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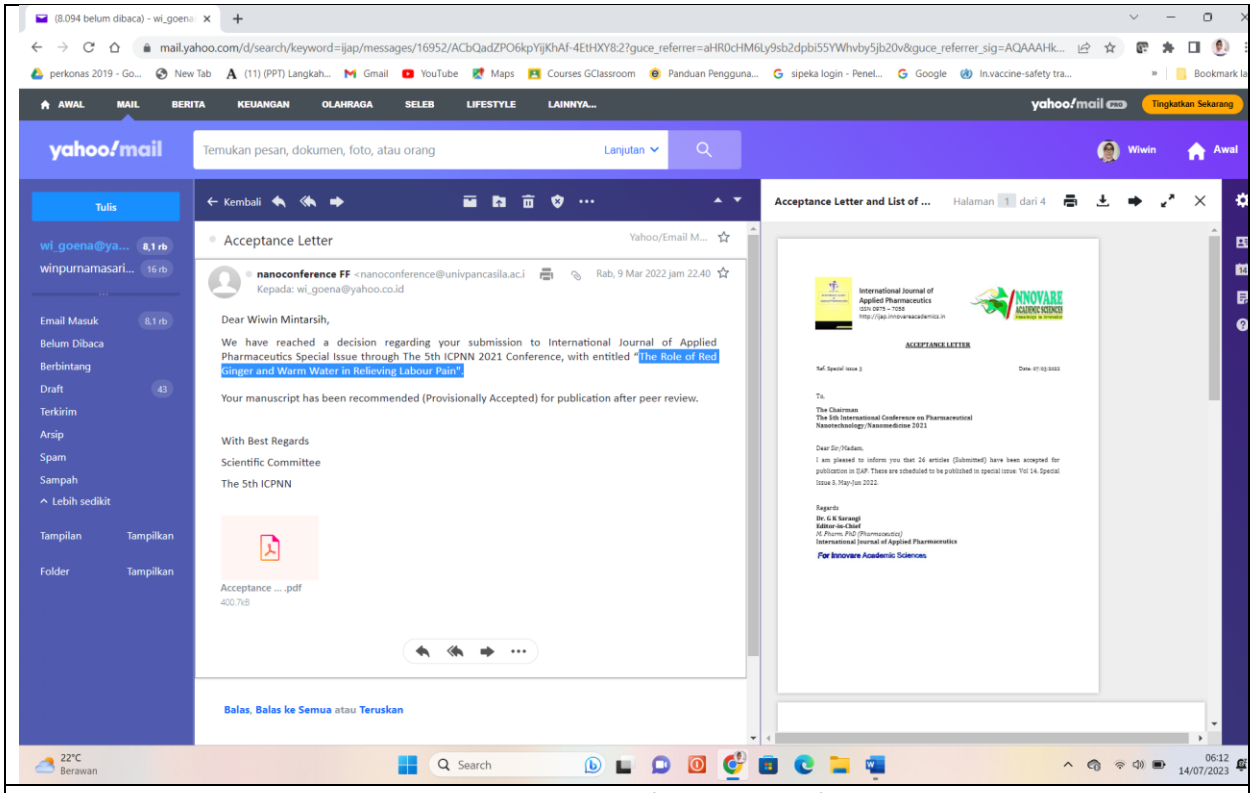

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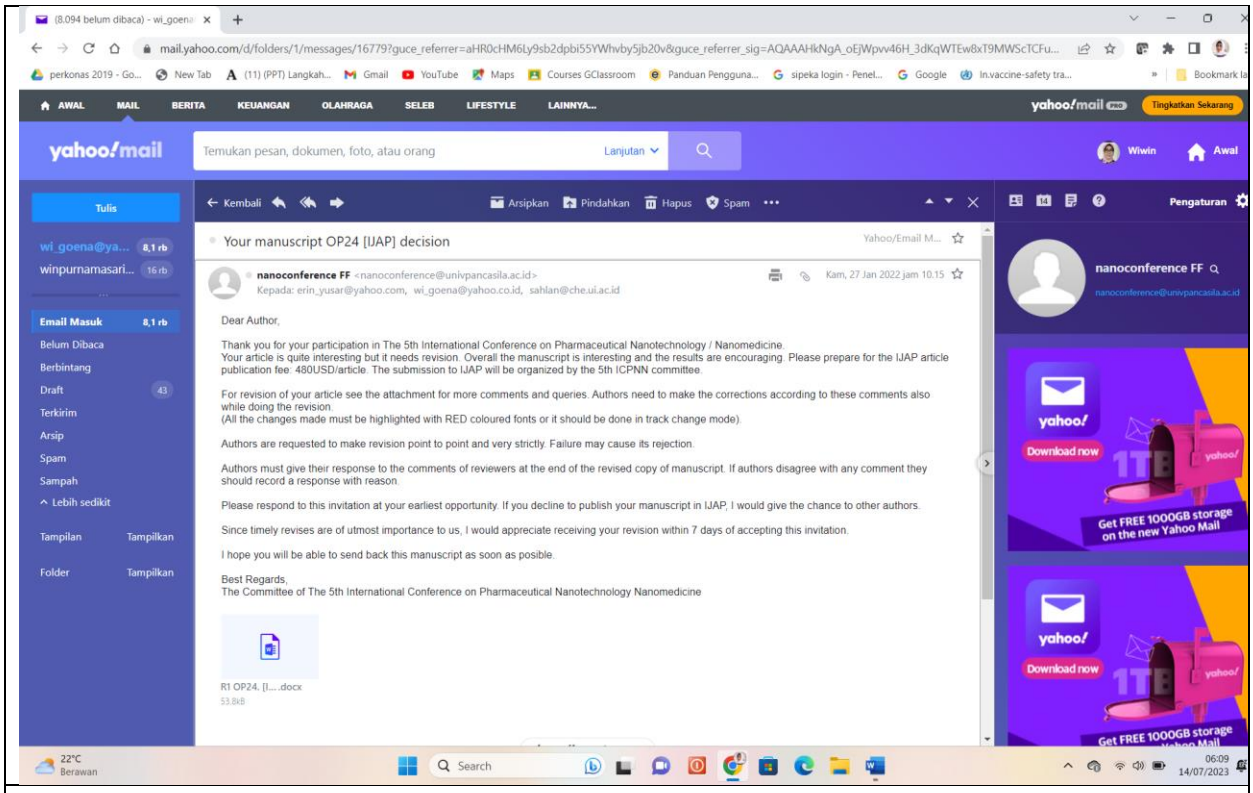

