The Profile of Interleukin-6, PGE2, and Menstrual Pain Levels through the Counter-Pressure Regiosacralis Therapy

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Abstract: Menstrual pain (dysmenorrhea) is a pain frequently felt by most women due to the progesterone hormone instability in blood. The pain is commonly felt since the first day of the menstrual period. The mostly used therapy for dysmenorrhea was the pain killing therapy which resulted to a number of bad side effects such as organ damage and hypertension. The non-pharmacological therapies, such as the counter-pressure region sacralis may become an effective and safe alternative to reduce pain. This research aims at describing the profile of interleukin-6, PGE2, and menstrual pain levels through counter-pressure region sacralis therapy. A quasiexperimental research method was conducted with research samples of 50 female teenagers who meet the inclusion criteria. Counter-pressure interventions were given three times when the pain occurred for 45-50 second per treatment. The pain level was measured before and after treatment through Numeric Rating Scale. The research result showed that respondents' average age was 18.74 (± 3.148) years old, with the youngest age of 15 years old, and the oldest age of 35 years old; most respondents had their first menstrual period (menarche) at the age of 12.58 (± 1.23) years old; the average pain scale before intervention was 5.0 (± 1.54;max 3;min 9); the average pain scale after intervention was 2.53 (± 1.474;max 7;min 1); the average Interleukin-6 was 4.82 (± 5.66) pg/ml; and the average prostaglandin E-2 was 994.73 (± 221.82) pg/ml. This research concludes that counter-pressure region sacralis is effective to decrease menstrual pain.

Keywords: menstrual pain, counter pressure regiosacralis, prostaglandin, interleukin

1. INTRODUCTION

Menstrual pain (dysmenorrhea) is a gynecologic complaint due to progesterone hormone instability in blood which is frequently experienced by women[1] and which possibly happens in the first to several days of menstrual period[2]. Some researchers from different countries have reported about the occurrence of high menstrual pain [3,4]. The results of a study conducted among 404 middle school female students in Muscat Oman showed that 380 (94%) female students[3] This finding is similar with a study conducted in Turkey where 1298 (85.7%) of the respondents also experienced menstrual pain[4].
The prevalence of dysmenorrhea in Indonesia itself in 2008 was stated at 64.25% consisting of

54.89% of primary dysmenorrhea and 9.36% of secondary dysmenorrheal [5]. Some factors causing the dysmenorrhea included both psychological and physical disturbance such as stress, shock, narrowing of blood vessels, and decreasing physical conditions[6], i.e. poor health conditions, e.g. anemia can worsen menstrual pain conditions[7–9].

Various methods have been implemented to reduce menstrual pain. The intervention forms given included the intervention to relieve pain with both pharmacological and non-pharmacological therapies. The use of pharmacological therapies, e.g. painkillers (paracetamol, mefenamic acid, ibuprofen, methampyrone, etc.) and the use of excessive or discontinuing analgesic may result to side effects on the kidney functions and hepatotoxic especially on patients with kidney disturbance or those who continuously consume alcohol and experience liver damage and hypertension[10]. Pharmacological interventions were more frequently performed with sedative, analgesic, and anesthesia, while the interventions which can reduce pain use non-pharmacological therapies which include hypnotic, acupressure, yoga, hydrotherapy, acupuncture, and counter pressure. *Counter Pressure Regio Sacralis* is a therapy where the therapist gives strong pressure or push to the waist of a patient's body which aims at managing and inhibiting the pain impulses along the central nervous system. This therapy was proven effective in terms of reducing the pain during the first phase of a labor through turning pain from severe to mild level[11–13]. Not many studies tried to implement *Counter Pressure Regio Sacralis Therapy* for other pain conditions which include the menstrual pain, especially on the first day of menstrual period which bears the highest level of pain compared to the pain felt for the following days. For this situation, researchers are interested in conducting a research on the influence of *Counter Pressure Regio Sacralis* on menstrual pain and seeing the profile of Interleukin-6 and PGE2 level as the menstrual pain occurs.

