

# The Influence of Cinnamon (*Cinnamomum Burmanni*) Aromatherapy Treatment to Dysmenorrhea for Female Students at Air Batu Senior High School in 2021

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## ABSTRACT

### BACKGROUND

Adolescence is one of the life periods to find the self - identity and prepare to be an adult. *Cinnamomum burmanni* including in *Lauraceae* Family is one of Indonesia's seasonings and one of the oldest herbal medicines. Based on research implemented to the humans and animals, it resulted many advantages. One of them is cinnamon (*Cinnamomum burmanni*) extract oil has anti-inflammatory activity applying as a dysmenorrhea treatment and capable to stop bleeding.

### AIM

The study aimed to find out the influence of cinnamon (*cinnamomum burmanni*) aromatherapy treatment to dysmenorrhea for female students at Air Batu Senior High School in 2021.

### MATERIALS AND METHODS

The research type used was pre - experimental design. This study used one group pre - test and post - test design without control group. The research was carried out at Air Batu Senior High School located in Air Batu Sub District Asahan District. The population were all female students of grade X, XI, dan XII having dysmenorrhea as 80 students. There were 28 of grade X, 30 of grade XI and 22 of grade XII. The sampling technique was purposive sampling. The total sample was 44 respondents. Wilcoxon test was used to find the relation between two variables by 95 % of confidence coefficient.

### RESULTS AND DISCUSSION

The output of this study was to find out a significant of the influence of cinnamon (*cinnamomum burmanni*) aromatherapy treatment to dysmenorrhea for female students at Air Batu Senior High School in 2021. The outputs of statistical tests using the Wilcoxon test inform that  $p < \alpha$  as  $0.000 < 0.05$ . The output explains that cinnamon (*cinnamomum burmanni*) aromatherapy treatment in effective in reducing dysmenorrhea pain level for female students at Air Batu Senior High School in 2021.

### CONCLUSION

The suggestion of the study can be applied as an intervention in nursing care of dysmenorrhea by *cinnamomum burmanni* aromatherapy treatment as one of non-pharmacological alternative treatment.

### KEYWORDS

*Cinnamomum Burmanni* Aromatherapy Treatment, Dysmenorrhea Primary

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## INTRODUCTION

Diabetes Adolescence is one of the life periods to find the self - identity and prepare to be an adult. The peak of female adolescent growth occurs around 12 - 18 months before experiencing the first menstruation (menarche) or around the age of 10 - 14 years. During menstruation, young women sometimes experience pain. The pain level is varied from low to high. This condition is dysmenorrhea. The pain will impact the daily activities, particularly to the female students since it can disturb the learning activities at school. Menstrual pain or Dysmenorrhea Primary (DP) is a gynecological complaint with high pain cramp symptoms in the lower abdomen compounded by sweating, dizziness, nausea, vomiting, and diarrhea. DP usually lasts for 1 - 2 days during the menstrual process. Due to the pathogenesis, dysmenorrhea is divided into two types, *i.e.* dysmenorrhea primary and dysmenorrhea secondary. Dysmenorrhea primary is defined as pelvic pain occurring during menstruation without pelvic abnormalities. While secondary dysmenorrhea secondary is generally caused by disorders of the reproductive system including endometriosis, uterine myomas, adenomyosis, cervical stenosis, pelvic inflammatory disease, and pelvic adhesions.<sup>1</sup> WHO (World Health Organization) in 2015 mentioned that UK Hospitals found the dysmenorrhea prevalence occurring 8.8 % on 21 - 41 years old group, 94 % on 10 - 20 years group. Another study implemented on 1.018 junior high school female students in Japan found that 46.8 % had moderate dysmenorrhea and 17.7 % had high dysmenorrhea. The most age group experiencing dysmenorrhea is of 12 - 15 years old group. Dysmenorrhea becomes the main cause of female students' absence at school.<sup>3</sup> The dysmenorrhea incidences in Indonesia are 64.25 % consisting of 54.89 % dysmenorrhea primary and 9.36 % secondary dysmenorrhea secondary.<sup>4</sup> While from 175 high school female students studied in the North Sumatera, there were 93.8 % experiencing dysmenorrhea including 73.1 % moderate dysmenorrhea.<sup>5</sup> DP impacts the emotional conflict, stress, and discomfort to the female teenagers. It will impact the skill and ability. The learning process can be disturbed and less concentration affecting the learning process. The students are difficult to receive the lesson because no concentration.<sup>6</sup> the dysmenorrhea primary is the painful rose from the first of menstrual period. It will recover after the hormone is stable. Menstrual pain felt without genitals abnormalities is a normal condition. This condition occurs to the women in the menstrual periods. The dysmenorrhea impact the pain. The pain felt is varied from low to medium. The pain felt is the spasms in the lower abdomen distributing to waist and thighs. This condition is affected by the uterine muscle spasms and insufficient bloodstream. This condition impacts the activities, particularly the school activities. The students can consume pharmacological therapy to relieve pain as a treatment option. This therapy has side effect, it can obstruct the Cyclooxygenase (COX) enzyme affecting prostaglandin synthesis inhibition, kidney function and gastric mucosal defense.<sup>7</sup> In addition to pharmacological