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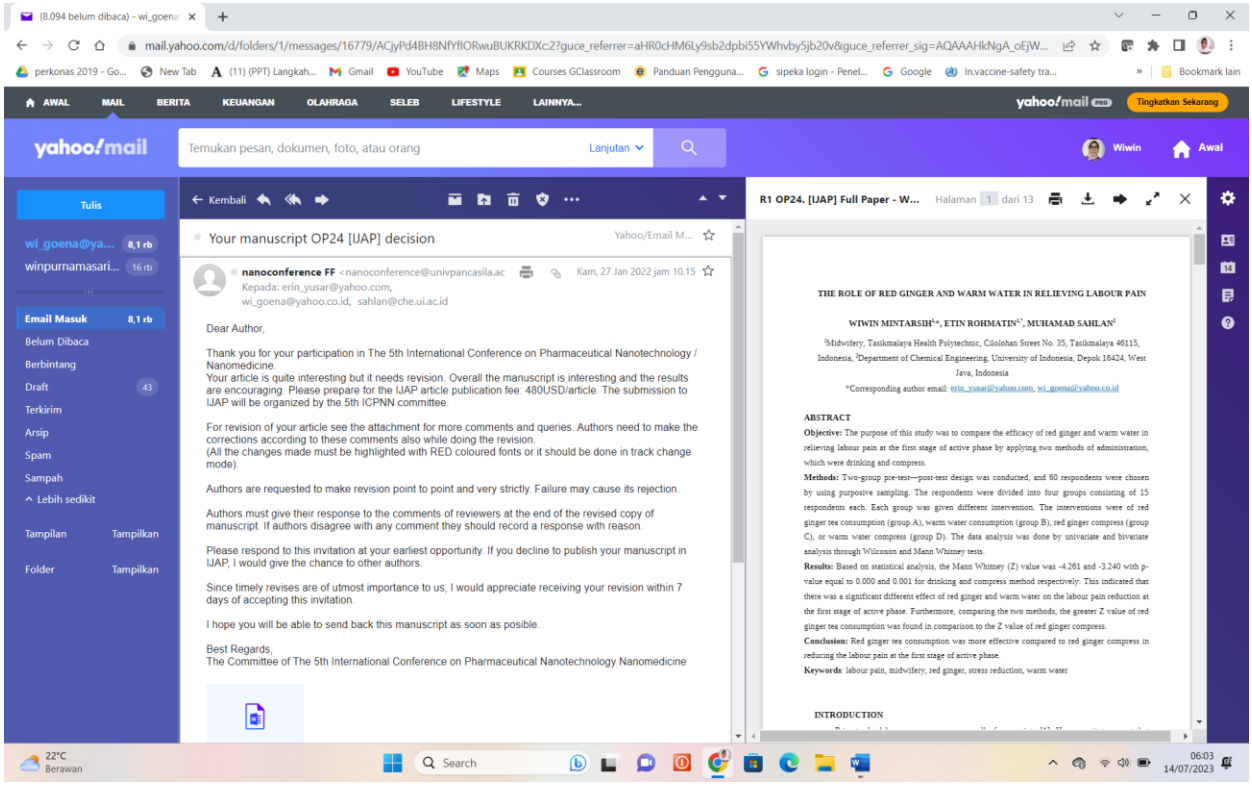

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THE ROLE OF RED GINGER AND WARM WATER IN RELIEVING LABOUR PAIN

WIWIN MINTARSIH[1,*], ETIN ROHMATIN[1,*], MUHAMAD SAHLAN[2]

[1]Midwifery, Tasikmalaya Health Polytechnic, Cilolohan Street No. 35, Tasikmalaya 46115, Indonesia, [2]Department of Chemical Engineering, University of Indonesia, Depok 16424, West Java, Indonesia

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ABSTRACT

Objective: The purpose of this study was to compare the efficacy of red ginger and warm water in relieving labour pain at the first stage of active phase by applying two methods of administration, which were drinking and compress.

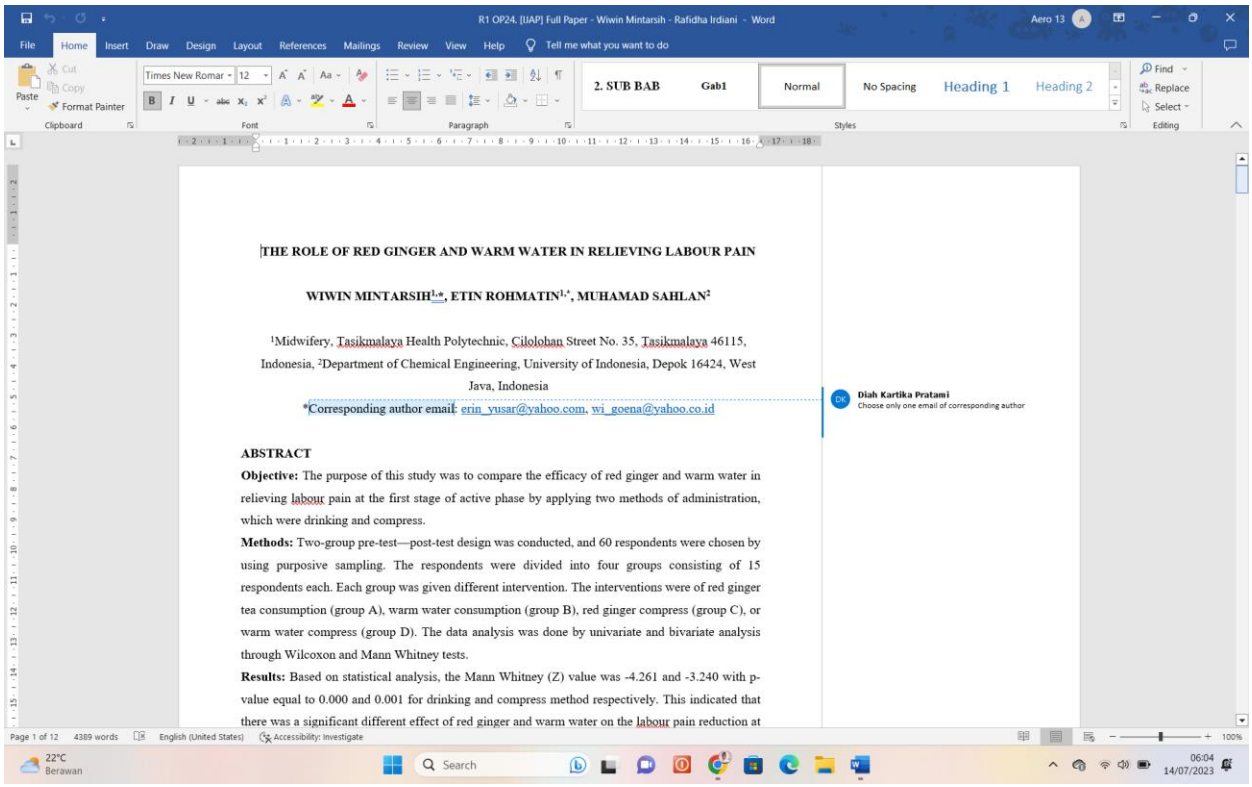
Methods: Two-group pre-test—post-test design was conducted, and 60 respondents were chosen by using purposive sampling. The respondents were divided into four groups consisting of 15 respondents each. Each group was given different intervention. The interventions were of red ginger tea consumption (group A), warm water consumption (group B), red ginger compress (group C), or warm water compress (group D). The data analysis was done by univariate and bivariate analysis through Wilcoxon and Mann Whitney tests.

Results: Based on statistical analysis, the Mann Whitney (Z) value was -4.261 and -3.240 with p-value equal to 0.000 and 0.001 for drinking and compress method respectively. This indicated that there was a significant different effect of red ginger and warm water on the labour pain reduction at the first stage of active phase. Furthermore, comparing the two methods, the greater Z value of red ginger tea consumption was found in comparison to the Z value of red ginger compress.

Conclusion: Red ginger tea consumption was more effective compared to red ginger compress in reducing the labour pain at the first stage of active phase.

