

*Original Article***The effect of acupressure at the Sanyinjiao point (SP6) on primary dysmenorrhea in students resident in dormitories of Tabriz**

*Sakineh Mohammad Alizadeh Charandabi\**, *Maryam Shabani Nashtaei\*\**,  
*Sedigheh Kamali\*\*\**, *Ramin Majlesi\*\*\*\**

**Abstract**

**BACKGROUND:** There are two types of primary dysmenorrhea (spasmodic and congestive) which differ from each other in terms of the occurrence time in menstrual cycle, pain quality and other symptoms. The present study aimed to determine the effect of acupressure at the Sanyinjiao point (SP-6) on severity of menstrual symptoms (primary outcome) and the duration of resting time as well as the number of ibuprofen consumption (secondary outcome) in the two types of primary dysmenorrhea.

**METHODS:** This was a clustered randomized controlled trial on 72 eligible students residing in dormitories of public universities of Tabriz. Determining the type of primary dysmenorrhea using a Menstrual Symptoms Questionnaire (MSQ), 36 participants which suffered from each type of dysmenorrhea were enrolled from the four dormitories. The dormitories were randomly divided into intervention and control groups. No intervention was carried out at the first cycle. During the two next cycles, Sanyinjiao point of the subjects in the intervention group was pressed for twenty minutes at the time of pain. The subjects in both groups were allowed to consume ibuprofen, if needed. During these three cycles, the participants recorded and reported menstrual symptoms severity, duration of resting time and the number of the used ibuprofen.

**RESULTS:** The severity of menstrual symptoms and duration of resting time in the 2<sup>nd</sup> and 3<sup>rd</sup> cycles were significantly reduced more than control groups for both spasmodic and congestive types of primary dysmenorrhea. In addition, the average numbers of ibuprofen pills taken by both intervention groups was significantly less than the control groups. There was no significant difference between the two intervention groups in terms of any of the outcomes.

**CONCLUSIONS:** Acupressure is effective on lowering the symptoms of dysmenorrhea and duration of resting time almost equally in both spasmodic and congestive types. Therefore, using this method either alone or along with other methods is recommended to treat dysmenorrhea.

**KEY WORDS:** Dysmenorrhea, acupressure, complementary medicine, controlled randomized trial.

IJNMR 2011; 16(4):

**P**Primary dysmenorrhea is a painful menstruation which occurs in absence of demonstrable pelvic disease.<sup>1</sup> The systematic review article of 106 researches on 125249 women, conducted by the World Health Organization (WHO), reported the prevalence of dysmenorrhea as 17-81 percent.<sup>2</sup>

Dalton (1969) believed that primary dysmenorrhea can be manifested in two forms, name-

ly spasmodic and congestive. In fact, these two types of dysmenorrhea are different at the time of manifestation in menstrual cycle in terms of pain quality and other symptoms. Spasmodic dysmenorrhea is an acute pain which occurs in the first 2-3 days of menstruation and is often associated with gastrointestinal symptoms. Pain, in this type of dysmenorrhea, is confined to the parts of body which are innervated by the

\* PhD, Associate Professor, Department of Midwifery, School of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran.

\*\* MSc, Tabriz University of Medical Sciences, Aras International Campus, Jolfa, Tabriz, Iran.

\*\*\* MSc, Department of Midwifery, School of Nursing and Midwifery, Zanjan University of Medical Sciences, Zanjan, Iran.

\*\*\*\* PhD, Acupuncturist, Nanjing TCM University of China, Nanjing, China.

Correspondence to: Maryam Shabani Nashtaei, MSc.

Email: mshabaninashtaei@yahoo.com

This article was derived from MSc thesis in the Aras International Campus, Tabriz University of Medical Sciences, No: 181010.