therapy, there are another methods implemented in reducing dysmenorrhea level without consuming the medicines. One of the methods is non - pharmacological therapy by using cinnamon (*cinnamomum burmanii*). Cinnamon (*cinnamomum burmanii*) including seasoning containing flavorful, sweet and spicy. It contains essential oils, resins and linders. It is also effect if as analgesic, somatic and aromatic. It also becomes aromatherapy.<sup>8</sup> The aromatherapy mechanism of the human body consists of two physiological systems *i.e.* circulation system and the smell system. The fragrances can psychological, memory and emotion conditions. The smelling process is divided into 3 phases, starting from the smell molecules entrance to the olfactory epithelium, then the smell will be transmitted as a message to the olfactory center located behind the nose, finally the various neuron cells will recognize the smells and deliver them to the limbic system be sent to the hypothalamus for processing. By using response delivery carried out by the hypothalamus, all the elements of the essential oil will be delivered by the circulation system and chemical organs to the organs required.<sup>9</sup> *Cinnamomum burmanni* including in *Lauraceae* Family is one of Indonesia's seasonings and one of the oldest herbal medicines. Based on research implemented to the humans and animals, it resulted many advantages. One of them is cinnamon (*cinnamomum burmanni*) extract oil has anti - inflammatory activity applying as a dysmenorrhea treatment and capable to stop bleeding. Cinnamon bark is spicy, sweet, smells good, and warm. Several chemicals containing cinnamon are essential oils, eugenol, safrole, cinnamaldehyde, tannin, calcium oxalate, resin and tanning substances. The pharmacological effects caused by cinnamon are antirheumatic, appetite enhancer and pain reliever. The main components of essential oil made from cinnamon sticks are Cinnamaldehyde (55 - 57 %) and eugenol (5 - 18 %). Cinnamaldehyde is proven containing antispasmodic effects. In addition, eugenol can prevent prostaglandin biosynthesis and reduce inflammation. Cinnamon also contains vitamins, *i.e.*, vitamin A, thiamin, riboflavin and ascorbic acid.<sup>10</sup> this study is in line with the research carried out by.<sup>11</sup> resulted that cinnamon extract and honey can reduce the menstrual pain of dysmenorrhea primary. The indicator used were pain level indicator using NRS (NUMERIC RATING SCALE) as p - value = 0.000 and prostaglandin levels (P - value = 0.003). This study is also in line with.<sup>12</sup> The output using an independent t - test statistical test explaining that dysmenorrhea primary scale with an average pain scale reduction was 1.18 and p = 0.000. The cinnamon (*cinnamomum burmanni*) aromatherapy by using inhalation can be used as an alternative therapy in reducing dysmenorrhea primary. The initial study conducted at Air Batu High School to 10 students consisting of 3 students in grade X, 3 students in grade XI and 4 students in grade XII. All students were online interviewed; the data was obtained from the school. From the total of 10 students, all students never come to the

school when occurring dysmenorrhea on their menstrual periods before the pandemic, they always consume medicine to reduce the pain. When interviewed by video call, they mentioned that they never receive the information before that there is another method used to reduce the pain, particularly by using cinnamon (*Cinnamomum Burmanni*) aromatherapy. Based on the above background, the researchers were interested in conducting study on the influence of cinnamon (*cinnamomum burmanni*) aromatherapy treatment to dysmenorrhea for female students at Air Batu Senior High School in 2021.

**Research Question**

Due to the previous background, the researcher can formulate the question of this study. The question is "are there any the influence of cinnamom (*cinnamomum burmanni*) aromatherapy treatment to dysmenorrhea for female students at Air Batu Senior High School in 2021?".

