



Comparison of the influence of acupressure and self-care behavior education on the severity of primary dysmenorrhea based on visual analogue scale among students

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ABSTRACT

Dysmenorrhea is one of the frequently occurring problems which affect many young women's life, and their efficiency and productivity. The aim is comparison of the effect of acupressure in two points of Guan Yuan (RN- 4) and Qiuju (RN- 2) with self-care behaviors education on severity of primary dysmenorrhea based on visual analogue scale. This is a non-randomized open-label parallel-group clinical trial. The study was conducted on 120 female students residing in dormitory who suffered from dysmenorrhea in three groups in 2014. Pressure in the acupressure group was done for 20 minutes (15 seconds pressure, 15 seconds rest) on the first two days of menstruation for two cycles. Training was conducted in four sessions and the control group received ibuprofen 400 mg for three cycles. For evaluating of pain severity, visual analog scale was applied. Paired t-test was employed to compare the means before and after the intervention. The mean and standard deviation of pain severity before and after the intervention in all three groups of acupressure and education of self-caring behavior and control before and after the intervention showed statistically meaningful differences ($p < 0.05$), but there was no significant difference among the three groups statistically ($p > 0.05$). Regarding the prevalence and side effects of medical methods (non-steroid anti-inflammatory such as ibuprofen), it can be said that today we can equally use methods with the same effects like acupressure and education of self-caring in order to reduce the pain caused by dysmenorrhea which are available easily and with the least cost.

Keywords: acupressure, dysmenorrheal, education

Key Messages: acupressure and education of self-caring in order to reduce the pain caused by dysmenorrhea can equally effective ibuprofen treatment

INTRODUCTION

After menarche, the most common menstrual disorders among teenagers include painful menstruation (dysmenorrhea), irregularity in menstrual period and premenstrual syndrome. 75 percent of the girls have experienced some of the problems related to menstrual period. These problems may have resulted in educational failure and loss of self-confidence [1].

Dysmenorrhea is the severe cramping pain and increased sensitivity of the lower abdominal region [2]. Other symptoms include nausea, vomiting, diarrhea, fatigue, fever, headache and lightheadedness [3] pains in the back and a decrease in appetite, tiredness and anger [4]. In addition to the physical symptoms and signs, some of the matured girls may experience unpleasant psychological conditions, mild depression, and loss of concentration in class due to primary dysmenorrhea [5, 6]. Dysmenorrhea may lead to problems in life, work and school and the individual bears economic burdens [7].

Frequency of primitive dysmenorrhea has been assessed up to 20 to 90 percent in the menstrual cycle of females [3]. Some studies have reported the prevalence of primary dysmenorrhea as much as 40- 90 percent, and the prevalence of it has been considered various according to the age, place of residence, and the number of participants [8].

Frequency of dysmenorrhea in China in a research was reported 33.1 percent, of which 53.2 percent had primary dysmenorrhea and 13.55 percent suffered from secondary dysmenorrhea [9].

Its frequency varies from 60-90 percent in countries such as Canada, the United States, Turkey, Malaysia and Taiwan. More than 15 percent of the girls have experienced severe dysmenorrhea [5,10]. Frequency of dysmenorrhea in Iran is 74 to 86.1 % [11].

Dysmenorrhea can lead to mental and psychological problems and social isolation in some women, and it is one of the reasons for reduced participation of the women in the society [12,13].

Several treatments are suggested for dysmenorrhea, of which some are effective and some others are reported non-effective[11,12]. These include contraceptive pills, dilatation of the cervix in severe degrees, IUD, sport activities [14], acupuncture, thiamine behavioral treatment, relaxation, suitable local heat about 39 degrees Celsius [15], herbal and low fat diet, psychotherapy [16], biofeedback [17], keeping the waist and belly warm, electrical stimulating of the lumbar nerves, food supplements like calcium, magnesium, vitamin E, B, C, avoidance of smoking, salt consumption restrictions, and use of fish oil [18], spinal manipulating [19] and acupuncture [15]. Common medications include prostaglandin inhibitors [20], non-steroid anti-inflammatory and birth control pills [3]. Drugs include Aspirin, Acetaminophen, Ibuprofen, Naproxen, Mefnamic acid [14], Cetoprofen, Celecoxib[21], Paracetamol, and Diclofenac sodium [22].