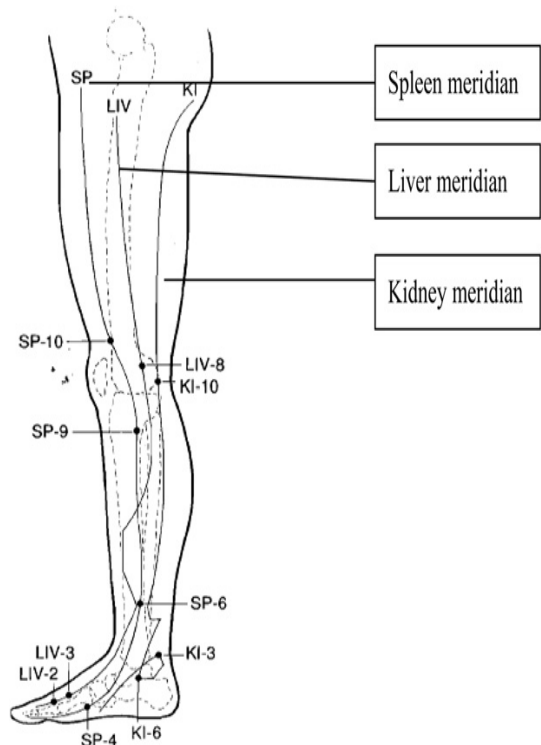
uterine or ovarian nerves. However, the congestive type is a kind of premenstrual syndrome which is felt as mild and uncertain pains a few days before menstruation and is associated with other physical and temperamental symptoms.<sup>3-6</sup> Menstrual Symptoms Questionnaire (MSQ) is used as a sophisticated psychometric tool for distinguishing the two types of primary dysmenorrhea.<sup>4</sup>

Since 1970s that prostaglandins were known as the factors responsible for primary dysmenorrhea, non-steroidal anti-inflammatory drugs (NSAIDs) have been the base of primary dysmenorrhea treatment. Ibuprofen, which is a NSAID, is used as the first-line treatment of primary dysmenorrhea.<sup>7</sup> However, various nutritional and therapeutic methods have been recently used to treat primary dysmenorrhea, including non-invasive methods such as psychotherapy, hypnosis, acupuncture and acupressure as well as the pharmacological methods.<sup>7</sup>

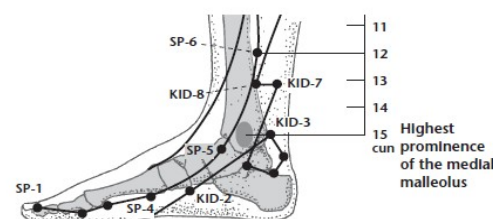
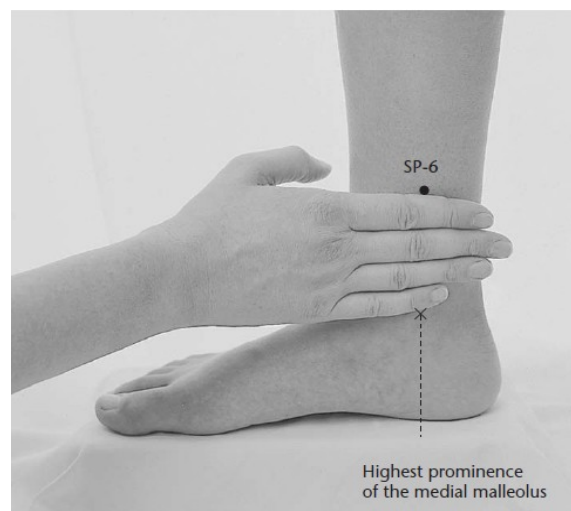
Acupressure and acupuncture are non-pharmacological treatments which are highly

regarded nowadays and the WHO has confirmed their application in more than 100 cases.<sup>8</sup> Acupressure, in fact, is the use of touch technique to balance energy channels in the body or Qi.<sup>9</sup> Energy or cosmic life force, which is called "Qi" in Chinese, moves inside the body in certain paths or channels, called meridian. Energy flow in these meridians is in balance. If energy is reduced in one or more meridians, body health would be affected. There are some parts in these meridians which have the minimal energy. These are the very points used in traditional medicine to utilize needle or acupressure.<sup>10-11</sup>

Sanyinjiao or the meeting point of spleen, liver and kidney channels, is located on spleen meridian, which is four fingers above the inner ankle behind the posterior edge of tibia (Figures 1 and 2).<sup>12</sup> This point is considered as a selective point in treating women's diseases. It is easily accessible, can be simply found and pressure can be exerted on it without the help of medical staff.<sup>13</sup>



**Figure 1.** Sanyinjiao point (SP-6)



**Figure 2.** Location of Sanyinjiao point

In addition to physical and psychological issues, dysmenorrhea causes economical problems for women all over the world.<sup>1</sup> Due to the high prevalence of this condition among young girls and its subsequent undesirable effects on their quality of life, one of the major duties of midwifery and medical staff is to reduce this problem.

