

Thiamine Supplementation for Primary Dysmenorrhea

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Abstract: Objectives: This research is an experimental study with one group pretest and post test to analyze the effectivity of thiamin supplementation as a treatment for primary dysmenorrhea. **Methods:** This research was carried out at Faculty of Medicine, University of Sumatera Utara, with total sample 50 person from February 2019 until April 2019. We required the sample using consecutive sampling, the visual analog score (VAS) of the same subject was obtained for primary dysmenorrhea before thiamin supplementation as a control and those subject were given thiamin supplementation for 2 menstrual cycle to assess the VAS after supplementation. **Results:** Based on this study with 50 sample of medical student of Universitas Sumatera Utara with primary dysmenorrhea as sample, we found that there is a significantly difference within the VAS before and after thiamine supplementation, for the first cycle and second cycle ($P < 0,001$). **Conclusion:** This study concludes the primary dysmenorrhea treatment with thiamine has been accepted, consider the efficacy and minimal side effect. Thiamine has been approved for primary dysmenorrhea pain, so this supplementation could consider as the substitute for NSAID with higher side effect.

Keywords: Primary Dysmenorrhea, Thiamine, VAS

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I. Introduction

Pain comes as the most common gynecological complaint in women. Forty to seventy percent of women in the repaired recovery period are inhabited and 10 percent experience it to spend every day. In the United States, menstrual pain is obtained by 30-70% of women of reproductive age, and 50-60% of adult women who are not married. However, according to Riyanto, there is no definite number of pain sufferers in Indonesia. This disorder occurs in 60-70% of women in Indonesia with 15% who are approved about their activities being limited due to dysmenorrhea.^{1,2}

At present, there is no adequate management to treat primary dysmenorrhea other than symptomatic. Various types of herbal supplements and foods have been recognized to help reduce dysmenorrhea. One study has shown that 100 mg of thiamine (vitamin B1) taken daily is an effective drug for dysmenorrhea: 87% of patients recovered until two months after treatment. Systematic reviews have concluded that the only supplement proven to be effective is vitamin B1 (B1 deficiency is thought to increase muscle cramps), magnesium (supplementation is thought to reduce prostaglandin levels). Complementary and alternative medicine (CAM) from SOGC has proposed a new treatment approach such as vitamin B1 of 100 mg per day is an effective therapy for primary dysmenorrhea.^{3,4}

Based on several previous studies, researchers were interested in examining the effectiveness of thiamine (vitamin B1) supplementation against complaints of menstrual pain (dysmenorrhea) in medical students at the medical faculty Medan.

II. Materials and Methods

The design of this study is a quasi-experimental test with a design of one group pretest and posttest design in all USU medical faculty students who suffer from primary dysmenorrhea starting from February 2019 to April 2019.

III. Results and Discussions

The research subjects characteristics based on age, age of menarche, body weight, body height, and BMI are explained in the table below.

Table 1. The average of characteristics of the research subject

| Characteristics | Mean | SD | Median (Min-Max) |
|--------------------------|--------|------|-------------------|
| Age (years) | 20,42 | 1,88 | 20 (18-25) |
| Age of menarche (years) | 12,56 | 0,97 | 12.5 (11-14) |
| Body Weight (kg) | 51,46 | 9,71 | 49 (40-86) |
| Body Height (cm) | 159,74 | 6,05 | 159.5 (150-170) |
| BMI (kg/m ²) | 20,11 | 3,07 | 19.55 (16.6-33.6) |

Table 1. shows the median value of each characteristic of the study sample. Based on age, the median value is 20 years (18-25 years). From menarche age, the median value is 12.5 years (11-14 years). Based on weight and successive height, the median value was 49 kg and 159.5 cm. The median value of the body mass index is 19.55 kg/m² (normoweight) with a range of 16.6-33.6 kg/m².