2. METHOD

This research used a quasi-experimental method with the research population comprised of female teenagers who were experiencing dysmenorrhea (menstrual pain) on the first day of their menstrual period and who were not using painkillers. There were 50 female teenagers based on the inclusion criteria who were selected as research samples. Each respondent was provided with three *counter-pressure* treatments for 45-50 seconds each which were provided to respondents whenever they would experience menstrual pain. The pain levels were measured before and after treatments through the numeric rating scale.

3. RESEARCH RESULT

The research results showed that respondents' average age was 18.74 (± 3.148) years old, with the youngest age of 15 years old and the oldest age of 35 years old. Based on the confidence interval value of 95%, it could be predicted that the female age in the population meeting the inclusion criteria ranged between 17.85–19.63 years old. The respondents had the average body mass index of 20.72 (± 2.423) kg/m^2, with the lowest body mass index of 17 kg/m^2 and the highest body mass index of 27 kg/m^2. Based on the *confidence interval value* of 95%, it could be predicted that the body mass index of the female students in the population meeting the inclusion criteria ranged between 20.04–21.41 kg/m^2. The respondents experienced their first menstrual period (*menarche*) averagely at the age of 12.58 (± 1.23) years old, with the youngest respondents at 9 years old and the oldest respondents at the age of 16 years old. Based on the confidence interval value of 95%, it could be predicted that the age of female respondents in the population experiencing *menarche* and meeting the inclusion criteria ranged between 12.23 – 12.93 years old.

The *counter-pressure* treatments were provided to respondents in order to figure out the influence of those treatments on the pain during menstrual period. The results showed that the average pain scale before being provided with *counter-pressure* treatments was 5.0 (± 1.54), with the minimum value of 3 and maximum value of 9. Based on the confidence interval value of 95%, it could be predicted that the pain scale before being provided with *counter-pressure* treatments of female respondents in the population meeting the inclusion criteria ranged from 4.56-5.44. Meanwhile, the respondents' average pain scale after bring provided with *counter-pressure* treatments was 2.53 (± 1.474), with the minimum value of 1 and maximum value of 7. Based on the *confidence interval* value of 95%, it could be predicted that the pain scale of female respondents in the population meeting the inclusion criteria ranged between 2.1-2.94.

The result of the analysis on the respondents' average difference revealed that there was a significant decrease between the pain scale before and after being provided with *counter-pressure* treatments ($p < 0.05$) with the average decrease of 2.48. The pain scale decrease was experienced by 100% of the respondents with an average level of 25.50. Based on the analysis results, it can be concluded that the *counter-pressure* treatments can decrease respondents' menstrual pain.

Table 1

The difference of pain levels before and after being provided with *counter-pressure* treatments

Indicator	pre-test		post-test		p
	f	%	F	%	
Pain Level					
Mild pain	10	20.0	38	76.0	0.0001 [a]
Medial pain	33	66.0	11	22.0	
Severe pain	7	14.0	1	2.0	

[a] *Wilcoxon-test*

All of the respondents performed a laboratory examination in order to figure out the concentration of *Interleukin-6* and *Prostaglandin E-2* through their venous blood specimens. This examination was conducted after the respondents were provided with *counter-pressure* treatments. The research results showed that the respondents' average *Interleukin-6* concentration was 4.82 (± 5.66) pg/ml, with the minimum value of 0.02 pg/ml and maximum

value of 21.629 pg/ml. Based on the *confidence interval* value of 95%, it could be predicted that the *Interleukin-6* concentration of female respondents in the population meeting the inclusion criteria ranged between 3.21-6.43 pg/ml. Meanwhile, the respondents' average *Prostaglandin E-2* concentration was 994.73 (± 221.82) pg/ml, with the minimum value of 394.242 pg/ml and maximum value of 2045.030 pg/ml. Based on the *confidence interval* value of 95%, it could be predicted that the *Prostaglandin E-2* concentration of female respondents in the population meeting the inclusion criteria ranged between 931.68-1057.76 pg/ml.

