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ORIGINAL RESEARCH

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LAVENDER (*LAVANDULA ANGUSTIFOLIA*) AROMATHERAPY AS AN  
ALTERNATIVE TREATMENT IN REDUCING PAIN IN PRIMIPAROUS  
MOTHERS IN THE ACTIVE FIRST STAGE OF LABOR

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ABSTRACT

**Background:** Labor and childbirth is an extremely painful process. Aromatherapy is considered as one of the nonpharmacological methods to reduce labor pain.

**Objective:** To determine the effect of lavender (*Lavandula Angustifolia*) aromatherapy on the level of pain in primipara in the first stage of labor.

**Methods:** A quasi-experimental research with pretest and posttest design with control group conducted between October until November 2016. Forty respondents selected using consecutive sampling, which 20 assigned in each group. a Numerical Rating Scale (NRS) pain scale was used. Paired and independent t-test were used for data analyses.

**Results:** The results showed that the p-value of labor pain after intervention was 0.000 ( $<0.05$ ), which indicated that there was statistically mean difference of labor pain between intervention group (6.10) and control group (4.05) in primipara in the first active stage of labor.

**Conclusion:** The women in the lavender aromatherapy group reported lower intensity of labor pain. The intervention study could be practiced in the community health centers for pregnant women in order for them to apply this healing method.

**Keywords:** labor pain, lavender aromatherapy, primipara

INTRODUCTION

Despite being a natural process, labor and childbirth is an extremely painful process.<sup>1</sup> Many women are fearful and anxious about the pain, which lead to excessive release of hormones such as catecholamines and steroids that can cause

tension of smooth muscle and vasoconstriction of blood vessels.<sup>2</sup> This can decrease uterine contractions, blood flow, and oxygen to the uterus, and the onset of uterine ischemia that leads to more pain. The long-term pain causes

hyperventilation with respiratory frequency 60-70 times per minute, decreases the maternal PaCO<sub>2</sub> level, and increases the pH. If the mother's PaCO<sub>2</sub> levels are low then the fetal PaCO<sub>2</sub> levels will be low too, then resulting in deceleration of the fetal heart rate. In addition, pain causes uncoordinated uterine activity and leads to prolonged labor that can ultimately threaten fetal and maternal life, and leads to increased systole blood pressure resulting in the potential for cardiogenic shock.<sup>3</sup>

Intensity of labor pain in primiparas is often more severe than labor pain in multiparas. It is because multipara mothers experience cervical thinning coinciding with cervical dilatation, while in primipara the cervical thinning process occurs earlier than cervical dilatation.<sup>4</sup> This process causes the intensity of the primiparous contraction to be more severe than multiparous, especially in the first stage of labor. Preliminary survey during October - December 2015 in the working area of the Community Health Center of Delitua showed that there were 42.55% of primigravida had normal duration of the first stage of labor (10-14 hours), 27.65% of primigravida had more than 14 - 20 hours duration, and 10.63% of primigravida had more than 20-24 hours duration of the first stage of labor. Therefore, the intervention to reduce pain that leads to long-term duration of the stage of labor in primipara is needed.

Aromatherapy is one of the interventions considered as an alternative therapy to reduce the pain in primipara. Aromatherapy is a therapy that uses essential oils to help improve or maintain health, encourages, refreshes and awakens body spirit.<sup>5</sup> Lavender (*Lavandula angustifolia*) is one of the essential oil-producing flowers, which can be used for aromatherapy with the main components

of linalool oil (51%) and linalyl acetate (35%).<sup>6</sup> Lavender is also the most popular and safest oil to use, which can increase alpha waves in the brain and help to create a relaxed state and reduce anxiety.<sup>7</sup> Mothers who are undergoing birth, soaking with lavender oil can reduce pain in the perineal area and reduce anxiety.<sup>7</sup>

Research on the effect of aromatherapy using lavender had been studied in Kediri Indonesia, and it is proven effective in reducing pain in mothers during the first stage of labor.<sup>8</sup> However, it is assumed that the aromatherapy might not affect all mothers in Indonesia, due to different taste in using lavender for treatment. Besides, bigger sample size is presented in this study. Therefore, the study aimed to determine the effect of lavender as aromatherapy in reducing pain in mother during the first stage of labor in Deli Serdang, North Sumatera, Indonesia.