Non-steroid anti-inflammatory drugs may force the patient to change the treatment due to making digestive problems (diarrhea, stomach pain and nausea) [23].

Ibuprofen is one of the drugs with the most efficacy and less side effects [18], but it may lead to inflammation and bleeding of the stomach and intestines, skin rash, itching, dizziness, and problems with liver and kidney[23].

Acupuncture is the use of touch technique in order to balance the stream of body energy or Qi in the human body. Philosophical Chinese idea is based on this fact that in the human body there are several canals in which a vital process called Qi is moving in the organs of the body and the lack of movement in the body causes different disease states [24].

The results of the study conducted by Vang et al. (2010) showed that pressure on the Sanyinjiao point (sp6) in order to affect the pain and distress regarding dysmenorrhea caused a statistically meaningful decrease in visual analogue scale in 2 groups of intervention with acupuncture (P= 0.003) and group of self-caring education (P= 0.008) [5].

Clinical interventions regarding complementary medicine have increased and the evidence on the effect of acupuncture and nursing interventions is important. With regard to few comparative researches in the past, this study was conducted to compare the effect of acupuncture with education of self-caring behaviors on the severity of primary dysmenorrhea based on visual scale questionnaire among students.

MATERIALS AND METHODS

In this clinical trial, non-medical sciences students residing in dormitories in Shiraz University were enrolled. With regard to the formula $N = \frac{2(z_{1-\alpha/2} + z_{1-\beta})^2 \sigma^2}{d^2}$ and reference to the research conducted by Kashefi and his colleagues[7] and with replacement of values of $d = 1.4$, $sd = 1.8$, $\alpha = 0.05$, $1 - \beta = 0.40$ and counting 10 percent drop,

the sample size for each group was obtained 40 persons (total 120 people). Among dormitories of Shiraz University, 5 dormitories were randomly selected (using table of random numbers) and of 5 dormitories were selected as the case control for acupressure, two dormitories as a group for training of self-care behavior, and one of them as a control group. Then for every dormitory, purposive sampling method was performed.

Inclusion criteria included being single (more than 95 percent of the students living in dormitories are single). So, in the primary dysmenorrhea, pelvic exams are usually healthy; therefore, for humdrum sampling only singles were selected), being less than 25 years old, having primary dysmenorrhea with severe pain or pain with score of 4 or higher (with VAS), having regular menstrual period lasting 21-35 days, experiencing painful menstrual cycle during the 6 recent menstrual period (self-reporting), not taking contraceptive pills, undergoing no treatment intervention (non-steroid anti-inflammatory, anti-progestin, supplements) from 2 months before the research, having no physical disease from 2 months before the research (broken vertebrae, discus hernia, acute inflammation, deep thrombus vein), having no gynecological and psychological diseases (no consumption of particular drugs like benzodiazepine, anti-depressants), and the lack of stress for reasons such as separation from parents and bereavement in the previous 6 months. Exclusion criteria of the study were symptoms and signs such as burning, itching and unnatural discharge from the vagina, and recent stressors (separation from parents, death of first degree relatives, etc.). During the study, lack of desire to continue the intervention was based on the patient decision.

After the approval of the ethics committee, obtaining written informed consent, and considering moral issues, sampling was done and the questionnaires were distributed among them.

In the first group, acupressure intervention was carried out in two months. Acupressure intervention was applied by the researcher under supervision of the specialist advisor of the project. Pressure was performed by the thumb of the researcher in the following points: (RN-2) and (RN-4) the point over the channel Ren Mai. Uterine artery is the origin of Meridian. The meridians of the lower abdomen (uterine in women) are the origin which begins from the perineum (between anus and external genitalia). Then, it extends from the anterior region of the symphysis pubis in the abdominal midline. RN-2 in the midline of the belly, five Sun lower than the umbilicus and its other name Qugu, Chuku. Guan Yuan spots (RN-4) in the middle of the abdomen; three Sun is lower than the umbilicus and is also called Guanyuan, Kuanyuan. The main point is that it's a place to store energy for the QI in the body and as a main course or energy path [25, 26].