Keywords: labour pain, midwifery, red ginger, stress reduction, warm water

INTRODUCTION



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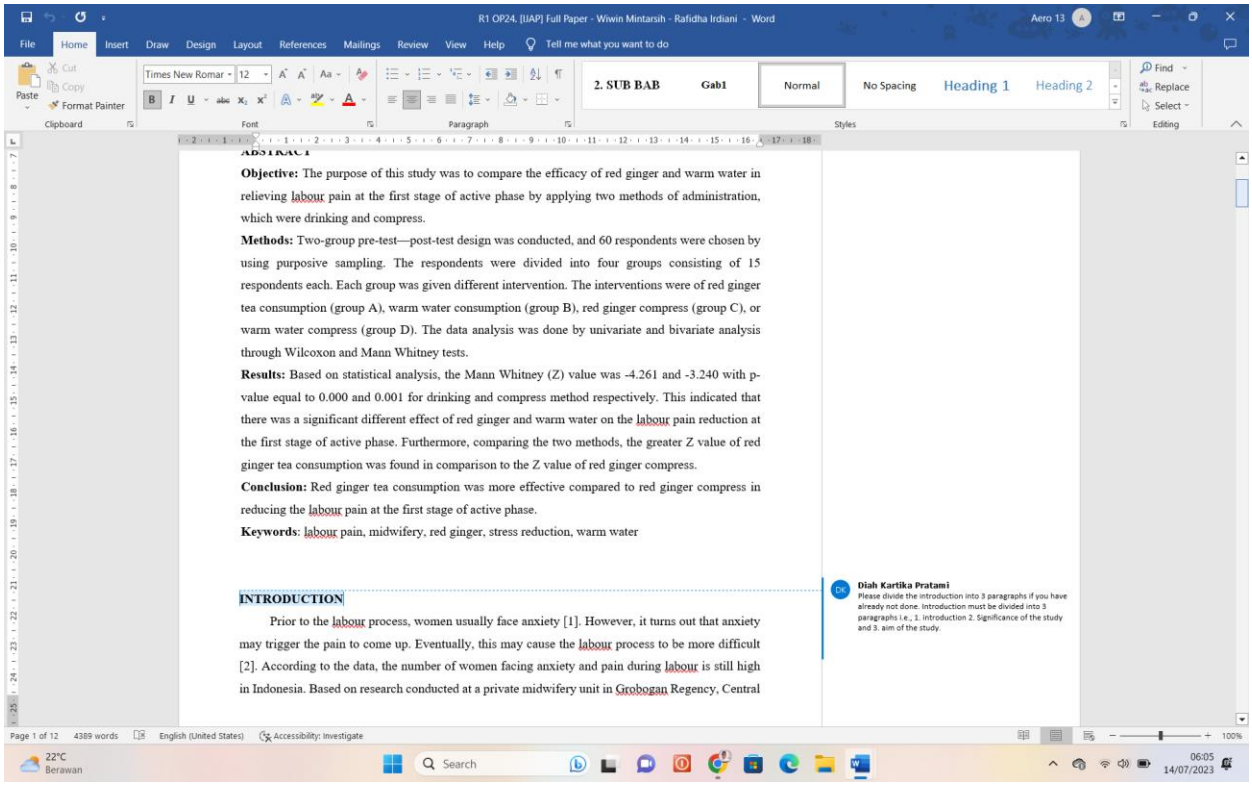

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INTRODUCTION

Prior to the labour process, women usually face anxiety [1]. However, it turns out that anxiety may trigger the pain to come up. Eventually, this may cause the labour process to be more difficult [2]. According to the data, the number of women facing anxiety and pain during labour is still high in Indonesia. Based on research conducted at a private midwifery unit in Grobogan Regency, Central

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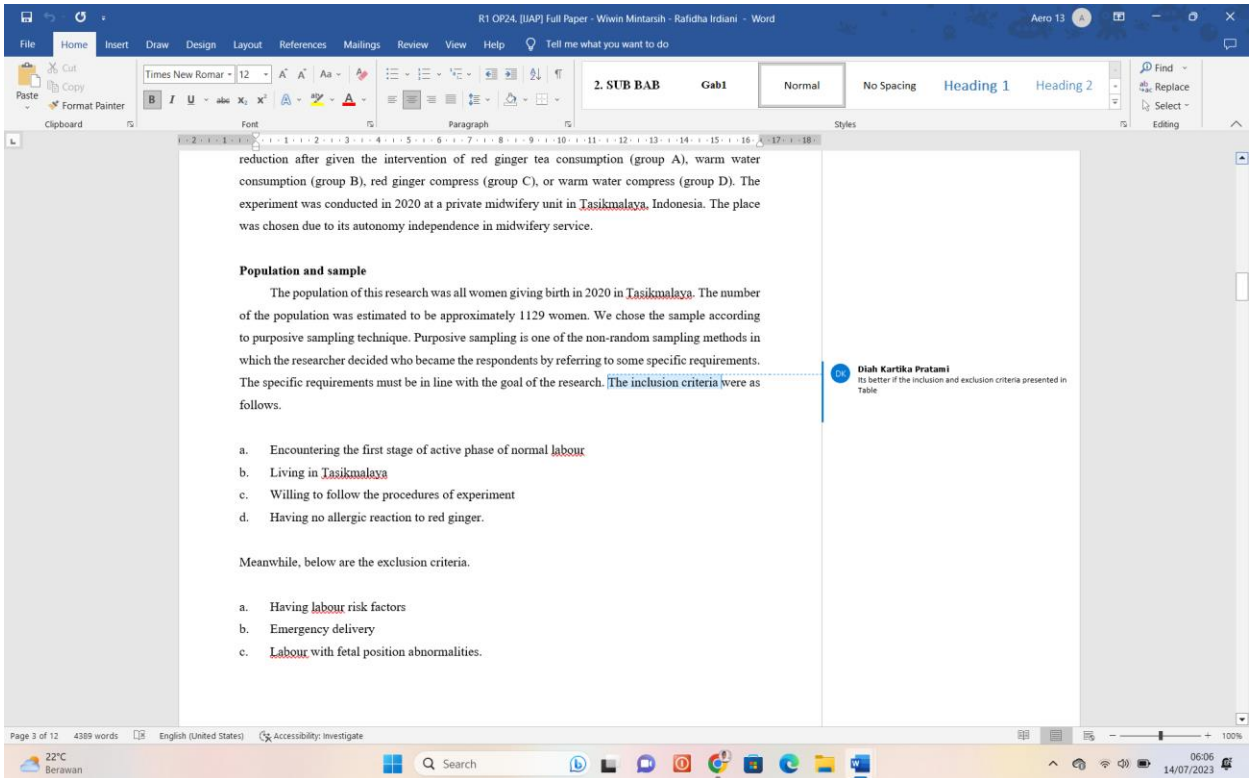

reduction after given the intervention of red ginger tea consumption (group A), warm water consumption (group B), red ginger compress (group C), or warm water compress (group D). The experiment was conducted in 2020 at a private midwifery unit in Tasikmalaya, Indonesia. The place was chosen due to its autonomy independence in midwifery service.

Population and sample

The population of this research was all women giving birth in 2020 in Tasikmalaya. The number of the population was estimated to be approximately 1129 women. We chose the sample according to purposive sampling technique. Purposive sampling is one of the non-random sampling methods in which the researcher decided who became the respondents by referring to some specific requirements. The specific requirements must be in line with the goal of the research. The inclusion criteria were as follows.

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a. Encountering the first stage of active phase of normal labour
b. Living in Tasikmalaya
c. Willing to follow the procedures of experiment
d. Having no allergic reaction to red ginger.

Meanwhile, below are the exclusion criteria.

a. Having labour risk factors
b. Emergency delivery
c. Labour with fetal position abnormalities.

