmitted within the compound of elementary schools. Crowded settings and lack of self-care awareness, these are the conducive factors for the transmission of microorganisms. Through their contaminated hands micro-organisms are transmitted directly among the children with inanimate objects serving as medium of transmission of diseases. This would imply that these elementary school students could potentially spread the acute respiratory infection and diarrhea unknowingly, and not only among the children themselves but also to the community.

Hand washing is the most effective method of preventing the transmission of diseases through hands. The previous study reported hand washing with clean water and soap was a good intervention resulting in 53% reduction of influenza and diarrhea. In addition, hands hygiene was also specifically recommended for the prevention of diseases with pandemic potential such as severe acute respiratory syndrome. The objective of the study was to identify relationship between knowledge, availability of hand washing facilities, perceived susceptibility of diseases related to hand washing, and perceived seriousness of diseases related to hand washing with hand washing behavior among sixth grade students of public elementary school.

METHODS

A cross-sectional research study was used in this study. 309 participants were recruited in 11 public elementary schools from 3 sub districts that has been implemented the hand washing program in Belitung, Indonesia. Purposive sampling method was used to select the participants with inclusion criteria were as follows: (1) sixth grade students who were studying at the public elementary schools, (2) students who were allowed by their parents or guardian to participate, and (3) students who were willingly volunteer to participate in the study. This study used a self-administered questionnaire with minimal interference in order to minimize bias by emphasizing to the students that this was not an examination.

In this study, availability of hand washing facilities refers to perception of
sixth grade students of public elementary school in Belitung district, Indonesia about sufficiency and accessibility of the infrastructure for supporting hand washing practice including location, hand washing stand, soap, tap water, and clean water. Perceived barriers towards implementing hand washing refers to belief of sixth grade students about the environmental and personal obstacles to perform hand washing behavior such as hand washing stand location, availability of clean water, availability of soap, lack of time, laziness, and possible to forget. Perceived barriers towards implementing hand washing refers to belief of sixth grade students about the environmental and personal obstacles to perform hand washing behavior such as hand washing stand location, availability of clean water, availability of soap, lack of time, laziness, and possible to forget. Subjective norm refers to perception about the expectation of the significant other (parents, teachers, and friends) in performing proper hand washing in the critical time.

The instruments were tested for the content validity and reliability before data collection process. The instrument was examined for content validity by panel of experts. The panel of experts consisted of 3 scholar persons in the areas of pediatric nursing, community health nursing, and health promotion. Panel experts were reviewed and assessed all of items of question by checking the content clarity and content relevance. All three experts were asked to rate the clarity and relevance of the instrument using Content Validity Index Item (CVI-I). The experts were asked to rate each item clarity and relevancy using 4-point rating scale: 1 = not relevant, 2 = items needs revision, 3 = relevant, it takes a bit revision and 4 = very relevant. Panel experts were also welcome to give suggestion and add any other items that important and relevant to the study. The result of content validity index was given by panel experts were 99% for content relevance and clarity. Then, the researcher tested the reliability of the questionnaires. The questionnaire in Indonesia language version was administered to the 30 sixth grade students in one public elementary school of Belitung district. The Cronbach’s alpha coefficient was used to assess internal reliability coefficient (ICR) of hand washing behavior questionnaire since the questionnaire was in multi-point scaled item.

The study was approved by Committee and Ethics Review Board (ERB) Committee for Research Involving Human Research Subjects, Boromarajonani College of Nopparat Vajira, Bangkok, Thailand. The permissions for data collection were obtained from Head of Belitung district Health Department, Head of Belitung district Educational Department, Head of the Elementary Schools selected for data collection, and Head of Public Health Centers (PHC) of each sub-district involved in this study. Data were collected from October to November 2015. The participants were assured that the rights and confidentiality during the study were protected. The participants were informed about the objectives, procedures, and benefits of the study through information sheet. Those parents who were willing to allow their children to participate in this study were signed the informed consent. Then, the participants who were agreed to participate in the study were asked to sign the informed consent. This study was used a self-administered questionnaire. Name, or any identify of students were not filled in the questionnaire. After the participants finishing with the questionnaire, the researcher checked and picked up the completed questionnaires from participants and then kept in the sealed envelope. Data were kept in the locked cabinet and secured computer.