**MATERIALS AND METHODS**

**Research Method**

The research type used was pre - experimental design. This study used one group pre - test and post - test design without control group. The research was carried out at Air Batu Senior High School located in Air Batu Sub District Asahan District. The population was all female students of grade I, II, and III having dysmenorrhea as 80 students. There were 28 of grade X, 30 of grade XI and 22 of grade XII. The sampling technique was purposive sampling. The total sample were 44 respondents. Wilcoxon test was used to find the relation between two variables by 95 % of confidence coefficient.

**RESULTS**

**General Description**

The research was carried out at Air Batu Senior High School located in Air Batu Sub District Asahan District. This school is led by Drs. Roban as the headmaster. There are 16 government staff teachers. There were 181 students of Grade X, 171 students of Grade XI, and 181 students of Grade XII. There are 80 female students occurring dysmenorrhea during their menstrual periods consisting of 28 of Grade X, 30 of Grade XI, and 22 of Grade XII. The sampling technique was purposive sampling. The total sample was 44 respondents occurring dysmenorrhea in every menstrual period.

**Respondents' Characteristic**

The study was implemented to 44 respondents by treating cinnamon aromatherapy during 15 minutes in dysmenorrhea condition. The respondents' characteristic can be explained as below (Table 1).

No	Demographics Data	Frequency	Percentage (%)
1	Age		
	15 years old	6	14

	16 years old	20	46
	17 years old	16	36
	18 years old	2	4.5
	Total	44	100
2	Menstrual Cycle		
	27 days	12	27,3
	28 days	21	47,7
	29 days	7	15,9
	30 days	4	9,1
	Total	44	100

**Table 1. Respondents' Characteristic.**

Table 1 informs that the majority of the students are 16 years old as 12 respondents (45.5 %), the majority of menstrual cycle is 28 days as 21 respondents (47.7 %).

**The Dysmenorrhea Primary of Pre - Cinnamon (*Cinnamomum Burmanni*) Aromatherapy Treatment**

The dysmenorrhea primary data of pre cinnamon (*cinnamomum burmanni*) aromatherapy treatment at Air Batu Senior High School in 2021 can be explained in (Table 2).

Dysmenorrhea Primary (Pre)	Frequency	%
No pain	0	0
Low Pain	1	2.3
Moderate Pain	10	23
High Pain	21	48
Extremely Pain	12	27
Total	44	100

**Table 2. The Dysmenorrhea Primary Data of Pre - Cinnamon (*Cinnamomum Burmanni*) Aromatherapy Treatment.**

Table 2 explained that the majority of the students feel high pain as 21 respondents (47.7 %) during dysmenorrhea primary of pre cinnamon (*cinnamomum burmanni*) aromatherapy treatment at Air Batu Senior High School in 2021.

**The Dysmenorrhea Primary of Post Cinnamon (*Cinnamomum Burmanni*) Aromatherapy Treatment**

The dysmenorrhea primary data post cinnamon (*cinnamomum burmanni*) aromatherapy treatment at Air Batu Senior High School in 2021 can be explained in (Table 3).

Dysmenorrhea Primary (Post)	Frequency	%
No pain	0	0
Low Pain	17	39
Moderate Pain	20	46

High Pain	7	16
Extremely Pain	0	0
Total	20	100

**Table 3. The Dysmenorrhea Primary Data of Post Cinnamon (*Cinnamomum Burmanni*) Aromatherapy Treatment.**

Table 3 explained that the majority of the students feel moderate pain as 20 respondents (45.5 %) during dysmenorrhea primary of post cinnamon (*Cinnamomum burmanni*) aromatherapy treatment at Air Batu Senior High School in 2021.

**The Influence of Cinnamon (*Cinnamomum Burmanni*) Aromatherapy Treatment to Dysmenorrhea for Female Students**

The statistical output of the influence of cinnamon (*Cinnamomum burmanni*) aromatherapy treatment to dysmenorrhea for female students at Air Batu Senior High School in 2021 can be summarized in Table 4.