The number of samples were determined by using the Federer equation (Equation 1) [19]. The number of treatments (t) were two, reflecting the number of ingredients that were used, which were red ginger and warm water. Hence, the number of samples (n) were 15 for each group (n = 15). In total, there were 60 women (n = 60) became the respondents (Table 1).

$$(t-1)(n-1) \geq 15 \qquad \text{(Equation 1)}$$

Table 1. Number of Respondents on Each Group

Group	Intervention	Number of Respondents
A	Drinking red ginger tea	15
B	Drinking warm water	15
C	Red ginger tea compress	15
D	Warm water compress	15
	Total	**60**

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Research Variables and Instrumentation

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The research variables consisted of red ginger compress, warm water compress, red ginger tea consumption, and warm water consumption as the independent variables and the degree of labour pain as the dependent variable. The research instruments included questionnaire, volumetric glassware to measure the water, and weight scale to measure the weight of red ginger being used. The questionnaire was adapted from Hamilton Anxiety Rating Scale (HARS). It was proven to have high validity and reliability to measure the degree of pain in clinical trial [20]. The degree of pain was measured by using the scale below.

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water only brought up 0.66 average difference. It can be concluded that drinking red ginger tea could give higher contribution in relieving labour pain at the first stage of active phase compared to drinking warm water.

For the compress method, the Mann Whitney (Z) value was -3.240 with p-value equal to 0.001. The p-value less than α (0.05) showed that H_0 was rejected and H_a was accepted instead, meaning there is a different effect between red ginger compress and warm water compress on relieving anxiety at the first stage of the active phase. Based on the results, it was also known that red ginger compress could give the average difference of pain reduction with the value of 8.07, while warm water compress brought up a 3.05 average difference. In conclusion, red ginger compress gave a higher contribution to relieve labour pain at the first stage of the active phase compared to warm water compress.

CONCLUSION

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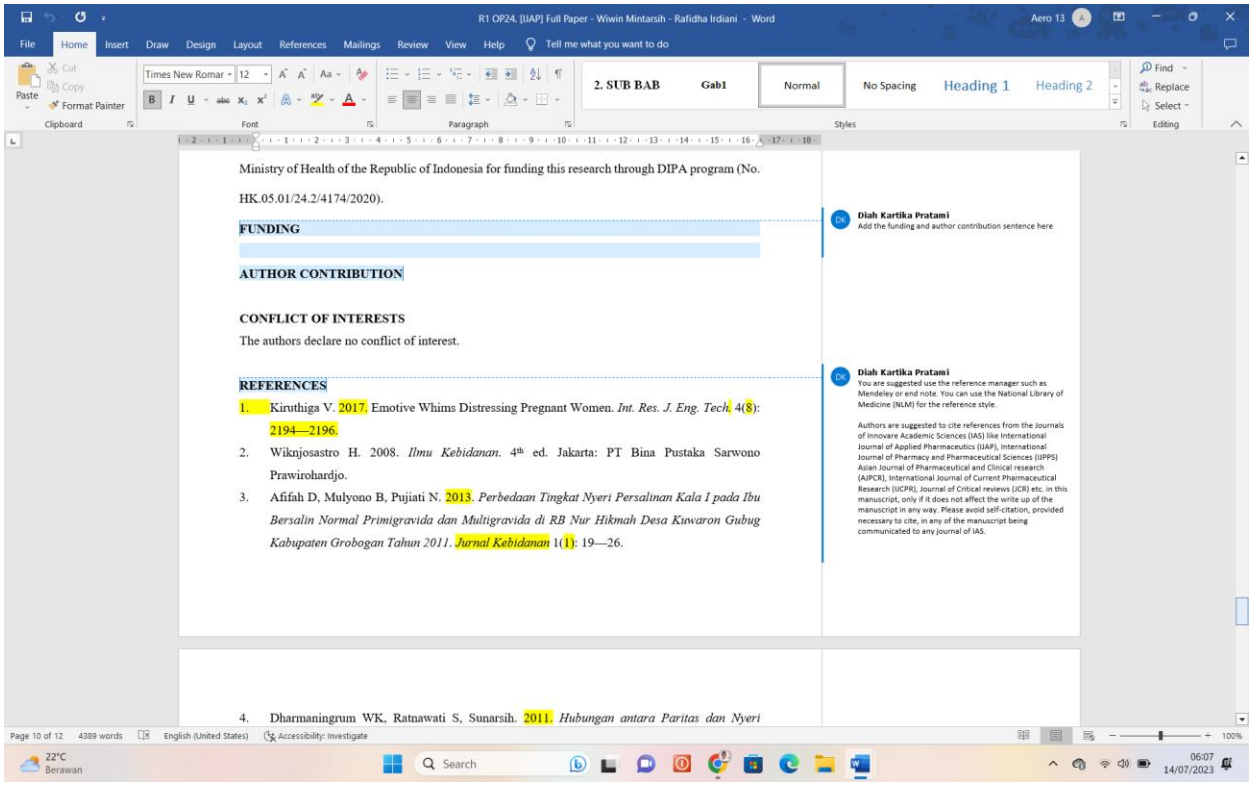
Based on statistical analysis, the Mann Whitney (Z) value was -4.261 and -3.240 with p- value equal to 0.000 and 0.001 for drinking and compress method respectively. This indicated that there was a significant different effect of red ginger and warm water on the labour pain reduction at the

first stage of active phase. This is also supported by the fact that the value of the average difference pain reduction value of each method by using red ginger was greater than the average difference pain reduction value of each method by using warm water. It means that red ginger gave a greater contribution to the reduction of labour pain compared to warm water. Furthermore, comparing the



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FUNDING

AUTHOR CONTRIBUTION

CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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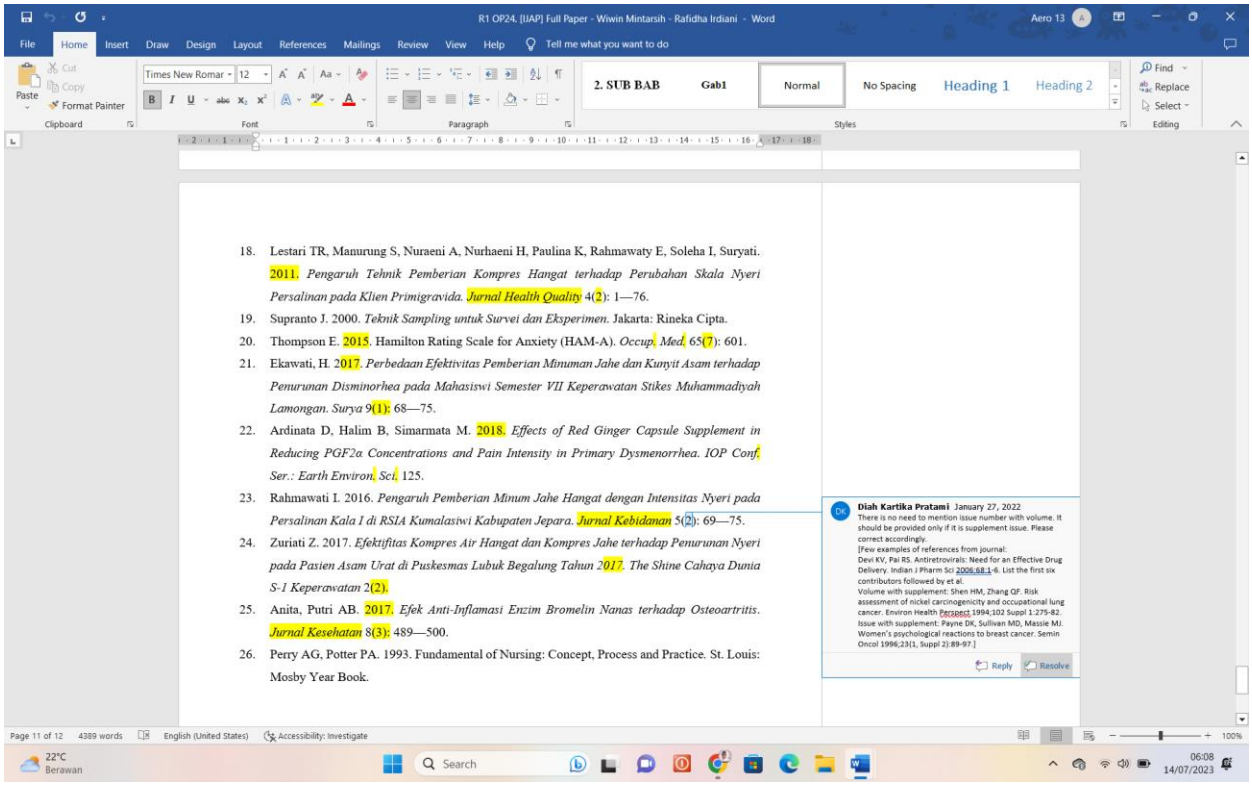