For data analysis, Chi-square test was used to identify the relationships between gender, availability of hand washing facilities, perceived barrier toward hand washing compliance, subjective norm of hand washing and hand
washing behavior among sixth grade students of public elementary schools since the data were nominal scale. Phi statistic was used to examine the strength of the relationships.\textsuperscript{11,12}

RESULTS

The results in Table 1 and 2 showed that participants were male (44.7%) and female (55.3%). Regarding hand washing facilities at the schools, the results shows the majority of clean water, soap, and hand washing stands for hand washing had available at the schools (98.1%, 98.4%, and 85.8%). Furthermore, the reason of participants for did not wash their hands were forgetfulness (68.3%), laziness (11.7%), lack of clean water (8.7%), lack of soap (4.2%), and lack of time (3.2%). About 11.7% of students had high level of perceived barrier toward hand washing compliance followed by the participants who had low level of perceived barriers were 49.5%. The students who had high level of subjective norm of hand washing were 59.5%. The students who had moderate level and low level of subjective norm were 30.1% and 10.4%.

Furthermore, this study showed gender ($\chi^2 = 2.445$, $p > .05$), availability of clean water at schools ($\chi^2 = 1$, $p > .05$) availability of soap at schools ($\chi^2 = 0.623$, $p > .05$), availability of hand washing stands at schools ($\chi^2 = 0.049$, $p > .05$) and perceived barrier ($\chi^2 = 1.985$, $p > .05$) were not significantly related to hand washing behavior. However, the results of this study show subjective norm of hand washing ($\chi^2 = 4.459$) was significantly related to hand washing behavior. The strength of the relationship between subjective norm hand washing behavior was positively weak (Phi = 0.12).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percent</th>
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</thead>
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<tr>
<td>Male</td>
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<td>Female</td>
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<tr>
<td>Low</td>
<td>32</td>
<td>10.4</td>
</tr>
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</table>
DISCUSSIONS

The results showed that there was no relationship between gender and hand washing behavior among sixth grade students of public elementary schools in Belitung district, Indonesia. This finding is inconsistent with the previous studies mentioned that gender was related with hand washing behavior.\textsuperscript{13} The reasons of this finding because the peers’ role was influenced the behavior among students rather than gender. The children who want to fit in peer’s activity, they are also sensitive to influence from their friends.\textsuperscript{14,15}

Regarding availability of hand washing facilities, the results shows that there was no relationship between availability of hand washing facilities and hand washing behavior among sixth grade students of public elementary schools. This study finding was inconsistent with the previous studies mentioned that facilities affected proper hand washing in the schools, including the availability, supplies, functionality of water, soap, and toilets.\textsuperscript{16,17,18} The possible reason of this finding due to the hand washing facilities was placed in the unseen area and uneasy to reach. For example, hand washing stands were not in the front of class, soap were not always available in the washing stands and toilets, even supporting by clean water sufficiency. According to previous study conducted in the schools showed that hand washing compliance was greater when the availability of hand washing facilities was clean and posted in the strategic places could improve awareness and also remind the student to wash hands.

The results of this study showed no relationship between perceived barriers toward hand washing compliance and hand washing behavior among sixth grade students of public elementary schools. In this study even though the students had low level of perceived barriers but only 28.2\% of participants who proper hand washing. The reason of this finding because the students focused on the two critical time of hand washing as the norm in the society including washing hands before eating and after visiting toilet, but they were not always perform hand washing in the other activities, such as every touch of something dirty, after touching animals, and less than 20 seconds as required time.\textsuperscript{17}

The result of this study showed that subjective norms were related to hand washing behavior among sixth grade students of public elementary schools. It was indicated that the increase of subjective norms of hand washing would increase the proper hand washing behavior among sixth grade students of public elementary schools. The results of the study were as expected as the hypothesis and also consistent with the Planned Behavior Theory (TPB) mentioned the greater of subjective norm will engage the people in behavior to decrease the risk. The possible reason of this finding was because the students accepted all components of subjective norm, including parents, teachers, and friends as the

Table 2 Summary Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Proper Hand Washing</th>
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<td>Subjective Norm</td>
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<tr>
<td>Low</td>
<td>Yes 27 (21.6%)</td>
<td>No 98 (78.4%)</td>
</tr>
<tr>
<td>High</td>
<td>Yes 60 (32.6%)</td>
<td>No 124 (67.4%)</td>
</tr>
</tbody>
</table>

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expectation of others who lead them to hand washing behavior.\textsuperscript{18-20}

CONCLUSION

In conclusion, the results of this study showed that 28.2\% of participants washed their hands properly, and majority of participants (71.8\%) did not wash their hand properly. This study also shows that gender and availability of hand washing facilities were not related with hand washing behavior among sixth grade students of public elementary schools in Belitung district, Indonesia. However, the study showed that subjective norm was related with hand washing behavior among sixth grade students of public elementary schools in Belitung district, Indonesia.