Dysmenorrhea Primary	Cinnamon Aromatherapy Treatment		Ranking Change	p value
	Pre	Post		
	F	F	F	
	0	0	Positive Ranking	0
- No Pain	1	17	Negative Ranking	4
- Low Pain	10	20	Ties	2
- Moderate Pain	21	7		
- High Pain	12	0		
- Extremely Pain				

**Table 4. The Influence of Cinnamon (*Cinnamomum Burmanni*) Aromatherapy Treatment to Dysmenorrhea for Female Students.**

**Description:** a) Wilcoxon test  
**Dysmenorrhea primary change**

- Negative ranking is the change of dysmenorrhea primary on pre and post of cinnamon (*Cinnamomum burmanni*) aromatherapy treatment from "Extremely Pain" category to "Low Pain" category.
- Positive ranking is the change of dysmenorrhea primary on pre and post of cinnamon (*Cinnamomum burmanni*) aromatherapy treatment from "Low Pain" category to "Extremely Pain" category.
- Ties means that there is no change of dysmenorrhea primary on pre and post of cinnamon (*Cinnamomum burmanni*) aromatherapy treatment condition.

Table 4 explains that the cinnamon (*Cinnamomum burmanni*) aromatherapy treatment has impacted dysmenorrhea primary condition for female students at Air Batu Senior High School in 2021. The students felt extremely pain as 21 respondents (27.7 %) on pre cinnamon (*Cinnamomum burmanni*) aromatherapy treatment. While dysmenorrhea primary level reduces for there were 20 respondents (45.5 %) feeling moderate pain and only 7 respondents (15.9 %) feeling high pain. The outputs of statistical tests using the Wilcoxon test inform

that  $p < \alpha$  as  $0.000 < 0.05$  meaning that  $H_0$  is rejected so that there is the difference of dysmenorrhea level between pre and post treatment. There is a significant correlation between cinnamon (*Cinnamomum burmanni*) aromatherapy treatment and dysmenorrhea level for students at Air Batu Senior High School in 2021. It is proved that cinnamon (*Cinnamomum burmanni*) aromatherapy treatment to be effective in reducing dysmenorrhea level for students at Air Batu Senior High School in 2021.

**DISCUSSION**

**The Dysmenorrhea Primary of Pre - Cinnamon (*Cinnamomum Burmanni*) Aromatherapy Treatment**

The output explained that the majority of the students feel high pain as 21 respondents (47.7 %) during dysmenorrhea primary of pre *Cinnamomum burmanni* aromatherapy treatment. While there were 12 respondents feeling extremely pain, 10 respondents feeling moderate pain and only 1 respondent feeling low pain. The dysmenorrhea primary levels were varied from low – extremely pains. The pain felt is the spasms in the lower abdomen distributing to waist and thighs. This condition is affected by the uterine muscle spasms and insufficient bloodstream. This condition impacts the activities, particularly the school activities.<sup>7</sup> the students can consume pharmacological therapy to relieve pain as a treatment option. This therapy has side effect, it can obstruct the Cyclooxygenase (COX) enzyme affecting prostaglandin synthesis inhibition, kidney function and gastric mucosal defense.<sup>7</sup> In addition to pharmacological therapy, there are another methods implemented in reducing dysmenorrhea level without consuming the medicines. One of the methods is non - pharmacological therapy by using cinnamon (*Cinnamomum burmanni*). Cinnamon (*Cinnamomum burmanni*) including seasoning containing flavorful, sweet and spicy. It contains essential oils, resins and linders. It is also effective as analgesic, somatic and aromatic. It also become aromatherapy.<sup>8</sup> The aromatherapy mechanism of the human body consists of two physiological systems *i.e.* circulation system and the smell system. The fragrances can psychological, memory and emotion conditions. The smelling process is divided into 3 phases, starting from the smell molecules entrance to the olfactory epithelium, then the smell will be transmitted as a message to the olfactory center located behind the nose, finally the various neuron cells will recognize the smells and deliver them to the limbic system be sent to the hypothalamus for processing. By using response delivery carried out by the hypothalamus, all the elements of the essential oil will be delivered by the circulation system and chemical organs to the organs required.<sup>9</sup> Based on the output above, it can be summarized that most of the painful during menstrual periods disturb the student. The dysmenorrhea level can interfere the learning concentration. It is required the rest and medicine to reduce the painful.