Pressure was applied for 20 minutes (15 seconds pressure and 15 seconds rest) and a pressure equivalent to 1710 millimeters of mercury on the first two days of menstrual cycle. Severity of pain was assessed half an hour, 1h and 2 hours after applying the pressure. In the second cycle of menstruation, again the acupressure intervention was performed in the first month. Pressure control was done with the use of a scale and the researcher repeated this task till she achieved the skill to control the amount of required pressure applied by hand. For almost all research population, the same amount of pressure was applied. Assessment of pain was done by the research assistant. The second intervention was holding educational programs for self-caring behavior in four sessions (one session a week), each session lasting for 60-90 minutes with speech and group discussion method. In the education group, pain was evaluated and compared with each other before and after the intervention in the first menstrual cycle after training. The content of the interventional program included anatomy and physiology of the urogenital system and the food taken during menstrual period (dairy products, calcium, and vitamin D, and food containing vitamin B12, Omega 3, consumption of fiber and supplement of magnesium, calcium and Vit. E). Isometric sports during menstrual period: The researcher taught the participants supervised by a physical education expert for 4 weeks and these sports were done by girls themselves for 4 weeks (totally 8 weeks).

Group III (control) underwent the intervention for common treatment of dysmenorrhea. Severity of pain before using ibuprofen and after the first cycle, second cycle and third cycle, the effect of using ibuprofen was evaluated. They administered 400 mg ibuprofen three times a day (one tablet every 8 hours) for three cycles and after finishing the project, an educational pamphlet was given to the control group.

Pain severity assessment tool was the visual analogue scale. Visual analog scale (VAS), a scale with 10 numbers, is interpreted as follows: No pain (0), mild (1 to 3), moderate pain (4 to 6), severe pain (7 to 9), and the worst pain possible (10) [27]. The validity and reliability of the scale has been confirmed in Molazem *et al.*'s study. The content validity was measured using experts' opinion and reliability using Cronbach's alpha formula which was proved to be 0.80 [28,29,30]. Pair t-test was used for comparison of the intensity of pain after and before the

education of self-care behaviors group and after and before acupressure group. Also, Kruskal-wallis test was applied to compare the mean of the severity of pain between experimental (acupressure- education of self-care behaviors) and control groups. Mann-Whitney test was used for comparison of the intensity of pain of the acupressure group and education of self-care behaviors and also the comparison of the intensity of pain of education of self-care behaviors and the control group. A p value of 0.05 was considered as significant. To analyze the data, SPSS, version 16, was used.

RESULTS

The three groups were homogeneous based on the variables as age ($P= 0.569$), duration of pain after menarche ($P= 0.96$), and body mass index ($P= 0.605$).

The results of paired t-test showed that mean and standard deviation of the pain severity in the group undergoing education before the intervention was 6.10 ± 1.64 and after intervention it was 4.40 ± 3.55 ; the difference was statistically significant. ($P= 0.003$) (Table 1).

Table1: Comparison of the intensity of pain after and before of the education of self-care behaviors group of the visual analogue scale

Group	Before of the intervention	After of the intervention	P value ^a
	M±SD	M±SD	
Education	6.10±1.64	4.40±3.55	0.003

The mean and standard deviation of the pain severity before the intervention in the acupressure group was 7.17 ± 1.73 and with the pain severity after the intervention on the first and second days in the first month of the cycle during half, one and two hours after the intervention ($P < 0.001$), on the first and the second days in the second month of the menstrual cycle ($P < 0.001$), and during half, one and two hours after the intervention had a significant difference ($P < 0.001$) (table2).