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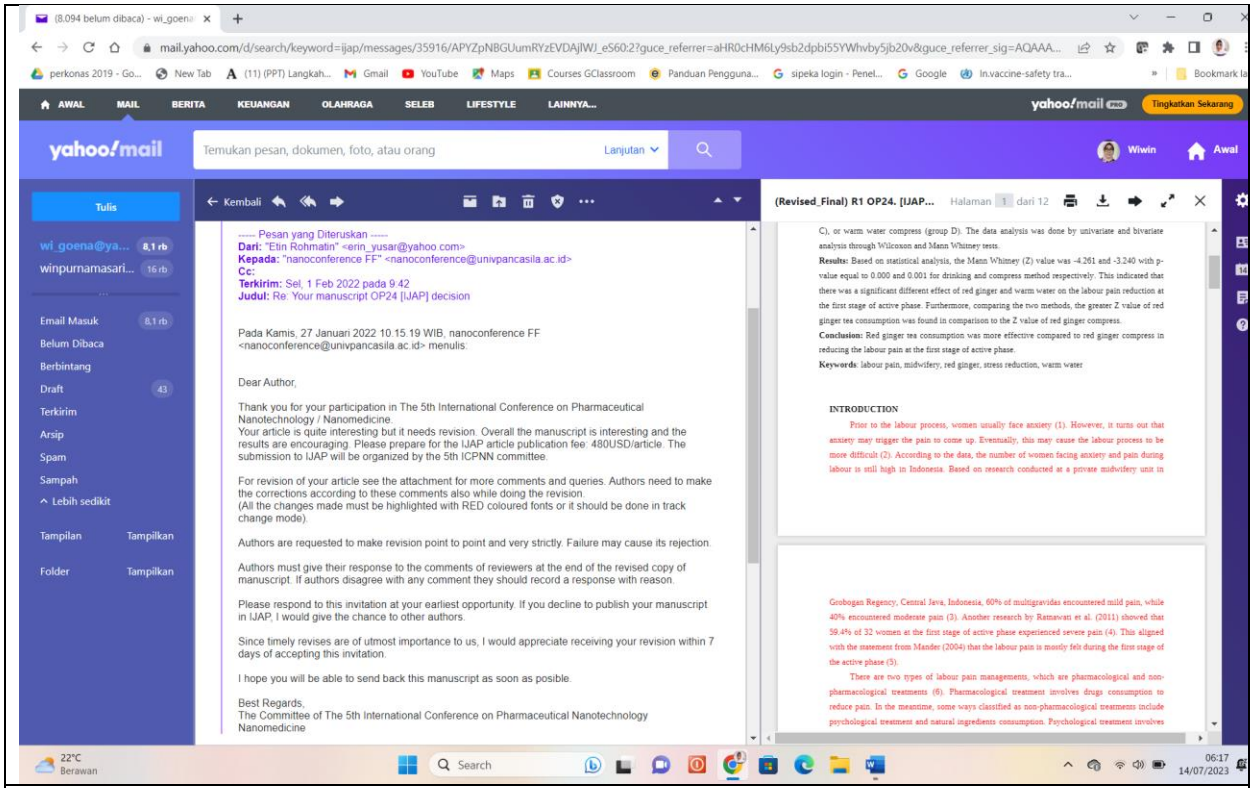