Profile of Interleukin-6

32%

68%

*Note: High (Blue), Low (Orange)
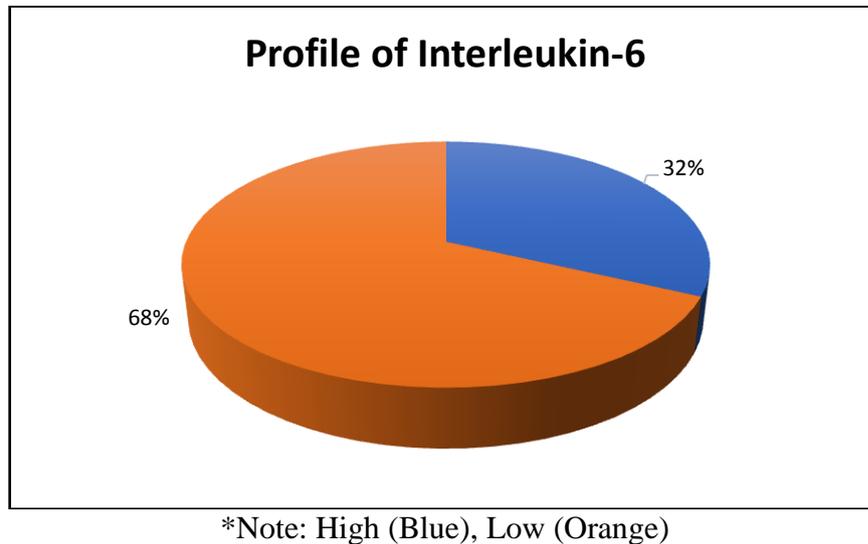
Figure 1. Proportion of Respondents' Interleukin-6 Concentration Levels

Profile of Prostaglandin E-2

36%

64%

*Note: High (Blue), Low (Orange)
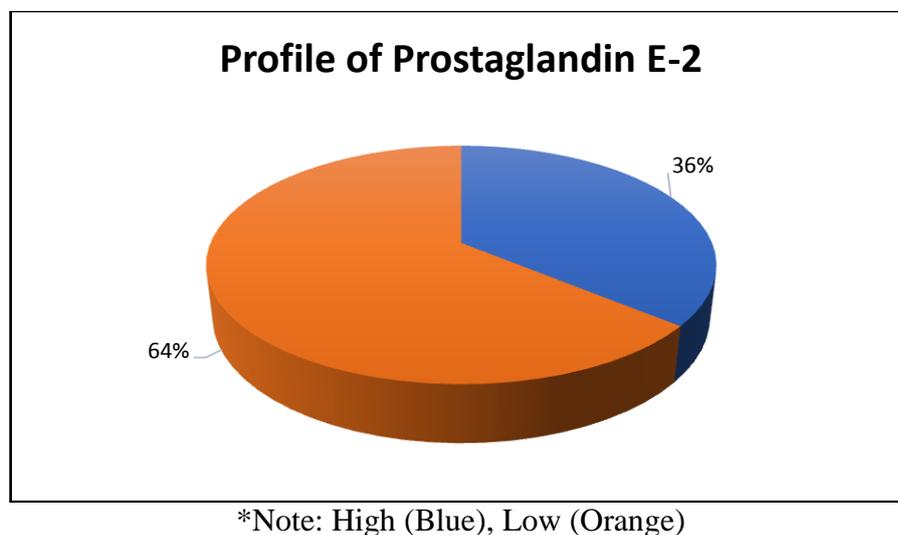
Figure 2. Proportion of Respondents' Prostaglandin E-2 Concentration Levels

The researchers performed the control analysis in order to make sure that the influence of *counter-pressure* treatments will decrease respondents' pain. The control was observed through performing the correlation test between the respondents' characteristics consisting of the following: age, body weight, body height, and age of *menarche* with the respondents' pain scale decrease. The research results showed that there was no variable of respondents' characteristics that correlates with the respondents' pain scale decrease (p>0.05).