**The Dysmenorrhea Primary of Post Cinnamon (*Cinnamomum Burmanni*) Aromatherapy Treatment**

The output explains that the majority of the students feel high pain on pre cinnamon (*Cinnamomum Burmanni*) aromatherapy treatment condition as 21 respondents (47.7 %) and the condition change after cinnamon (*Cinnamomum Burmanni*) aromatherapy treatment. There were 20 respondents (45, 5 %) feeling moderate pain. It indicates that respondents feel distracted after aromatherapy treatment inhaled for a few minutes. The effects of cinnamon aromatherapy can reduce dysmenorrhea primary level during menstrual periods. The dysmenorrhea primary level changes to the student after cinnamon treatment since the respondents treat the cinnamon aromatherapy by inhaling during dysmenorrhea condition. The change is not significant for some other cofactors such as respondent respond in confronting the pain and other factors. The pain level is subjective including pain level. The respondents have different parameter in feeling the pain level. The most dominant condition felt by the respondent is the changing condition from high pain to moderate pain and to low pain. This output is in line with the research carried by on SMAN 1 Sungai Ambawang, Kubu Raya District mentioning that pre cinnamon treatment, there were 68.8 % of respondents felt moderate pain.<sup>13</sup> While post cinnamon treatment, there were 75 % of respondents feeling low pain. Based on the respondent demographic characteristic of the age, the majority of the respondents are 15 - 17 years old, it is in line with argument of mentioning that dysmenorrhea primary occurs on the young women between 15 - 25 years old and will be reduce in the end of 20 - 30 years old without any genital abnormalities on gynecological examination.<sup>14</sup> According to, dysmenorrhea will decrease and disappear by the increasing of the age.<sup>15</sup> The older the woman, the more often she experiences menstruation. It impacts the uterus becomes larger and stronger.<sup>16</sup> Many factors impact the dysmenorrhea occurring to the teenage between 15 to 17 years old. Several factors are environmental factors and stress.

### **The Influence of Cinnamon (*Cinnamomum Burmanni*) Aromatherapy Treatment to Dysmenorrhea for Female Students**

The output of the study describes that cinnamon (*cinnamomum burmanni*) aromatherapy treatment influences in reducing dysmenorrhea primary for female students at Air Batu Senior High School in 2021. It indicates that pre cinnamon treatment; the majority felt high pain as 21 respondents (47.7 %). After the treatment, the dysmenorrhea level reduce to moderate level as 20 respondents (45.5 %) and low pain as 7 respondents (15.9 %). The outputs of statistical tests using the Wilcoxon test inform that  $p < \alpha$  as  $0.000 < 0.05$  meaning that  $H_0$  is rejected so that there is the difference of dysmenorrhea level between pre and post treatment. There is a significant correlation between cinnamon (*cinnamomum burmanni*) aromatherapy treatment and dysmenorrhea level for students at Air Batu Senior High School in 2021. It is proved that cinnamon (*cinnamomum burmanni*) aromatherapy treatment to be effective in reducing dysmenorrhea level for students at Air Batu Senior High School in 2021. The average intensity of dysmenorrhea on the post - test decreased due to cinnamon aromatherapy treatment. According to, cinnamon essential oil cinnamon can overcome menstrual cramps.<sup>17</sup> before the treatment, the respondents fell constant and increase of

dysmenorrhea level. This is in line with the research conducted by explained that cinnamon extract and honey can reduce the menstrual pain level of the dysmenorrhea primary teenagers. The essential oil aroma will impact the smell sense reaction by delivering the message to the brain then resulting a positive relaxing effect and reducing pain. The aromatherapy mechanism of the human body consists of two physiological systems *i.e.* circulation system and the smell system. The smell is a volatile molecule entrance the nose through breathing. Then it processed by brain as smelling process. By using inhalation, some molecules enter the lungs, and then aromatic molecules will be absorbed by the mucosal lining of the respiratory tract. There is the gas exchange in alveoli both in bronchi and bronchioles. These molecules are transported by the blood circulation system in the lung. Deep breathing will improve the amount of aromatic substances in the body. The cinnamon applies as aromatherapy because it can use to overcome dysmenorrhea. The cinnamon has anti - inflammatory activity applying as a dysmenorrhea treatment and capable to stop bleeding. Cinnamon bark is spicy, sweet, smells good, and warm. The cinnamon oil is very useful for encouraging contractions and reducing the pain in the menstrual periods.