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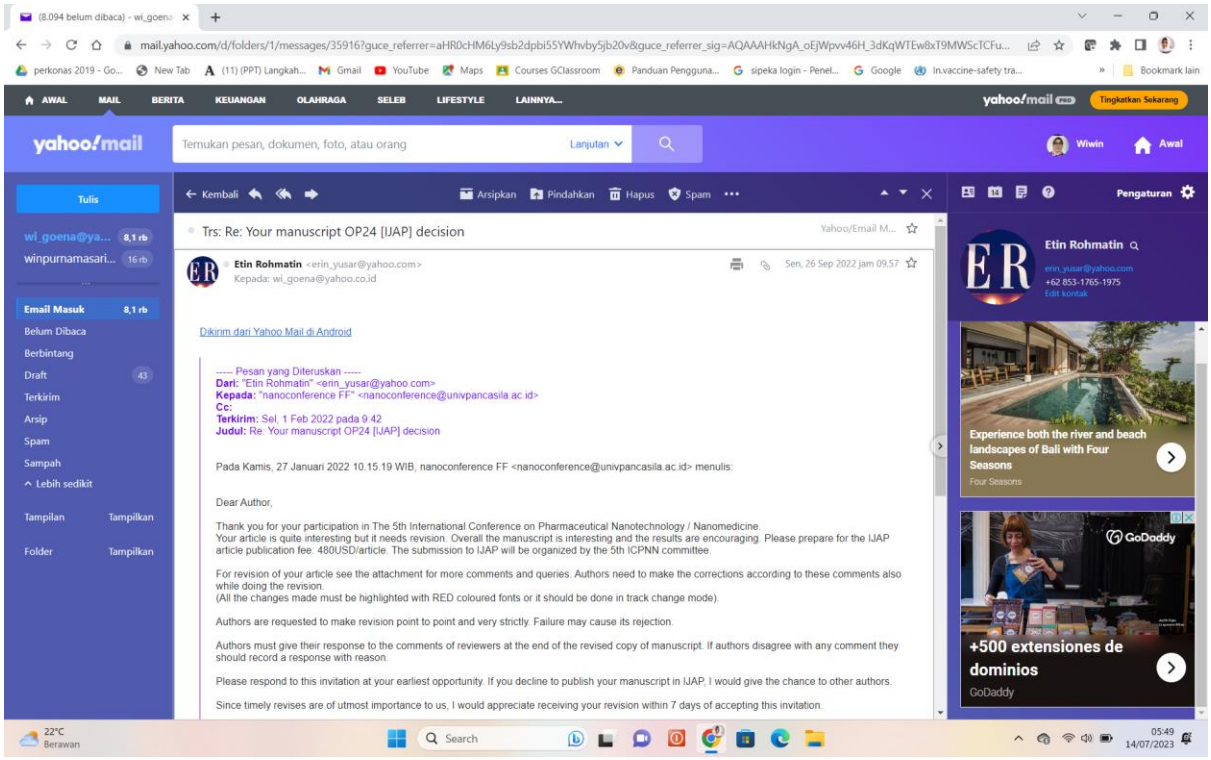
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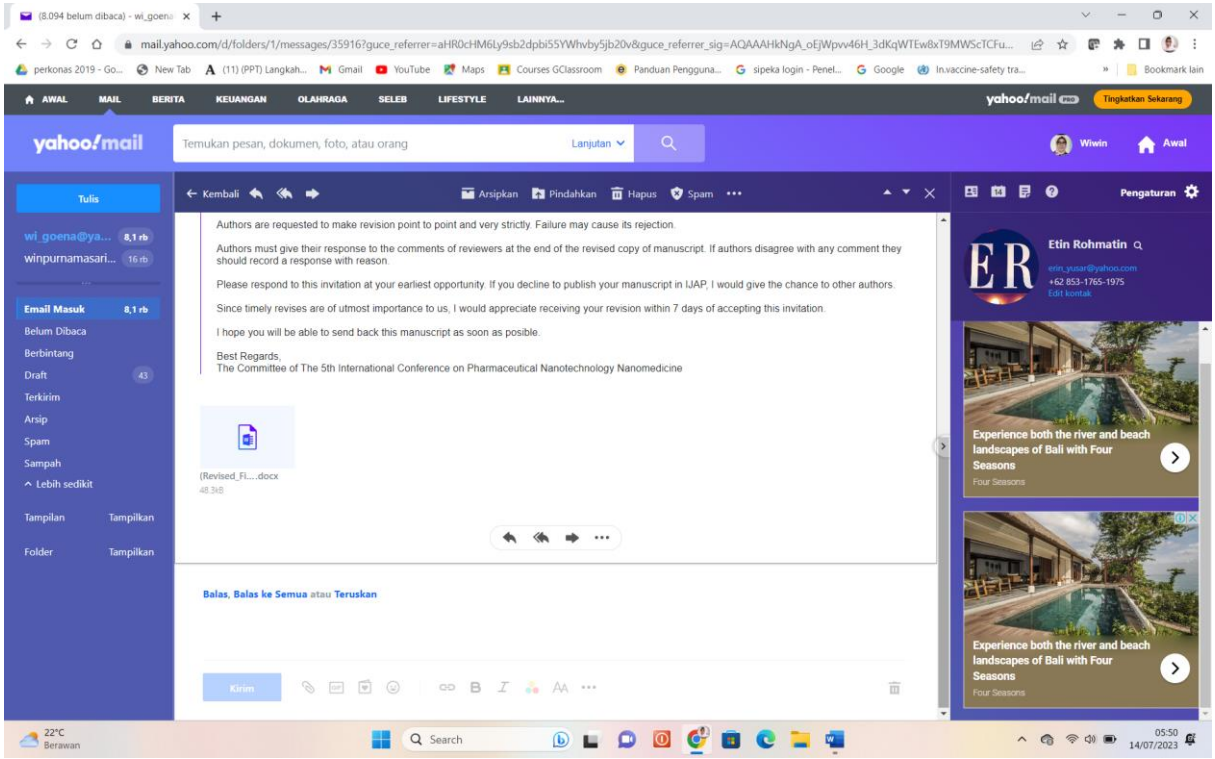
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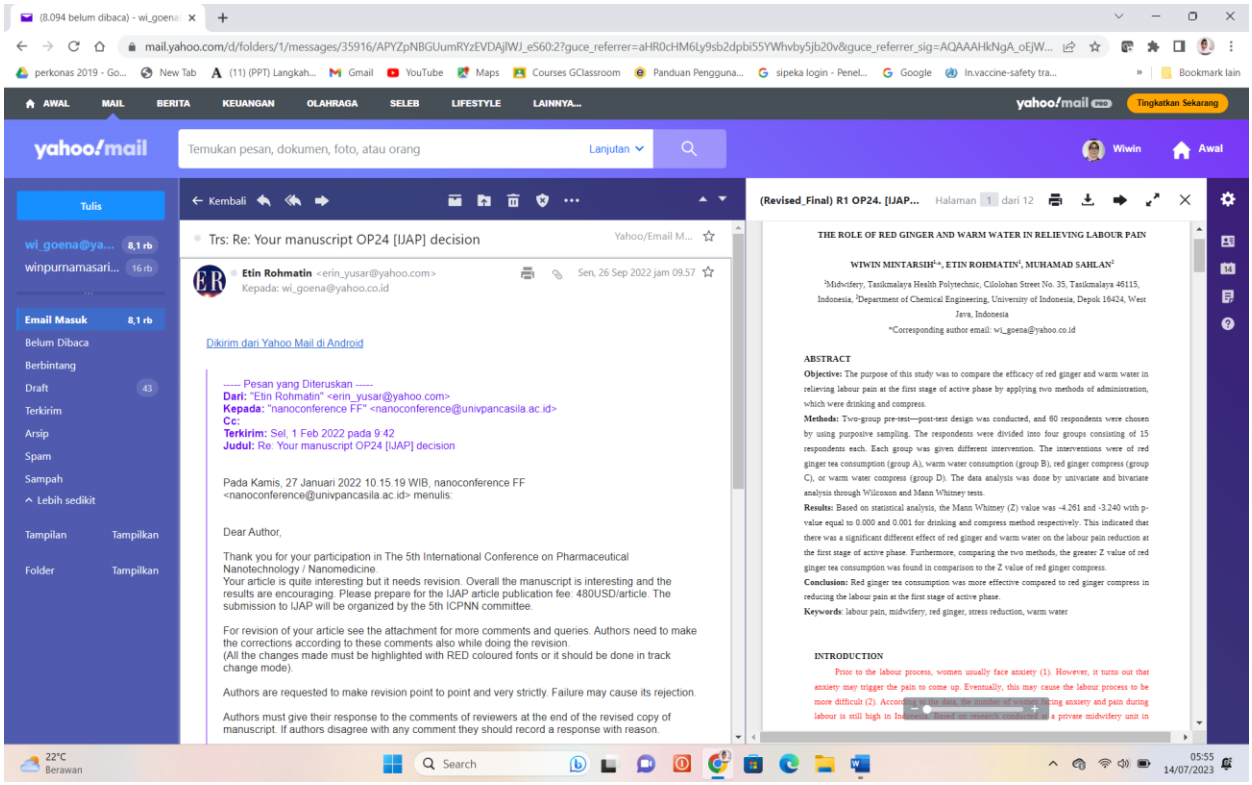

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*Corresponding author email: wi_goena@yahoo.co.id

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Keywords: labour pain, midwifery, red ginger, stress reduction, warm water

INTRODUCTION

Prior to the labour process, women usually face anxiety (1). However, it turns out that anxiety may trigger the pain to come up. Eventually, this may cause the labour process to be more difficult (2). According to the data, the number of women facing anxiety and pain during labour is still high in Indonesia. Based on research conducted at a private midwifery unit in Grobogan Regency, Central Java, Indonesia, 60% of multigravidas encountered mild pain, while 40% encountered moderate pain (3). Another research by Ratnawati et al. (2011) showed that 59.4% of 32 women at the first stage of active phase experienced severe pain (4). This aligned with the statement from Mander (2004) that the labour pain is mostly felt during the first stage of the active phase (5).