Table 2. Degree of pain before and after administration of thiamine

| VAS | Mean | SD | Median | Min. | Max. |
|--|------|------|--------|------|------|
| Before Thiamin Administration (February) | 4,72 | 0,96 | 5 | 3 | 7 |
| After Thiamin Administration First Month (March) | 3,82 | 0,69 | 4 | 3 | 5 |
| Sesudah Pemberian Thiamin Second Month (April) | 1,68 | 1,31 | 1,5 | 0 | 6 |

Table 2 shows the degree of pain (VAS) is explained before and after thiamine administration. The mean degree of pain before thiamine administration was 4.72 (in February), whereas the average degree of pain after thiamine administration tended to decrease which was carried out for 1 and 2 months after administration which are 3.82 and 1.68.

Table 3. Differences in primary dysmenorrhoea pain before (February) and after 1st month thiamine administration (March)

| | EarlyVAS (median (min-max)) | VAS I (median (min-max)) | p |
|------------------------|--------------------------------|-----------------------------|---------|
| Thiamin Administration | 5 (3-7) | 4 (3-5) | <0,001* |

*Wilcoxon test

Table 4. Differences in pain in primary dysmenorrhoea before (February) and after administration of second month thiamine (April)

| | Early VAS (median (min-max)) | VAS II (median (min-max)) | p |
|------------------------|---------------------------------|------------------------------|---------|
| Thiamin Administration | 5 (3-7) | 1,5 (0-6) | <0,001* |

*Wilcoxon test

Table 5. Differences in primary dysmenorrhoea pain after 1st month thiamine (March) and 2nd month (April)

| | VAS I (median (min-max)) | VAS II (median (min-max)) | p |
|------------------------|-----------------------------|------------------------------|---------|
| Thiamin Administration | 4 (3-5) | 1,5 (0-6) | <0,001* |

*Wilcoxon test

In table 3, table 4, table 5, the Wilcoxon test was carried out because the data were not normally distributed, to assess differences in pain before and after administration of thiamine, from the test there was a difference in the initial VAS values before and after thiamine administration in the first month or second month with a value of p <0.001 (p <0.05). Then also tested the two VAS values after administration of thiamine, with a value of p <0.001 (p > 0.05) which means that there are significant differences in the value of both VAS.

IV. Discussion

The main causes of primary dysmenorrhea are almost unknown, ranging from increased activity of aldosterone, adrenal function, hyperprolactinemia, hypoglycemia, reduced levels of central dopamine, serotonin, essential fatty acids.⁵

Menarche age varies by individual and is a sensitive indicator to describe the characteristics of the population besides nutritional status, environmental factors, and socio-economic impacts on dysmenorrhea. There was no significant difference between menarche age and dysmenorrhea severity (p=0.76). This was also published by Akbarzadeh: there was no significant relationship between menarche age and dysmenorrhea

($p=0.15$). On the contrary, Shrotriya succeeded in showing a significant correlation between these two variables; more due to long-term prostaglandin exposure which triggers the high incidence of dysmenorrhea in women with early menarche.^{6,7}

The frequency of primary dysmenorrhea in the underweight, normoweight, and overweight group was 20.3%, 66.73%, and 12.93% of the 579 women who were sampled in this study ($p = -$, OR 1; $p = 0.053$, OR 1.69; $p = 0.153$, OR 1.88); Khodakarami concluded there was no relationship between the severity of dysmenorrhea and body mass index. Increasing body weight can interfere with the balance of steroid hormones, such as androgen, estrogen, and sex hormones that are bound to globulins due to increased levels of estrogen produced by adipose tissue.^{8,9}

The reduction in pain intensity based on the Visual Analog Scale (VAS) was clearly seen significantly ($p = 0.001$) between before and after thiamine administration, which was 48.69 mm and 36.34 mm respectively. Similar results can also be observed in the duration of dysmenorrhea that is much reduced before than after administration of thiamine, ie 2.01 hours and 1.47 hours ($p = 0.001$). This finding was also reported by Ziaei et al. with the results of this study that found a significant difference in the reduction in pain intensity between before and after thiamine administration in primary dysmenorrhoea with a value ($p < 0.001$).¹⁰

Regarding the side effects of giving vitamin B1, it was reported that 2 samples (2.6%) complained of heart palpitations and 3 other samples showed symptoms of malaise, the rest there were no complaints. Some studies report anxiety as another side effect.¹¹