Table 2

The Relationship of Respondents' Characteristics with Pain Scale Decrease

Indicator		Correlation Coefficient	P
Age		-0.067	0.642 [b]
Body Height		0.250	0.080 [b]
Body Weigh		-0.056	0.697 [b]
Age of *Menarche*		-0.024	0.870 [b]

[b]*Rank Spearman test*

4. DISCUSSION

Menstrual pain (dysmenorrhea) is a problem frequently faced by women experiencing menstruation, in which 82.2% experienced menstrual pain[14], especially on the first day of menstrual period[15]. There are some factors which influence menstrual pain and which relate to women's physical conditions, e.g. shock, narrowing blood vessels, chronic diseases, reduced blood, and decreasing immunity and psychological conditions, e.g. stress[6,16]. Medial to several pain levels experienced by women at the school and productive age the daily activities, such as going to school/work[17], studying, social interaction, appetite, sleeping, and others are affected. So it should be given importance.

The pain level of each individual is different due to a number of factors. However, some researchers reported that the average pain level is experienced during menstrual period at the medial and severe level[18]. This is in accordance with the result of this research where 33 (66%) respondents experienced medial pain level, while 10 (20%) respondents experienced severe pain on the first day of their menstrual period. Beside the pain scale, pain indicator was seen based on the respondents' height of chemical mediator values of *Interleukin-6,* with an average of 4.82 (± 5,66) pg/ml and *Prostaglandin E-2* with an average of 994.73 (± 221.82) pg/ml. those high values in both chemical mediators caused the circulation disturbance due to the blood vessels' vasoconstriction.

There was a uterus activity increase in the ovulation process which caused the decrease of blood flow. Consequently, the uterus ischemia happened and resulted to pain. High prostaglandin level in women with dysmenorrhea history also caused the sensory nervous pain in uterus which is sensitive to the work of bradykinin and other pain stimuli. Besides, women with history of dysmenorrhea experienced vasopressin level increase. If dysmenorrheal followed with the increase of oxytocin level results in the uterus construction irregularity, hypoxia, and uterus ischemia[19].

The conventional therapies frequently used to relieve pain are the analgesic pharmacology (NSAIDs) and oral contraception pills, yet only around 6% of teenagers were given the pharmacological therapy to relieve pain, while the other 70% used their independent therapy[17]. Some non-pharmacological therapies have been investigated and developed which includes Counter Pressure Regio Cacralis Method. This therapy was frequently used to relieve labor pain[13,20] and menstrual pain[21] where mechanisms work by pressing or reducing pain resulted from the production of chemical mediators, such as the effective prostaglandin and *Interleukin-6* to possibly decrease pain scale[22]. Counter pressure was proven effective to decrease pain compared with other therapies, such as Back-Effleurage[12] and abdominal lifting[23]. This finding is in accordance with the result of this research where there was a significant influence to the pain level changes after being provided with counter-pressure regio sacralis therapy with an average decrease of 2.48 (p-value<0.05).

Counter-Pressure Regio Sacralis Therapy consists of constant strong push given to some points on the lower back during contractions, through hand fists, end of hand palms, or strong objects. The pressure may be provided in both thighs at the side through hands performed by health service helpers or providers[24]. The Counter-Pressure Regio Sacralis Therapy has been developed through tested instruments where results are as effective as the use of humans' physical power[20]. The working mechanisms from the procedures of Counter Pressure Region Sacralis Therapy are done through blocking the pain message gate (Gate Control Theory) which will be delivered to the medulla spinalis and brain. The hands' pressure around the sacrum areas should be provided when performing the counter pressure techniques[25]. This theory states that pain impulses can be managed or even inhibited through defending mechanisms along the central nervous system. The pain impulses are delivered when a defense is opened and impulses are inhibited when a defense is blocked. The effort to block the defense is the therapeutic principle to relieve pain[26].

5. CONCLUSION

Counter Pressure Regio Sacralis Therapy reduces the pain level by giving pressure on *lumbalis* area through blocking the pain stimulation gates. The average pain scale decrease after being provided with this therapy was at 2.48. Thus, it can be concluded that the **Counter-Pressure Regio Sacralis Therapy** *is* effective to reduce the pain by women experiencing dysmenorrhea.

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