There are two types of labour pain managements, which are pharmacological and non-pharmacological treatments (6). Pharmacological treatment involves drugs consumption to reduce pain. In the meantime, some ways classified as non-pharmacological treatments include psychological treatment and natural ingredients consumption. Psychological treatment involves the use of aromatherapy, behavioral treatment, and meditation (7). As for natural ingredients consumption, it is considered as a great potential for the discovery of pain relieve drugs due to less to no side effects and has been reported to be able to relieve pain (8, 9). Based on our literature review, some research reported the effects of red ginger and warm water in reducing labour pain. Ginger is widely known for its health benefits and can be used as analgesic, antipyretic, anti-inflammatory, antiemetic, anti-rheumatic, a drug to treat diarrhea and a supplement to boost immune system (10). As for the effects of warm water, drinking water is an instant way to relieve stomachache and headache (11). Warm water may bring certain relaxation effect so that the release of endorphins as natural analgesic may be induced. Related to the labour pain, Marlina (2018) explained that warm water compress on the lower back region successfully reduced the labour pain with the percentage of 47.05% (12).

Although there has been a lot of research regarding the effects of red ginger and warm water in relieving labour pain, to the best of our knowledge, there has been no research studying the comparison of the efficacy between both interventions. Whereas this is important so that the optimization of the most effective ingredients can be conducted to develop a potent natural-based drug for pain relief. Hence, in this research, we compared the efficacy of both interventions. We also used two methods of administration, which were drinking and compress.

MATERIALS AND METHODS

Research design

This research implemented two-group pre-test—post-test design to find out labour stress reduction after given the intervention of red ginger tea consumption (group A), warm water consumption (group B), red ginger compress (group C), or warm water compress (group D). The experiment was conducted in 2020 at a private midwifery unit in Tasikmalaya, Indonesia. The place was chosen due to its autonomy independence in midwifery service.

Population and sample

The population of this research was all women giving birth in 2020 in Tasikmalaya. The number of the population was estimated to be approximately 1129 women. We chose the sample according to purposive sampling technique. Purposive sampling is one of the non-random sampling methods in which the researcher decided who became the respondents by referring to some specific requirements. The specific requirements must be in line with the goal of the research. The inclusion criteria were as follows (Table 1).

Table 1. The number of participants on each group

Inclusion criteria	Exclusion criteria

a. Encountering the first stage of active phase of normal labour b. Living in Tasikmalaya c. Willing to follow the procedures of experiment d. Having no allergic reaction to red ginger.	a. Having labour risk factors b. Emergency delivery c. Labour with fetal position abnormalities.

The number of samples were determined by using the Federer equation (Equation 1) (13). The number of treatments (t) were two, reflecting the number of ingredients that were used, which were red ginger and warm water. Hence, the number of samples (n) were 15 for each group (n = 15). In total, there were 60 women (n = 60) became the respondents (Table 2).

$$(t-1)(n-1) \geq 15 \qquad \text{(Equation 1)}$$

Table 2. Number of respondents in each group

Group	Intervention	Number of respondents
A	Drinking red ginger tea	15
B	Drinking warm water	15
C	Red ginger tea compress	15
D	Warm water compress	15
	Total	**60**

Research variables and instrumentation

The research variables consisted of red ginger compress, warm water compress, red ginger tea consumption, and warm water consumption as the independent variables and the degree of labour pain as the dependent variable. The research instruments included questionnaire, volumetric glassware to measure the water, and weight scale to measure the weight of red ginger being used. The questionnaire was adapted from Hamilton Anxiety Rating Scale (HARS). It was proven to have high validity and reliability to measure the degree of pain in clinical trial (14). The degree of pain was measured by using the scale below (Table 3).

Table 3. Degree of Pain

Degree of Pain	Scale	Description
Mild pain	1—3	Patients were still able to communicate well.
Moderate pain	4—6	Patients were grimacing, able to pinpoint the location of the pain and describe it, able to follow order from the midwife.
Severe pain	7—9	Patients were not able to follow order from the midwife, but still responded and were able to pinpoint the location of the pain but unable to describe it. The pain was not relieved by changing the body position, long breathe or distraction.
Very severe pain	10	Patients were no longer able to communicate and started hitting.

Methods

The methods were divided into two parts, which were preparation and data collection. The preparation included managing the documents related to research permits, research ethics

(granted by Health Research Ethics Committee at Yogyakarta Health Polytechnic, reference number: 033/EC-KEPK/VII/2020), and approval from prospective respondents. We also prepared the red ginger tea and red ginger compress by boiling 50 grams of red ginger in 500 ml of water. The boiling process was carried out until the water reached 200 ml.

As for the data collection, it started by selecting the respondents based on the predetermined criteria. Before the intervention was given, the respondents filled out a questionnaire as a pre-test. After that, the intervention was given by the midwife. For the intervention with compress method, the compress was applied for 20 minutes on the suprapubic region. Two hours after the intervention, the effects were measured by using a questionnaire as a post-test.

Data processing

The data was processed by using a unit of computer. The steps were divided into editing, coding, data transferring, and data tabulation. Editing aimed to check the completeness of the data and correct the possible error during the observation. Next, in the coding process, the data was classified into some categories. The classification was done by applying code to the data in the form of numbers. This aimed to ease the process of data analysis. After that, for the steps of data transferring and data tabulation, the data was input to a master table.

Data analysis

In the meantime, the univariate analysis was done by calculating distribution and percentage of each variable. Meanwhile, the analysis to find out the role of red ginger and warm water interventions to the labour pain reduction was performed by using Wilcoxon and Mann Whitney tests.

RESULTS AND DISCUSSION

Univariate analysis

The univariate analysis showed the frequency distribution of pain management by using red ginger tea consumption (group A), warm water consumption (group B), red ginger compress (group C), and warm water compress (group D). As seen in Table 4, among group A, there were 9 women (60%) encountering moderate pain and 6 women (40%) with severe pain before being given with red ginger tea. Having given the red ginger tea, there were no women experiencing severe pain. To be specific, 5 women (33.3%) felt mild pain and 10 women (66.7%) felt moderate pain.

In the meantime, in group B, there were 7 (46.7%) and 8 (53.3%) women encountering moderate and severe pain respectively before given the intervention. After the intervention, there were still 4 women (26.7%) feeling severe pain. The other 10 (66.7%) women felt moderate pain, while a woman (6.7%) felt mild pain.

Table 4. Frequency distribution of labour pain at the first stage of active phase before and after the consumption of red ginger tea and warm water

Degree of pain	Red ginger				Warm water			
	Before intervention		After intervention		Before intervention		After intervention	
	F	%	F	%	F	%	F	%
No pain	0	0	0	0	0	0	0	0
Mild pain	0	0	5	33.3	0	0	1	6.7
Moderate pain	9	60	10	66.7	7	46.7	10	66.7
Severe pain	6	40	0	0	8	53.3	4	26.7
Total	**15**	**100**	**15**	**100**	**15**	**100**	**15**	**100**

Furthermore, Table 5 presents the results of the intervention by using compress method (group C and D). In the group C, before red ginger compress was applied, there were 9 women (60%) who felt no pain and 2 women (13.3%) who felt mild, moderate, and severe pain each. After the intervention, 14 women (93.3%) had no pain and a woman (6.7%) had moderate pain. On the other hand, in the group D, of 15 women who were given warm water compress, there were 4 women (26.7%) felt no pain, a woman (6.7%) encountered mild pain and 5 women (33.3%) encountered moderate and severe pain each. After the intervention, 5 women (33.3%) felt no pain. The other 2 (13.3%), 5 (33.3%) and 3 (20%) women encountered mild, moderate, and severe pain respectively.