According to the findings of this study, health care provider could develop specific intervention programs based on TPB to promote subjective norm among elementary schools’ students since this norm or perception of norm can motivate hand washing behavior among elementary schools’ students effectively. The results of this study could be used as evidence, supporting information, and health education to design programs in nursing curriculum especially in family and community health.

The findings of this study could be applied for the schools that had implemented the hand washing program, may not be generalized to the schools that had not implemented the program of hand washing. Further, the results of this study may not be able as reference of explanation the hand washing behavior in the private elementary schools and in other regions.

Declaration of Conflicting Interest
None declared.

Acknowledgment
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Authorship Contribution
Nazliansyah designed the study, reviewed the concepts, collected data, analyzed data, and drafted the manuscript. Susheewa Witchaiull and Kanokwan Wetasin were the study advisors of Nazliansyah.

References

THE LIFESPAN OF NURSING EDUCATION IN CAMBODIA

Virya Koy*

President of Cambodian Council of Nurses
Chief of Bureau of Nursing and Midwifery, Ministry of Health, Phnom Penh, Cambodia

*Corresponding author:
Virya Koy, PhD (Cand), MNSc., MHPEd., SNAE., NHD., RN
Bureau of Nursing and Midwifery, Ministry of Health, Kampuchea Krom (St.128), Phnom Penh, Cambodia
Email: Virya2403koy@gmail.com

ABSTRACT
This paper aims to explain the lifespan of nursing education in Cambodia, which has been up and down for over 66 years. The journey of Cambodian nursing education is fulfilled by many challenges faced by nursing leaders in the country, including the challenges caused by the decades of civil war devastated Cambodian society. It takes high responsibility and needs more powers, skills, and commitments to produce competent professional nurses to fulfill the tasks in the clinical settings through nursing education, and it is characterized by the progress in responding societal needs of the society.

Keywords: nursing education, Cambodia, Asean community

INTRODUCTION
Over 66 years, nursing education in Cambodia has been turbulence based on the challenging issues, which has been up and down along the periods of the time. It took about 300 years after Angkor Wat Empire was built up. Nursing education is characterized with progress in responding to societal needs of the country. Decades of civil war devastated Cambodian society - its infrastructure, education and particularly the health system. Many health professionals and other intellectuals were murdered or forced from the country, and health professional schools were closed. While health services delivery has been improved, resulting in improved health care for the rural poor and the most vulnerable, with some of the worst human development indicators in South East Asia.

It is the responsibility of all nursing educators and leaders to shape nursing education to produce qualified nurse educators in order to produce nurse leaders and practitioners of tomorrow. Through carefully determined pedagogy and curriculum, nurse educators can engage students in important ways: ways that will fully prepare students to shape and partake in the emerging primary health care system, a system founded on respect, understanding and a keen awareness of the...
social determinants of health. A system that will rely on nurses that know how to effectively lead change, and truly promote health, healing, and wellness in the diverse populations we serve.

**HISTORY OF NURSING EDUCATION IN CAMBODIA**

Cambodian has a long history of nursing education since 1950. Recognizing the importance of good nursing care to a patient’s well-being, the physicians initiated the courses for those who were interested in nursing.

The history of nursing is intertwined with the history of nursing education and nursing’s quest for a professional identity. Education has been vital in providing the knowledge, skills, and ability to give quality care to our patients, elevating nursing to a profession and gaining the respect of other professions. Physicians, while recognizing the need for nursing care, feared that if nurses were given too much education the nurse would supplant them. These were challenges that nurses needed to overcome. Given the enormous challenge, slowly, nurses have risen to the challenges. Thus, the profession of nursing was built.

This nursing educational history encourages understanding in defining professional identity in Cambodia. As such, it is relevant to current nursing practice. In so doing, it is needed to give a sense of professional identity, a useful methodological research skill, and a context for evaluating information.