Previous studies indicated different results about the effectiveness of various therapeutic methods on two types of primary dysmenorrhea.<sup>4-6, 14-16</sup> Although some studies showed the positive effect of acupressure on reduction of severity and duration of pain in women with primary dysmenorrhea,<sup>10, 12, 13, 17-19</sup> no study was found evaluating the effect of acupressure on the severity of menstrual symptoms (a combined index from 8 symptoms) and duration of resting time, neither about the difference of acupressure effects on the two types of primary dysmenorrhea. Moreover, there were some methodological deficiencies in some studies, such as poor random allocation and allocation concealment. Therefore, the present study was conducted to determine the effect of acupressure at the Sanyinjiao point on the severity of menstrual symptoms (primary outcome) and the length of resting time duration as well as the number of used ibuprofens (secondary outcomes) in spasmodic and congestive primary dysmenorrhea.

## Methods

This was a cluster randomized controlled trial with two parallel arms. Since the subjects are pretty accessible and making intervention and follow-up are relatively easy in dormitories, we selected all the female students living in dormitories (Tabriz University and Tabriz University of Medical Sciences) in 2010 who suffered from primary dysmenorrhea and had the inclusion criteria. The inclusion criteria consisted of being 18-22 years old, being single, having regular menstrual periods (a menstruation duration of 3-8 days with a 21-35 day interval between two menstrual cycles), obtaining a pain score of 5 or more according to visual analogue scale (VAS of 0-10), lack of any pelvic disease or any

known physical-mental illnesses, not using oral contraceptives, lack of pain during the whole menstrual cycles or during the whole menstrual bleeding and no allergies to NSAIDs. The exclusion criteria included pelvic diseases, abdominal and pelvic surgeries or having severe psychological stress (parents' divorce, death of close relatives, etc.). To determine the sample size for comparing the groups considering the scores of menstrual symptoms severity (primary outcome), the data of the previous study on female students of Tabriz was used.<sup>16</sup> Considering 0.05 for  $\alpha$ , 80% for power of test,  $\mu_1 = 24.6$ ,  $\mu_2 = 21$ ,  $sd_1 = sd_2 = 3.5$ , sample size was calculated to be 15 subjects in each group. However, taking into account the possible 20% sample loss, 18 females were selected for each group.

Ethical approval was obtained from the Ethics Committee of Tabriz University of Medical Sciences (No. 8917) and the trial was registered in Iranian Registry of Clinical Trials by IRCT138901253706N1 code. One afternoon (since the subjects were more likely to be accessible during afternoon), the corresponding author attended in the dormitories of Tabriz University and Tabriz University of Medical Sciences to select and justify the participants. She provided introduction of the team and project to the students. She also explained that due to the random allocation, the probability of being in the intervention or control groups would be equal. It was explained that a third party would categorize the students into the two groups of intervention and control. The students, who gave a positive answer to the question "Do you suffer from dysmenorrhea?", completed the primary questionnaire containing questions related to individual-social characteristics, history of menstruation and women's diseases and psychiatric problems. The severity of menstrual pain was also determined using VAS. Thereafter, a written informed consent was obtained from the subjects suffered primary dysmenorrhea with a pain intensity of equal to five or higher (based on VAS) who satisfied the inclusion criteria. Then, they completed the Menstrual Symptom Questionnaire (MSQ) and were accordingly placed in one of

the two primary spasmodic or congestive dysmenorrhea groups. The subjects with score higher than 80 were categorized as spasmodic dysmenorrhea and those with 74 or lower as congestive group. The subjects with scores of 75-79 were considered as borderline subjects and were excluded. Before the intervention, all the enrolled subjects completed a questionnaire related to duration of resting time and daily symptom severity scale (SSS) during a menstrual cycle, from two days before starting the menstruation to two days after menstrual bleeding. SSS consisted of 8 signs (cramp, headache, backache, leg pain, depression, irritability, general pain and abdominal pain). In this 5-point scale, score 1 meant "absence of any symptom", score 2 "mild state", score 3 "moderate state", score 4 "severe state" and score 5 indicated "extremely severe state". For spasmodic cases, the obtained mean scores during the first two days of menstruation, and for congestive cases, the obtained mean scores during the two days before menstruation were considered.