## METHODS

### *Design*

A quasi experimental research with pretest and posttest design with control group.

### *Setting*

The research was conducted for 2 months between October until November 2016 in the Labor Clinic in the working area of the Community Health Center of Delitua in Deli Serdang Regency.

### *Sample*

Forty respondents selected using consecutive sampling, which 20 assigned in each group. The inclusion criteria included the primigravida in the first active phase of labor (cervix is dilated from 4-10 cm), the height of fundus uteri was 32 cm - 38 cm above the symphysis,

presentation of the back of the head, and willing to be respondent.

#### *Instruments*

A research instrument to measure pain used a Numerical Rating Scale (NRS) pain scale in the range of 0-10, which indicates that 0 refers to no pain, 1-3 refers to mild pain, 4-6 moderate pain, and 7-10 refers to severe pain.<sup>9</sup> Pain was measured before and after intervention.

#### *Intervention*

Lavender essential oil was used as aromatherapy in 10 ml of each pack. The lavender aromatherapy has been applied in the electric aromatherapy diffuser, which was turned on for 5 minutes in an intervention room. When the room was ready, then the researcher invited the respondents to the room for 30 minutes.

#### *Data analysis*

There was no difference in characteristics of the respondents and labor pain with p-value <0.05. Paired and independent t-test were used for data analysis to determine

the influence of lavender aromatherapy on the level of pain in primigravida. Chi square test was also performed for testing confounding factors.

#### *Ethical consideration*

The study permission was obtained from Department of Health of Deli Serdang and the Community Health Center of Delitua. The study has been approved by the Ethical Research Committee with No. 278/KEPK/Poltekkes-Smg/EC/2016. The researchers have confirmed that each respondent have obtained an appropriate informed consent.

## **RESULTS**

Table 1 shows that the average of age of respondents in the intervention and control group was 23 years old, and the cervix dilation was 6. There were no effects of age and cervix dilation on labor pain as the result of chi square with p 0.855 for age, and p 0.314 for cervix dilation (<0.05).

**Table 1** Age and cervix dilation of the respondents and its influence on labor pain

| Group           | N  | Mean  | SD    | Min. | Max. | Median | P-value (Chi Square) |
|-----------------|----|-------|-------|------|------|--------|----------------------|
| Age (Year)      |    |       |       |      |      |        |                      |
| Intervention    | 20 | 23.55 | 2.16  | 20   | 27   | 24     | 0.855                |
| Group           | 20 | 23.70 | 2.92  | 20   | 29   | 24     |                      |
| Cervix Dilation |    |       |       |      |      |        |                      |
| Intervention    | 20 | 6.10  | 1.210 | 4    | 8    | 6      | 0.314                |
| Group           | 20 | 5.65  | 1.599 | 4    | 8    | 5      |                      |

**Table 2** Anxiety level in the primigravida mothers and its influence on labor pain using chi-square test

| Group        | N  | Mild |    | Moderate |    | P-value (Chi Square) |
|--------------|----|------|----|----------|----|----------------------|
|              |    | N    | %  | N        | %  |                      |
| Intervention | 20 | 8    | 40 | 12       | 60 | 0.114                |
| Group        | 20 | 7    | 35 | 13       | 65 |                      |

Table 2 shows that 40% of respondents in the intervention group had

mild anxiety and 60% had moderate anxiety, while 35% respondents in the

control group had mild anxiety and 65% of them had moderate anxiety. There was no significant influence of anxiety on

labor pain with p-value of chi square result 0.114 ( $<0.05$ ).

**Table 3** Fatigue in the primigravida mothers and its influence on labor pain using chi-square test

| Group        | N  | Yes |    | No |    | P-value<br>(Chi Square) |
|--------------|----|-----|----|----|----|-------------------------|
|              |    | N   | %  | N  | %  |                         |
| Intervention | 20 | 12  | 60 | 8  | 40 | 0.527                   |
| Group        | 20 | 10  | 50 | 10 | 50 |                         |

As shown in the Table 3, 60% of respondents in the intervention group and 50% in the control group had fatigue.