<table>
<thead>
<tr>
<th>Year</th>
<th>Description of education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>• First nursing school was founded 2 years general nursing course was commenced</td>
</tr>
<tr>
<td>1960</td>
<td>• Nursing training curriculum was expanded to be a 3-year diploma program</td>
</tr>
<tr>
<td>1975</td>
<td>• Nursing school closed down by “Khmer Rouge regime”</td>
</tr>
<tr>
<td>1979</td>
<td>• Primary nursing started</td>
</tr>
<tr>
<td></td>
<td>• Primary midwife course commenced</td>
</tr>
<tr>
<td>1980</td>
<td>• 3-year program for secondary nurses and midwifery started</td>
</tr>
<tr>
<td>1983</td>
<td>• 2-year bridge course for primary nurse to secondary nurses started</td>
</tr>
<tr>
<td>1989</td>
<td>• 1-year primary nurse and primary midwife program were started</td>
</tr>
<tr>
<td>1991</td>
<td>• 2-year anesthesiology course was introduced, and closed on 1999</td>
</tr>
<tr>
<td></td>
<td>• 1-year dental nursing course</td>
</tr>
<tr>
<td>1994</td>
<td>• New 3-year nursing curriculum for secondary nurses started</td>
</tr>
<tr>
<td></td>
<td>• New 3-year midwifery curriculum for secondary midwives started</td>
</tr>
<tr>
<td>1995</td>
<td>• 3+1-year secondary nurse and midwife curriculum started</td>
</tr>
<tr>
<td>1997</td>
<td>• 2-year bridge course from primary to secondary nurse and midwife</td>
</tr>
<tr>
<td>1998</td>
<td>• New nursing curriculum revised for ADN.</td>
</tr>
<tr>
<td></td>
<td>• 1-year program of basic eye nurse started</td>
</tr>
<tr>
<td>1999</td>
<td>• 1.5-year psychiatric/mental health nursing course was commenced</td>
</tr>
<tr>
<td>2003</td>
<td>• 1-year program for nurse manager, closed 2006</td>
</tr>
<tr>
<td>2008</td>
<td>• Curriculum of bachelor of science in nursing (4-year program)</td>
</tr>
<tr>
<td>2013 February</td>
<td>• Bridging course from ADN to BSN (2-year program) started.</td>
</tr>
</tbody>
</table>

**NURSING EDUCATION SYSTEM**

Public nursing schools are under the Ministry of Health, and private nursing schools and military schools are under Ministry of Education and Youth. Since 1950 until 1975, there was only one nursing school around Cambodia. After 1979, the Khmer Rouge Regime collapsed...
and the new government started the improvement of infrastructures and education systems. Nursing education was the one, which the new government concentrated on and opened. By 1996, approximately 5 regional nursing schools were in operation in the country. These programs followed a fairly typical pattern. Each nursing school was either affiliated with or owned by a physician. Students received two to three years of training. While in the program students carried out the majority of patient care activities offered in the hospital, receiving only a modicum of classroom education in the form of lectures on patient care and related subjects. At the end of the educational program, students received a diploma and were eligible to seek work as a trained nurse. Currently, there have been 16 nursing schools in Cambodia.

NURSING EDUCATION CURRICULUM

There are three types of nursing programs for students, such as primary nurse, Associate Degree in Nursing (ADN), and Bachelor of Science in Nursing (BSN). In addition, BSN is divided into two programs: (1) students hold diploma of general school, they take national entry exam to study 4-year program, (2) ADN’s graduates take national entry exam to enroll for 2-year program. Although, primary nursing program is not mandated to do national exit exam and registration. However, ADN and BSN are mandated to do national exit exam and registered for getting license to practice.

Primary Nursing Program. This program offers 1-year academic program. The students require having diploma of general education. After 2 years of graduation, primary nurses can continue to associate degree in nursing program. The graduates of this program must continue in second year of ADN.

Associate Degree in Nursing Program. Government and private universities offer associate degree in nursing programs, designed to be completed in three academic years by a full-time student whom has diploma of general education as required.

Bachelor of Science in Nursing. There are two programs are conducted in Cambodia: 1) The 4-academic year program (full-time), for those who have a diploma of general school as required. Graduates are able to provide nursing care to individuals of all ages and families from diverse cultural backgrounds in any setting offering health care services. Health promotion, health maintenance, disease prevention and teaching are emphasized in all clinical settings. In addition, careful attention is paid to the skills needed in the treatment of the acutely ill, geriatric populations, and populations at risk. 2) Bridging course program has been developed from associate degree in nursing to bachelor of science in nursing. This curriculum has been designed for 2-year program.