Since random allocation was not possible at individual level, in order to prevent from teaching acupressure to the dormitory partners (contamination), the dormitories were divided into two intervention (acupressure) and control groups. Therefore, one condominium from dormitory of Tabriz University and one dormitory from University of Medical Sciences were allocated to each group of intervention or control. Thus, 72 females from the two types of dysmenorrhea were selected (36 spasmodic and 36 congestive) and there were four 18-member groups (2 control and 2 intervention groups).

All necessary explanations about Sanyinjiao point and the methods of finding and applying pressure to it were offered to the members of both spasmodic and congestive intervention groups by a trained researcher and an experienced specialist. The subjects were told that at the time of pain and menstrual symptoms (for spasmodic cases during the two first days of menstruation and for congestive group during the two days before menstruation) Sanyinjiao point should be pressed with the thumb for five minutes (6 seconds pressure and 2 seconds rest)

as far as pain is tolerable (pain threshold). This procedure should have been repeated for the other foot. Then the whole routine must have been repeated on both feet for another 10 minutes (each foot for two 5-minute times). Furthermore, a brochure containing the main tips was given to participants. They were noted to avoid painkillers during this study as much as possible, and if necessary, use ibuprofen and make sure to note the number and time of the drugs taken in the relevant form.

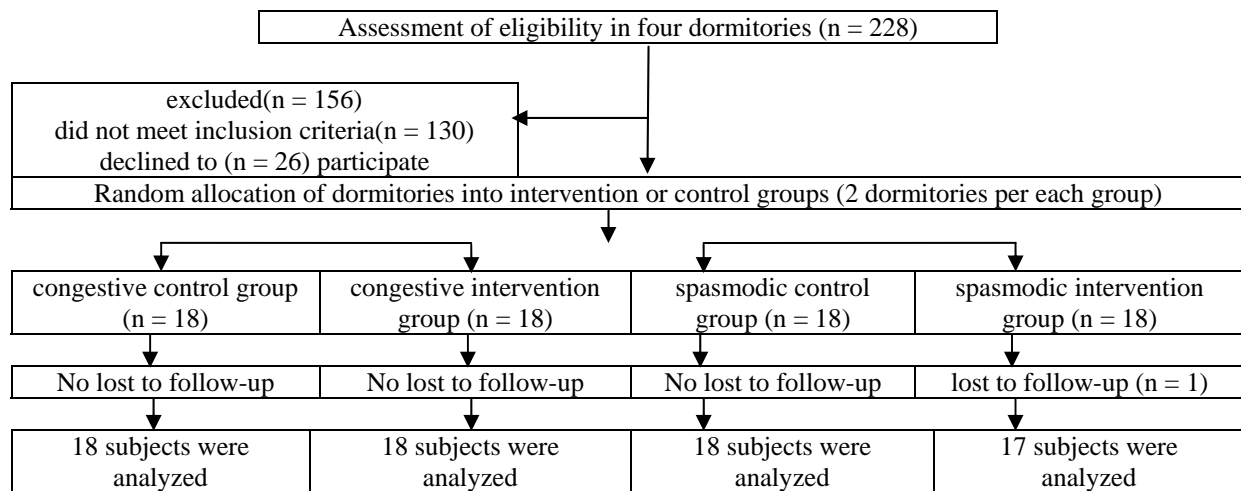
The control spasmodic and congestive groups were told to take an ibuprofen (400 mg) every 6 hours, in case of need. All the study subjects were reminded to avoid taking other palliatives as much as possible except ibuprofen and non-pharmacological methods. In very severe cases, the subjects of both groups could use any method they wanted but they had to mention the type, number and duration.