### **CONCLUSION**

According to the Above Explanation of the Study Outputs and Discussion, it can be Concluded as below

- The majority of the students feel high pain as 21 respondents (47.7 %) during dysmenorrhea primary of pre cinnamon (*cinnamomum burmanni*) aromatherapy treatment at Air Batu Senior High School in 2021.
- The majority of the students feel moderate pain as 20 respondents (45.5 %) during dysmenorrhea primary of post cinnamon (*cinnamomum burmanni*) aromatherapy treatment at Air Batu Senior High School in 2021.
- There is a significant correlation between cinnamon (*cinnamomum burmanni*) aromatherapy treatment and dysmenorrhea level for students at Air Batu Senior High School in 2021. The outputs of statistical tests using the Wilcoxon test inform that  $p < \alpha$  as  $0.000 < 0.05$ . It is proved that cinnamon (*cinnamomum burmanni*) aromatherapy treatment to be effective in reducing dysmenorrhea level for students at Air Batu Senior High School in 2021.

### **SUGGESTIONS**

Based on the Study Outputs, the Researchers Require Giving Several Suggestions as below

- To the nursing education: This study proves that cinnamon aromatherapy can reduce dysmenorrhea primary. This output can be used as information and development of nursing science, especially sexuality block of cinnamon aromatherapy benefit to dysmenorrhea primary.
- To the nursing service: The output can be the intervention in dysmenorrhea nursing care by using

cinnamon aromatherapy as non - pharmacological alternatives treatment.

- To the next researchers: It is expected to the next researcher to implement the cinnamon aromatherapy by using other methods. The next researcher can continue by finding out the cinnamon impact to solve dysmenorrhea problem. This study is expected to be as reference to continue other similar research and compare by other reference to provide the benefits to others.

Jogjakarta: Gara Ilmu.

17. Prima, Dewi. Cinnamon (*Cinnamomum Burmanni*) Aromatherapy as Relaxation Media.

## REFERENCES

1. De Sanctis V, Soliman A, Bernasconi S, et al. Primary dysmenorrhea in adolescents: Prevalence, impact and recent knowledge. *Pediatr Endocrinol Rev* 2015;13(2):512–520.
2. Bharkatiya M, Nema RK, Rathore KS, et al. Aromatherapy: Short Overview. *Int J Green Pharm* 2008;2(1):1-5.
3. Ibrahim N K, Alghamdi M S, Al - Shaibani, et al. Dysmenorrhea among female medical students in king abdulaziz university: Prevalence, predictors and outcome. *Pak J Med Sci* 2015;31(6):1312-1317.
4. Buckle Jane (2018) *Clinical Aromatherapy: Essential Oils in Practice*. 3<sup>rd</sup> edition. Elsevier, London, UK. 1-412.
5. Wiknjosastro H, Saifuddin A B, Rachimdh T. *Gynecology: Bina Pustaka Sarwono Prawihardjo*, 2018.
6. Wong C L. Health-related quality of life among Chinese adolescent girls with Dysmenorrhoea. *Reprod Health* 2018;15(1):1–10.
7. Ida Mariana. The Impact of Cinnamon Aromatherapy to Dysmenorrhea Primary for Female Teenagers in 2020 Prayoga. *Pharma Acad J* 2020;5(2).
8. Pain Management (2017) *Aromatherapy Section B Clinical Guidelines King Edward Memorial Hospital Perth Western, Australia*.
9. Primadiati, Rachmi (2017) *Natural Treatment Aromatherapy for Healthy and Beauty*. Jakarta: Gramedia Pustaka Utama.
10. Hutasoit AS (2017) *The Guideline of Aromatherapy Massage Practice for Beginners*. Jakarta: PT. Gramedia Pustaka Utama.
11. Tria Anita (2020) *The Potency of Cinnamon Extract and Honey of Menstrual Pain Level on Female Teenage to Dysmenorrhea Primary*.
12. Tarigan DAP (2018) *The Influence of Cinnamon (Cinnamomum Burmanni) Aromatherapy to Dysmenorrhea Primary Level of the Students at SMA Air Batu, Air Batu Sub District, Asahan District*.
13. Kasdu Dini (2015) *Female Problem Solution*. Jakarta: Puspa Swara.
14. Koensoermadiyah (2019) *AZ Aromatherapy for Health, Fitness, and Beuty*. Yogyakarta: CV and Offset.
15. Proverawati, Atikah, Siti Maisaroh (2019) *Menarche First Pride Menstruation*. Yogyakarta: Muha Medika.
16. Prasetyono DS (2016) *Getting Pregnant Tips*.