Table 5. Frequency distribution of labour pain at the first stage of active phase before and after red ginger compress and warm water compress

Degree of pain	Red ginger				Warm water			
	Before intervention		After intervention		Before intervention		After intervention	
	F	%	F	%	F	%	F	%
No pain	9	60	14	93.3	4	26.7	5	33.3
Mild pain	2	13.3	0	0	1	6.7	2	13.3
Moderate pain	2	13.3	1	6.7	5	33.3	5	33.3
Severe pain	2	13.3	0	0	5	33.3	3	20
Total	**15**	**100**	**15**	**100**	**15**	**100**	**15**	**100**

Based on the results, consuming red ginger tea showed positive effects in reducing the labour pain. This reflected by no women experiencing severe pain. On average, the degree of pain was reduced by one level—from severe to moderate, and from moderate to mild. The effects of consuming ginger tea were also described in research titled "The Difference of Ginger and Turmeric Drink Efficacy to the Relieve Dysmenorrhea" (15). The results showed that ginger drink was effective in relieving dysmenorrhea, with the average reduction of 0.45 point (15). Other research that studied the effect of red ginger capsule supplement on reducing PFG-2a contractions and pain intensity in primary dysmenorrhea also reported similar results. There was a primary dysmenorrhea pain intensity reduction after ginger consumption with $p < 0.001$ (16).

On the other side, in the group B, there were still women encountering severe pain after the intervention. The advantage of warm water consumption in reducing pain were explained in several non-scientific articles. Unfortunately, only a few research showed the effects of this method to reduce pain. Hence, we aimed to provide more scientific proof about this presumed method of pain management. It turned out that our results were aligned with research conducted by Rahmawati (2016). The research showed that warm water consumption had insignificant effects to the pain reduction (17).

In the meantime, the results of the compress method showed a significant level of pain reduction after red ginger compress and warm water compress. According to Zuriati (2017), since labour pain and anxiety are correlated, red ginger can reduce anxiety by reducing labour pain. It has a heat effect, which may relieve pain, stiffness, and muscle spasm. It also may prevent the vasodilatation of blood vessels as well (18). The benefits of red ginger in reducing pain reached its peak after 20 minutes of intervention. Furthermore, red ginger compress allegedly led to a greater metabolism rate, causing the increasing of blood flow rate. As a result, more leukocytes can be delivered to lessen the pain (19).

Similar to the effect of red ginger compress, warm water compress also showed pain reduction effects. This aligned with the results from Marlina (2018), Bakara et al. (2013) and

Paulina et al. (2011) showing that warm water compress exhibited the effect of pain reduction (12, 20, 21). Warm water compress showed relaxation effect due to its ability in increasing blood flow rate to reduce pain from spasm and stiffness. It also maintained vascular system component in a vasodilatation condition as a result the blood flow to pelvic muscles became homeostatic and patient adapted to the pain during labour. Perry and Potter (1993) further explained that warm water compress is a cutaneous stimulation to release endorphin and block pain stimulus transmission (22).

Bivariate analysis

Table 6. The effect of each intervention on the labour pain at the first stage of active phase

Detail of analysis	Number of samples	Z	Significance
Labour pain at the first stage of active phase before and after red ginger tea consumption	15	-3.462	0.001
Labour pain at the first stage of active phase before and after warm water consumption	15	-2.673	0.008
Labour pain at the first stage of active phase before and after red ginger compress	15	-3.418	0.001
Labour pain at the first stage of active phase before and after warm water compress	15	-3.071	0.002

As seen in Table 6, the Wilcoxon test for red ginger tea consumption showed the correlation between the two variables of -3.642 with the significance of 0.001. This implied that the correlation between two variables during before and after intervention was strong and significant. Furthermore, the p-value was 0.001, due to p-value 0.000 < α (0.05), H_0 was rejected then. It means that red ginger tea consumption did give any effects on the labour pain reduction at the first stage of active phase.

Meanwhile, for warm water consumption, the Wilcoxon test exhibited the correlation between two variables at -2.673 with the significance of 0.008. This indicated that there was no correlation between two variables during before and after intervention. In addition, the p-value was 0.008. because of p-value 0.000 < α (0.05), H_1 was rejected, meaning that there was no significant effect of warm water consumption on the labour pain reduction at the first stage of active phase.

For the compress method, the Wilcoxon test for red ginger compress showed that the correlation between the two variables was -3.418 with a significance of 0.001. This implied that the correlation between two variables before and after intervention was strong and significant. Furthermore, the p-value was 0.001, and due to the p-value 0.000 < α (0.05), H_0 was rejected. It means that red ginger compress did give any effect on the labour pain reduction at the first stage of the active phase.

Meanwhile, for warm water compress, the Wilcoxon test exhibited a correlation between the two variables at -3.071 with a significance of 0.002. This indicated that the correlation between the two variables was also strong and significant. Besides, the p-value was 0.002. The p-value of 0.000 < α (0.05) showed that H_0 was rejected, meaning that there was a significant effect of warm water compress on the labour pain reduction at the first stage of the active phase.

The difference between the effect of red ginger tea and warm water consumption and compress to the labour pain at the first stage of the active phase

Table 7. The difference between the effects of each intervention to the labour pain at the first stage of the active phase

Intervention		Mean	Z	p-Value
Red ginger tea consumption	Before	6.27	-4.261	0.000
	After	3.08		
Warm water consumption	Before	6.53		
	After	5.87		
Red ginger compress	Before	15.27	-3.240	0.001
	After	7.20		
Warm water compress	Before	23.40		
	After	19.87		

According to a statistical test (Table 7), the Mann Whitney (Z) value was -4.261 with p-value equal to 0.000. The p-value less than α (0.05) showed that H_0 was rejected, and H_a was accepted instead, showing a different effect between red ginger tea and warm water consumption on reducing pain at the first stage of active phase. Based on the results, it was also known that drinking red ginger tea could give the average difference of pain reduction with the value of 2.99, while drinking warm water only brought up 0.66 average difference. It can be concluded that drinking red ginger tea could give higher contribution in relieving labour pain at the first stage of active phase compared to drinking warm water.

For the compress method, the Mann Whitney (Z) value was -3.240 with p-value equal to 0.001. The p-value less than α (0.05) showed that H_0 was rejected and H_a was accepted instead, meaning there is a different effect between red ginger compress and warm water compress on relieving anxiety at the first stage of the active phase. Based on the results, it was also known that red ginger compress could give the average difference of pain reduction with the value of 8.07, while warm water compress brought up a 3.05 average difference. In conclusion, red ginger compress gave a higher contribution to relieve labour pain at the first stage of the active phase compared to warm water compress.

CONCLUSION

Based on statistical analysis, there was a significant different effect of red ginger and warm water on the labour pain reduction at the first stage of active phase. Moreover, red ginger gave a greater contribution to the reduction of labour pain compared to warm water. Comparing the two methods, the greater Z value of red ginger tea consumption was found in comparison to the Z value of red ginger compress, reflected that the drinking method was more effective than the compress method.

Following this research, we suggested to do an optimization to find out the optimum amount of the red ginger should be consumed to relieve pain effectively. Considering that the compress method was also successfully reduced the degree of pain, we recommended to develop a method to improve the penetration of the active compounds contained in red ginger into the skin. In the long run, the drug development of a pain relief containing the active compounds in red ginger should be conducted.

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AUTHOR CONTRIBUTION

All authors have equal contribution. All authors have discussed the results and contributed to the final manuscript.

CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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