All the study subjects were asked to complete the questionnaire related to duration of resting time and also SSS during two consecutive usual menstrual periods like the last cycle. In addition, they were asked to accurately record the pills taken and the way they applied pressure in a special form. Ultimately, the subjects of the control group could be taught about the acupressure techniques after finishing the study.

Content validity was used to verify the validity of the data collection tool and test-retest was used to determine the reliability of the data. The MSQ was completed twice by 10 students with a two-week interval and its correlation coefficient was determined to be more than 90 percent. Chi-square test and independent t-test (mean difference 95%CI) were used for data analysis in SPSS version 13 software. A  $p < 0.05$  was considered as statistically significant.

## Results

The study profile is shown in figure 3. Participants of intervention and control groups were similar in terms of potential confounding factors such as some of menstrual cycle characteristics and palliative consumption as well as scores of menstruation symptom severity and painless periods in the control period before starting the treatment (Table 1).



**Figure 3.** Flow diagram of the study subjects during the randomized trials process

**Table 1.** Demographic data of the study subjects in the two intervention (acupressure) and control group with spasmodic and congestive dysmenorrhea before the intervention

Characteristics	Spasmodic		p	Congestive		p
	Intervention (n = 17)	Control (n = 18)		Intervention (n = 17)	Control (n = 18)	
	Mean(SD)	Mean(SD)	Mean(SD)	Mean(SD)		
Age (years)	20.7(1.0)	20.2(1.2)	0.10	20.2(1.0)	20.8(1.0)	0.21
Menarche age (years)	13.2(1.4)	13.4(1.2)	0.74	13.6(1.3)	13.2(1.5)	0.37
Menstruation cycle duration (day)	28.8(1.3)	29.1(1.7)	0.59	29.3(1.3)	28.5(1.2)	0.06
Menstrual bleeding duration (day)	6.4(0.8)	6.8(0.7)	0.20	6.3(1.0)	6.1(0.8)	1
Menstrual pain intensity (VAS)	6.7(1.4)	6.8(1.4)	0.79	6.5(1.0)	6.2(0.9)	0.38
Menstrual symptom severity scores during the control period	23.5(6.3)	26.1(5.7)	0.20	22.6(5.8)	21.3(4.4)	0.53
Duration of resting time (hour) during the control period	3.3(2.4)	4.1(2.3)	0.38	3.7(1.5)	2.9(0.9)	0.10
	n (%)	n (%)		n (%)	n (%)	
Time of the first dysmenorrhea						
1-6 (months after menarche)	7 (41.2)	8 (44.4)	0.83	6 (33.3)	6 (33.3)	0.90
7-48	6 (35.3)	6 (33.3)		4 (22.2)	3 (16.7)	
I do not know	4 (23.5)	4 (22.2)		8 (44.4)	9 (50.0)	
Increased menstrual pain during the time	4 (23.5)	5 (27.8)	0.88	4 (22.2)	5 (27.8)	0.63
Missing daily activities due to dysmenorrhea (often/always)	9 (52.9)	9 (50.0)	0.86	7 (38.9)	8 (44.4)	0.73
Family history of dysmenorrhea	13 (76.5)	13 (72.2)	0.53	10 (55.6)	9 (50.0)	0.46
Regular exercise during non-menstruation (often/always)	9 (52.9)	11 (61.1)	0.62	11 (61.1)	10 (55.6)	0.10
Regular exercise during menstruation (often/always)	2 (11.8)	1 (5.6)	0.60	2 (11.1)	1 (5.6)	0.22
Using palliatives to relieve menstrual pain (always)	9 (52.9)	10 (55.6)	1	8 (44.4)	8 (44.4)	0.65
Using Ibuprofen/Gelofen to reduce menstrual pain	11 (61.2)	11 (61.1)	0.68	12 (33.3)	12 (33.3)	0.74



**Table 2.** The average reduction of menstrual symptom severity and duration of resting time after the treatment\* in the intervention and control groups