NURSING EDUCATION ISSUES

There are some issues in nursing education as follows: 1) In the current situation, mostly our nurse educators are ADN preparation; 2) There are two different types of faculty who teach at every nursing school. Most faculty members work part-time, but there is only the government nursing school that has more full-time faculty jobs. 3) Most nurse educators do not have extensive clinical experience, therefore, they cannot keep their own experiences, which lead to lack of effective clinical preceptorship for nursing students; 4) With experience, nurse educators can be advancing to administrative roles, managing nurse education programs, writing or reviewing.
textbooks, and developing continuing education programs for working nurses. Finally, the shortage number of faculty member is another concern.

In addition, as the Ministry of Health year 2001 mentioned that nurse educators must have higher degree than the class that they teach. In this regard, nurse educator is at least holding bachelor of science in nursing for teaching associate degree in nursing program, and at least holding master degree preparation to teach bachelor program.

CHALLENGES IN NURSING EDUCATION

Aligning education with clinical practice. As a critical component of the healthcare industry, the nursing profession must keep pace with changes in the healthcare system to insure the continued delivery of high quality, safe, and effective patient-centered care. To stay current, new nurses must be educated and equipped with relevant and appropriate competencies, knowledge, skills, and attitudes. The clinical learning environment remains the single most important resource in the development of competent, capable, and caring nurses. It is almost the same statement with American Nurses Association, which stated, “The public has a right to expect registered nurses to demonstrate professional competence throughout their careers. ANA believes that it is the nursing profession’s responsibility to shape and guide any process for assuring nurse competence. Assurance of competence is the shared responsibility of the profession, individual nurses, professional organizations, credentialing and certification entities, regulatory agencies, employers, and other key stakeholders.”

Improvement of nursing educators. Quality education is dependent on well-prepared faculty members. Faculty development and faculty vacancies are critical challenges in nursing education. The nursing shortage poses a significant threat to healthcare delivery in the future. Insufficient capacity in nursing schools is a major contributor to the shortage of nurses and the shortage of nursing faculty is a major cause of the capacity constraints. In addition to increasing both quantity and quality the number of faculty members are able to incorporate evidence-based teaching practices more effectively and teach nursing students the skills that will be required. Nursing schools require faculty members who are experts in nursing education and who must possess the knowledge to serve in an advanced practice role. Furthermore, deans of schools of nursing are needed to complement these experts and act to create systems that value and reward expertise in nursing education. Finally, faculty members need to be prepared to retain clinical skills to guide nursing students to practice according to the school learning goals.

Promoting BSN, Master and PhD level. Across the nation, BSN nurses at each level of health care facilities are needed rather than ADN nurses. In order to achieve this promotion, each health facility has to facilitate nursing staffs, which they want to seek bridging course from ADN to BSN. Furthermore, the acceleration of baccalaureates to Master and PhD of Science in nursing programs is much needed. Therefore, expert nurses that can work at specialty areas of practice can exist.

Improvement of faculty shortage. The faculty shortage is very crucial. One of the challenges is that hospital directors may send some staff to nursing schools, and then those nursing schools teach those staff how to be clinical faculty members. This kind of academic practice exchange is gaining prominence in nursing education
as a vehicle for bridging educational preparation and professional practice. Collaboration between academic institutions of nursing and hospitals or clinical agencies is a mean of solving critical problems facing educators and clinicians. They believe that academic-practice exchange can be an effective mean for helping to address workforce shortages and that policymakers should foster such partnerships.

**Regulation and laws.** A common thread of most approaches to nursing education involves existing laws and regulations. The reflection on language and cultural diversity are needed to develop understanding of values and beliefs.

**CONCLUSION**

As a part of the ASEAN economic community, Cambodia faces greater challenges to increase the quality of nursing education. Cambodian nursing education was started as 1-year program in 1950, and currently it has been upgraded to Bachelor of Science in Nursing.

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WHAT IS THE CENTRAL UNIFYING FOCUS IN NURSING?