Table 2: Comparison of the intensity of pain after and before the education in the acupressure group of the visual analogue scale

Stage of intervention	standard deviation and Mean M±SD	P value ^a
Before of the intervention	7.17±1.73	P<0.001
First month, first day, 30min after	4.07±2.24	
First month, second day, 30min after	2.70±1.62	
First month, first day, 1h after	5.05±2.34	
First month, second day, 1h after	3.27±1.83	
First month, first day, 2h after	2.22±2.18	
First month, second day, 2h after	3.62±1.91	
Second month, first day, 30min after	3.37±1.98	
Second month, second day, 30min after	1.87±1.45	
Second month, first day, 1h after	4.37±2.22	
Second month, second day, 1h after	2.82±1.64	
Second month, first day, 2h after	5.52±2.27	
Second month, second day, 2h after	3.47±1.70	

The mean and Standard Deviation of pain severity in the ibuprofen group based on the visual index of pain, before the intervention was 6.35 ± 1.52 ; one month after the intervention it was 4.97 ± 1.49 . Therefore, the difference was significant and it can be said that scores obtained from the severity of pain before and one month ($P < 0.001$) two months ($P < 0.001$) and three months after the intervention (3.07 ± 1.60 ; $P < 0.001$) had a significant difference. The mean and Standard Deviations of pain severity based on the visual index in the education, ibuprofen and acupressure groups were 4.40 ± 3.55 , 4.03 ± 1.45 and 3.86 ± 1.81 , respectively. With the use of the Kruskal- Wallis and according to the significant value ($P=0.857$), severity of pain in these three groups based on the visual index of pain had no statistically meaningful difference and the influence of each method was equal. (table3,4)

Table 3: Comparison of the mean of the severity of pain after intervention between experimental (acupressure- education of self-care behaviors) and control groups of the VAS scale

Group	N	standard deviation and Mean M±SD	P value ^a
Education	40	4.40±3.55	0.857*
Control	40	4.03±1.45	
Acupressure	40	3.86±1.81	
Acupressure	40	3.86±1.81	0.761**
Education	40	4.40±3.55	0.794**
Education	40	4.40±3.55	
Control	40	4.03±1.45	
Acupressure	40	3.86±1.81	0.583*
Control	40	4.03±1.45	

* *Kruskal-wallis test* ** *Mann-whithney test***Table 4 : Comparison of the difference in mean scores of the severity of pain in the three groups (acupressure- education of self-care behaviors and control of the VAS scale**

	Group	N	standard deviation and Mean M±SD	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	F	Sig.	df
					Lower Bound	Upper Bound					
difference mean	Education	40	1.70±3.39	0.53	0.61	2.78	-18	5	7.15	0.001	2
	Control	40	1.37±0.66	0.10	1.16	1.58	0	3			
	Acupressure	40	3.10±1.44	0.22	2.63	3.56	0	5			
	Total	120	2.05±2.27	0.20	1.64	2.46	-18	5			

DISCUSSION

The results of the study showed that the severity of pain in the education group after the intervention based on the significance level ($P=0.003$) was significant.

Chaudhuri and colleagues in India investigated the effect of sport and bottles of warm water on the severity of initial dysmenorrhea. With the use of visual analogue scale, the mean of pain severity showed a considerable reduction [30].

The advantages of the method used in our research over the method of Chaudhuri's investigation are that any of the two methods could be used at home and it is consistent with our study regarding the effectiveness in reducing pain

Education of self-care behavior in our study resulted in a decrease in pain and paying attention to the sport was one of the main aspects of this self-care education. Therefore, it can be said that sport activities lead to hypoxia.

Jamurtas stated that glucose with an increase in intercellular ATP causes closure of the ATP dependent potassium channels and the opening of calcium channels; it has also been observed that this has happened at the level of brain cells; therefore, hypoglycemia which occurs during severe physical activity conditions provides circumstances for production in beta-endorphin and the increase of its pain relieving effect [31].