Characteristic	Intervention	Control	Mean Difference (CI 95%)	p
	(n = 17) Mean (SD)	(n = 18) Mean (SD)		
Menstrual symptom severity scores				
Congestive	4.9 (3.8)	2.2 (2.2)	2.6 (0.5-4.8)	0.01
Spasmodic	6.2 (3.7)	2.0 (2.2)	4.2 (2.1-6.3)	< 0.001
Duration of resting time (hour)				
Congestive	1.3 (1.1)	0.7 (0.5)	0.6 (0.06-1.2)	0.01
Spasmodic	1.6 (1.0)	0.5 (0.5)	1.1 (0.6-1.4)	0.001

\*Mean of the first and second period compared to the period before the treatment

**Table 3.** Comparing the average number of ibuprofen consumption after the treatment in intervention and control groups

Type of dysmenorrhea	Intervention (n = 17) Mean (SD)	Control (n = 18) Mean (SD)	Mean Difference (95%CI)	p
Congestive	1.3 (1.1)	4.1 (3.0)	2.8 (0.9-4.1)	0.003
Spasmodic	1.4 (1.1)	4.3 (3.2)	2.9 (0.9-4.2)	0.002

The reduction of menstrual symptoms severity scores after the treatment was significantly more in the intervention group compared to the control group in both spasmodic and congestive dysmenorrhea (4.9 vs. 2.2 and 6.2 vs. 2.0, respectively). Furthermore, mean reduction of painless period duration in periods after the treatment was significantly more in intervention group than control group in both spasmodic and congestive dysmenorrhea (1.3 vs. 0.7 and 1.6 vs. 0.5, respectively) (Table 2). However, there was no significant difference between spasmodic and congestive dysmenorrhea either in intervention group ( $p = 0.31$ ) or in control group ( $p = 0.56$ ) in terms of these outcomes.

While all the subjects of the control group used at least one ibuprofen during the first and second periods after the beginning of the study, 29% and 33% of the intervention group members did not use any ibuprofen. The average number of used ibuprofen in the periods after treatment in the intervention group, both in spasmodic and congestive dysmenorrhea, was significantly lower than the control group (1.3 vs. 4.1 and 1.4 vs. 4.3, respectively) (Table 3).

However, there was no significant difference between participants with spasmodic or congestive dysmenorrhea in this regard. Moreover, in the period after the beginning of the intervention, none of the subjects used any palliative pills but ibuprofen except two subjects in the control group with congestive dysmenorrhea who had used hyoscine and diclofenac suppositories. There was no significant difference between spasmodic and congestive dysmenorrhea in terms of mean duration of pressure in the first and second periods after the treatment (48.5 vs. 47.5 minutes per two days;  $p = 0.86$ ).

## Discussion

The results of the present study showed that acupressure at the Sanyinjiao point (SP-6) had a significant effect on reduction of the severity of menstrual symptoms, duration of resting time period and the number of used ibuprofen similarly in both spasmodic and congestive types of dysmenorrhea. Since total score of menstrual symptoms severity had a high correlation (correlation coefficient above 80%) with each of its components related to pain, the results of this

part of the study were compared with results related to pain severity in other studies.

Sohrabi et al. in Ilam also showed that pain severity in the first and second months after treatment in acupressure group was significantly lower than ibuprofen group.<sup>18</sup> In the study of Jun et al. in Korea, there was a significant difference in dysmenorrhea severity between the two groups of intervention (acupressure at the SP-6 point) and control (placing the thumb on SP-6 point slowly with no pressure for 20 minutes) immediately after the treatment and two hours after it.<sup>19</sup> In Taiwan, Chen et al. found that acupressure at the Sanyinjiao point reduced the pain and the stress resulted from dysmenorrhea during the first session of pressure by the researcher. However, in the next cycle compared to the first session, participants applied acupressure themselves and could only significantly reduce the pain resulted from menstruation.<sup>13</sup>

Valiani et al. studied female students of Isfahan University of Medical Sciences and indicated that reflexology (10 sessions on both feet, each 40 minutes long, before the probable menstruation period) was associated with more reduction in severity and duration of menstrual pain in comparison with ibuprofen during three cycles of treatment.<sup>20</sup> This technique was more effective on sensory, emotional and cognitive pain dimensions.