Joko Gunawan*

Diploma Nursing Study Program, Politeknik Kesehatan Kementrian Kesehatan Pangkal Pinang, Bangka Belitung, Indonesia

*Corresponding author:
Joko Gunawan, RN
Diploma Nursing Study Program, Politeknik Kesehatan Kementrian Kesehatan Pangkal Pinang
Jl. Melati Kabupaten Belitung, Kepulauan Bangka Belitung 33684, Indonesia
E-mail: joe_gunawan@ymail.com

Dear Madam,

There are many perspectives from different standing points with distinguished context of truths in nursing, some philosophers may hold multiple truths, and others hold only one truth. However, truth in nursing is assumed in the eye of beholders, which means multiple perspectives are appropriate for knowledge development in nursing.¹ There are no less than nine different philosophical orientations identified have some relevance to nursing knowledge development, including empiricism, pragmatism, paradigmatic historicism, and science as a problem solving, feminism, phenomenology, hermeneutics, critical theory, and post-structuralism. It is indicated that a plurality of philosophies maybe necessary to reflect the many facets of nursing science.²

Nevertheless, some philosophers argue that as long as the multi worldviews have been embraced by nursing as the basic of conception, nursing knowledge would be fragmented because of a plurality of nursing conceptualism.³ In addition, Claxton⁴ mentioned, “we are like the inhabitants of thousands of little islands, all in the same part of the ocean, yet totally out of touch with each other”.⁴ Thus, Meleis⁵ suggested that to avoid being forever fragmented and divided, the integration of different perspectives is needed,⁵ which is also supported by Newman who also agreed with multi-perspectives, but convincing to a unitary-perspective for nursing.⁶ At this point, it can be drawn that multi-paradigms for nursing are accepted, but the same location/unified conceptualization need to be centered.

It is similar with Roy’s view of Unity in Diversity and Universal Truth,⁷ a way to bridge multiple approaches in nursing. The belief in the existence of universal truths is the idea that no simple insight is enough, in and of it self, to
disclose the whole truth, which believed that this broadened perspective is what makes nursing’s multiple ways of knowing accessible to other disciplines. Unity is due to logic of truth, nursing as a discipline is obligated to monitor whether its propositions cohere and are compatible with propositions known to be true inside and outside the discipline. However, to find the unity in diversity is dependent on the level of awareness of human. There are two things happens when one raises the level of awareness: 1) one’s perception of multiplicity dissolves, while at the same time, each level is reflecting all others. Similarly, if one examines a human being from a microscopic level, one sees a multitude of cells, 2) but if one raises the level of awareness to the whole person, one sees just one person. Consequently, one can possess both unity and plurality at the same time. In the process, one can choose to focus on separatness or unity.

In line with that, there are some concepts have been proposed to be the central focus of the profession of nursing, such as caring and human health experience (Newman and colleagues), human living (Kim), and human dignity (Jacobs). However, Willis et al. said that, those concepts could not mark the end of our search for clarification in nursing’s evolution because many facets of nursing knowledge require further development. Willis then offers a central unifying focus, which consists of facilitating humanization, meaning, choice, quality of life, healing, living and dying. These concepts may address the essential points in nursing, but may be overlapping in some parts; for instance, the concept of choice can be a part of facilitating humanism. Humanism is knowing and engaging human as a whole, including the choice of human, life experience, belief and quality of life, which are practiced by nurses to patients. Although Willis et al. mentioned that the concepts are interrelated and integrated, it may be a bit challenging to understand each concept. Therefore, the meaning of central-unifying focus in nursing needs further clarification.

To clarify its meaning, the concept of caring might be needed to consider as the essence of nursing and the central, dominant, and unifying focus of nursing. But caring does not mean to control, in the form of addictive co-dependency. Caring means depending on where you are (time, space, culture), one’s level of development (e.g. training, experience, education), and the situation (e.g. disaster, high pressure situation, relax, etc.), including consideration of patient’s (subjective) perspective and nurses’ (objective) perspective. An understanding and awareness of what it means to care, and be cared for, from different perspectives also provides a solid foundation to guide ethical decision-making. Thus, caring is considered as a central unifying focus for nurses, dependent on environment, nursing competency, and the context of situation.

However, because there are different perspectives among nursing philosophers, it raises the question again “What is the central focus in nursing actually? Does nursing need a central focus or keep holding multiple truths?” The discussion about it should be raised, and I remark that “The central unifying focus addresses unitary human-natural world phenomena of concern in nursing practice and provides a basis for conceptual progress in the discipline”.

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