The physical activity causes an increase in the levels of endorphin two to five folds more than the resting situation; even, there are higher quantities of it in the brain, but its amount cannot be measured. However, this amount of the increase depends on the individual's characteristics [32].

Aerobic exercises lead to rapid evacuation of waste material prostaglandins from the womb which is mostly responsible for pain and reduction of the duration of pain during the menstrual period [33].

Stress is one of the other effective factors in dysmenorrhea; menstrual pain originates from the increase in contraction in the uterine muscle which is innervated by sympathetic nervous system. It increases the sympathetic nervous system's activity and muscle contraction in the uterus through which pain during menstrual period increases. The aerobic exercises with a decrease in sympathetic activity and the increase in the activity of the

parasympathetic during the individual's rest lead to a decrease in stress and consequently a reduction in menstrual pain [32].

Daily et al. (2009) stated that in women with dysmenorrhea, the ligament band in their belly is in a cramping condition, so a collection of stretch exercises are useful for them and can highly improve most of the symptoms[34]. In the acupressure group based on the visual index of pain, before and after the intervention in all measurement times, there was a statistically significant difference in severity of pain. With regard to the lack of study in the points of Guan Yuan (RN- 4) and Qiuju (RN- 2), the results driven from acupressure have been brought in other parts.

Chen and his colleagues investigated the impact of acupressure on dysmenorrhea and waist pain caused by it in 129 young women with visual analogue scale score above. In this study, acupressure was applied as a massage three times a week for 30 minutes in points of SP6, BL32 and LIV3 group and control group which consisted of 64 subjects receiving education regarding the menstrual hygiene. Information was evaluated five times, i.e. 30 minutes, 4, 8 and 12 months after the intervention. During the 12 months of the follow up, the intervention group had less pain compared to the control group[35]. Other studies have also shown the effectiveness of acupressure in the treatment of dysmenorrhea and its relaxing effect [36, 37, 38, 39].

To justify pain relieving influence of acupressure, it may lead to inhibition of prostaglandin secretion and a decrease in the brain's cortex arousal and regulation of endocrine hormone discharge [13].

The use of the acupressure is based on the Meridian theory. In it, meridians are stimulated. Meridians are the ways of energy which have been scattered as a network all over the body. It is possible that energy in one or several circuits decreases or increases and this change can occur in special parts of these circuits. Lack of balance in Qi stream is an important factor in the individual's health condition [40].

Acupressure leads to the release of a variety of neurotransmitters that cut the transferred signals from the nervous system. Acupressure is a non-invasive method which controls the discharge of prostaglandin and leads to a decrease in the brain cortex arousal; it also regulates the discharge of the endocrine hormones [13].

Based on the significance value ($P < 0.001$), it can be concluded that there was a significant difference between the scores of pain severity based on the visual scale in the ibuprofen group before and after the intervention. Results of the study conducted by Rigi and Witt and colleagues (2013) were similar to those of our study, indicating the effectiveness of ibuprofen. However, this result is in contrast with those of Salmalian's study [23, 41, 42].

Ibuprofen (as a control group) causes side effect such as inflammation of the digestive system, bleeding, skin rashes, itching, tinnitus, dizziness and renal and hepatic problems, but it is successfully used in treatment of dysmenorrhea. However, its failure of treatment is about 20- 25 percent [43].

This study has several limitations. One limitation was lack of blinding. To reduce the biases, assessment of pain after treatment in both groups was performed by a research assistant. Another limitation was the difference in the mode of intervention used to reduce the difference of average pain into three groups. The third limitation was lack of placebo or no-treatment control to assess whether the apparent reduction in pain post-treatment is just a placebo effect.

CONCLUSION

The results of this study showed that there was no statistically meaningful difference among the three groups and in fact all the three treatment techniques, including acupressure, education and ibuprofen, lead to a decrease in severity of primary dysmenorrhea. Application of acupressure and self-care education in reduction of primary dysmenorrhea was able to compete with ibuprofen which is a medicine known as non-steroid anti-inflammatory drug with 80- 90% power in reducing primary dysmenorrhea.

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