No study was found about the effect of acupressure on primary spasmodic and congestive dysmenorrhea. Nonetheless, the effect of other interventions such as relaxation was separately investigated in two types of dysmenorrhea.<sup>4-6, 14-16</sup> In two researches in the United States, it was shown that relaxation exercises reduced the severity of menstrual symptoms in both types of spasmodic and congestive dysmenorrhea almost equally.<sup>14, 15</sup> While two other studies in the U.S. indicated that relaxation exercises were effective only on subjects with spasmodic dysmenorrhea.<sup>5, 6</sup> The study of Kamali et al. in Tabriz also showed the effectiveness of relaxation techniques on the severity of spasmodic dysmenorrhea.<sup>16</sup>

In addition, no study was found about the effect of acupressure on duration of resting time

(resting period) due to dysmenorrhea, and all the available studies were conducted on the effects of acupressure on length of pain. Since length of pain can have a direct association with duration of resting time length, the effects on duration of resting time was investigated in this study. In the study of Sohrabi et al., mean pain duration in the first and second months after implementation of acupressure was significantly lower than ibuprofen users.<sup>18</sup> Similarly in Gilan, Bostani et al. compared the effects of acupressure and vitamin E and found lower mean pain duration during the first and second cycles after acupressure.<sup>10</sup> The results of both of these studies are in accordance with the findings of present study.

Similar to the present study, Quillen and Denny showed that relaxation exercises can almost identically decrease the duration of resting time in both spasmodic and congestive dysmenorrhea.<sup>14</sup> However, conducted studies by Amodei et al.,<sup>6</sup> Cox and Meyer<sup>15</sup> and Kamali et al.<sup>16</sup> indicated that relaxation exercises only led to a reduction in painless period duration in subjects with spasmodic dysmenorrhea.

In the intervention group, the number of ibuprofen consumption was significantly lower than the control group which probably indicates the high analgesic effect of acupressure. In China, Wang et al. found that consumption of palliatives was significantly reduced after an injection of vitamin K in SP-6.<sup>11</sup> According to the Dalton's idea, since spasmodic dysmenorrhea irritations are associated with muscle contractions, and congestive dysmenorrhea irritations are associated with ischemia, it is possible that behavior therapy and muscle relaxation be more effective on spasmodic dysmenorrhea than congestive one.<sup>5, 6</sup>

According to Chinese traditional medicine, Xu type dysmenorrhea (spasmodic) is due to Qi and blood deficiency, especially in liver and kidneys. Therefore, they use the point on REN (a canal in front of the body which originate from perineum to a point under lips), spleen, liver and kidney channels to treat the problem and regulate and strengthen the Qi. They also believed that Shi type dysmenorrhea (congestive)

is caused by stagnation and coagulation of blood in the uterus. Consequently, they treat the problem by using the points of the REN and spleen channels to eliminate the obstruction of the channels and activate the blood flow.<sup>21, 22</sup> The Sanyinjiao point is the intersection of the three meridian channels of spleen, liver and kidney,<sup>23</sup> and maybe that is why acupressure at the SP-6 point has a similar effect on both spasmodic and congestive dysmenorrhea.

As acupressure is a non-pharmacological, cost-effective, simple and effective method with no side-effects and more importantly, it is a practical method which can be done anywhere and anytime by women themselves,<sup>13</sup> health and medical staff who are somehow related with girls and young women can apply it as an auxiliary and adjunctive therapy along with pharmacological therapy and/or alone in those who do not have the conditions of using drugs and chemicals. Moreover, it would provide the possibility of individual self-care which is an

important part in health care programs.

It is recommended to conduct similar studies in a wider level on all girls and young women with primary dysmenorrhea and also compare the effect of other acupressure points which probably are effective on primary dysmenorrhea (spasmodic, congestive) with the effect of acupressure on Sanyinjiao point. Furthermore, in this study, only a two-month follow-up was done and longer follow-ups in further studies are recommended. Future studies should also investigate the effect of acupressure in the next months after discontinuation of the method.

The authors declare no conflict of interest in this study.

### Acknowledgments

This was an MSc dissertation. Thereby, we would thank authorities of the Ethics Committee of Tabriz University of Medical Sciences, authorities of Kowsar, Fajr and Shohada Dormitories and all the students who sincerely helped us in conducting this research.

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