Hosseini et al. investigating the intensity and duration of dysmenorrhea was significantly reduced in the experimental group given thiamine, fish oil, and both ($p < 0.001$, $p = 0.018$, $p < 0.001$) than in the placebo group ($p = 0.79$). From the research of Abdollahifard et al. a significant reduction in pain intensity in women with dysmenorrhea ($p < 0.0001$) from before administration of thiamine was found, the first month to the third month of administration of vitamin B1: 47.49 ± 0.34 , 23.45 ± 0.83 , 15.40 ± 0.52 , 32.09 ± 0.73 ($p < 0.0001$). A Cochrane Collaboration article attached clinical trials ($n = 556$) with a significant difference between thiamine and placebo administration in two months to relieve dysmenorrhea; none of them relieved the pain in the placebo group (OR 14.74, 95% CI 10.07-21.58).^{5,12}

V. Conclusion

From the sample characteristics, the median values for age, menarche age, and body mass index were 20 years (18-25 years), 12.5 years (11-14 years), and 19.55 kg / m² (16.6- 33.6 kg / m²). The mean degree of pain before thiamine administration was 4.72 (in February), whereas the average degree of pain after thiamine administration tended to decrease which was carried out for 1 and 2 months after administration which are 3.82 and 1.68.

There was a significant difference between VAS values before and after administration of thiamine, both in the first and second months ($p < 0.001$). Thiamine has so far been accepted as a treatment for dysmenorrhea, given the efficacy and small complications it presents, proven to be effective in treating dysmenorrhea so that it can be considered a substitute therapy for NSAIDs with higher side effects. The use of thiamine can reduce the intensity of dysmenorrhea during the menstrual cycle. Thiamine does not change the user's menstrual pattern.

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References

- [1]. Joshi T, Kural MR, Agrawal DP, Noor NN, Patil A. Primary dysmenorrhea and its effect on quality of life in young girls. *Int J Med Sci Public Health* 2015;4:381-385
- [2]. Dysmenorrhea. Clinical Guideline Gynecologic Service. 2016. From website: https://phpa.health.maryland.gov/mch/FP_Guidelines_2016/1.9,Gyn,Dysmenorrhea,Final,2012.pdf
- [3]. Patient information from BMJ Group. Painful periods. *BMJ* 2015
- [4]. Harel Z. Dysmenorrhea in adolescents and young adults: etiology and management. *J Pediatr Adolesc Gynecol* (2006) 19:363e371
- [5]. Hosseinlou A et al. The effects of fish oil capsules and thiamin tablets on duration and severity of dysmenorrhea in students of high school in urmia-iran. *Global Journal of Health Science*; Vol. 6, No. 7; 2014
- [6]. Ambade R, Sagdeo M. Age at menarche and the menstrual pattern of secondary school adolescents in central India. *International Journal of Research in Medical Sciences*. 2017.
- [7]. Akhbarzadeh M, Tayebi N, Abootalebi M. The Relationship between Age at Menarche and Primary Dysmenorrhea in Female Students of Shiraz Schools. *Shiraz E-Med Medical Journal*. 2017.

- [8]. Pakniat H, Jahanian S, Hemmati N, et al. The Association of Anthropometric Indices with Dysmenorrhea in High School Students: A Cross-Sectional Study. *International Journal School Health*. 2019.
- [9]. Khodakarami B, et al. The Severity of Dysmenorrhea and its Relationship with Body Mass Index among Female Adloscents in Hamadan, Iran. *Journal of Midwifery and Reproductive Health*. 2015.
- [10]. Yu A. *Complementary and alternative treatments for primary dysmenorrhea in adolescents*. Wolters Kluwer Health. 2014.
- [11]. Zafari M, Aghamohammady A, Tofighi M. Comparison of the Effect of Vitamin B1 and Acupuncture on Treatment of Primary Dysmenorrhea. *ISCA Journal of Biological Sciences*. 2012.
- [12]. Proctor M, Murphy PA. *Herbal and dietary therapies for primary and secondary dysmenorrhoea*. The Cochrane Collaboration. Wiley. 2009.

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