There was no significant influence of fatigue on labor pain with p-value of chi square result 0.527( $<0.05$ ).

**Table 4** Distribution of Labor Pain in the in the intervention and control group using independent t-test

| Pain      | Group        | Mean | Mean Difference | t     | P-value |
|-----------|--------------|------|-----------------|-------|---------|
| Pre-test  | Control      | 6.55 | -0.30           | -0.88 | 0.381   |
|           | Intervention | 6.85 |                 |       |         |
| Post-test | Control      | 6.10 | 2.05            | 5.72  | 0.000   |
|           | Intervention | 4.05 |                 |       |         |

Table 4 shows that the mean of pain during pre-test between intervention and control group had no difference with p-value 0.381 ( $p <0.05$ ), while p-value of pain after intervention was 0.000 ( $<0.05$ ),

which indicated that there was statistically mean difference of labor pain between intervention (6.10) and control group (4.05).

**Table 5** Effect of lavender aromatherapy on labor pain in the intervention and control group using paired t-test

| Pain                    | Mean  | SD    | t     | P-value |
|-------------------------|-------|-------|-------|---------|
| Control (Pre-Post)      | 0.450 | 0.945 | 2.13  | 0.046   |
| Intervention (Pre-Post) | 2.800 | 1.196 | 10.46 | 0.000   |

Table 5 shows that the mean of pain before and after intervention in the control group was 0.450 with t count 2.13 and p-value 0.046 ( $<0.05$ ), while the mean of pain before and after intervention in the intervention group was 2.800 with t count 10.46 and p-value 0.000 ( $<0.05$ ), which indicated that there was a significant effect of aromatherapy in the intervention group and standard treatment in control group on labor pain. However, the higher decrease of pain was in the intervention

group compared to the decrease of pain in the control group.

## DISCUSSION

Age factor, cervical dilation, anxiety level, and maternal fatigue are often associated with pain before childbirth.<sup>10,11</sup> Therefore, suitable planning and performing midwifery interventions to control the pain during delivery seem to be necessity. However, the result of the present study showed that these factors

have not been associated with labor pain.

The results of this study revealed that there was a significant difference of labor pain before and after lavender aromatherapy. This finding supports the finding of the previous study that shows a significant influence of lavender aromatherapy to reduce maternal pain during the first stage of labor.<sup>12</sup> A semi-experimental clinical trial found that women who were treated with lavender aromatherapy during labor reported a lower intensity of pain than women in a control group.<sup>1</sup> Similar with study of Kaviani revealed that The mean of pain intensity perception in the aroma group was lower than that of the control group at 30 and 60 minutes after the aromatherapy intervention ( $p < 0.001$ ).<sup>13</sup> However, the result of this study was in contrast with the Burns et al study who reported that aromatherapy scent had little effect on the pain realization of the primiparous women.<sup>14</sup> Similar with Yazdkhast revealed that there was no difference in mean duration of the active phase of labor.<sup>15</sup>

Aromatherapy affects the body in three ways: pharmacological effects of the hormones and enzymes that can cause chemical changes in the body; psychological effects, including relaxation and sedative effects on the body; and physiological effects resulting from the brain's response to inhaling aromas.<sup>13,16</sup> The studies conducted on the issue have shown that lavender aroma might suppress the activity of the sympathetic nervous system.<sup>13,17</sup> Volatile compounds may enter the bloodstream through the nasal or lung mucosa, or directly diffuse into the olfactory nerve and pass up to the limbic system which can influence the sympathetic nervous system.<sup>18</sup>

The results of this study indicated that the lavender aromatherapy fits with

the primiparous women in the North of Sumatera Indonesia and has proven effective in reducing labor pain.

## CONCLUSION

According to the results of this study, the women in the lavender aromatherapy group reported lower intensity of labor pain. This intervention study could be practiced in the community health centers for pregnant women in order for them to apply this healing method.

## Declaration of Conflicting Interest

None declared.

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## Author Contribution

All authors contributed equally in this study.

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