Effects of acupressure at the Sanyinjiao point on primary dysmenorrhoea

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Aim. This paper presents the findings of a study that assessed the effects of acupressure at the Sanyinjiao point on symptoms of primary dysmenorrhoea among adolescent girls.

Background. Dysmenorrhoea is the most common gynaecological disorder among adolescents. Traditional Chinese acupressure derived from acupuncture is a non-invasive technique. Despite renewed interest in the use of acupressure, relatively few studies have been undertaken to examine its effects on primary dysmenorrhoea.

Methods. An experimental study was conducted between December 2000 and August 2001. Participants were female students attending a technical college in Taiwan. None of the 69 participants had a prior history of gynaecological disease or secondary dysmenorrhoea, and all were rated higher than five for pain on a visual analogue scale from 0 to 10. The experimental group ($n = 35$) received acupressure at Sanyinjiao (above the ankle) while the control group ($n = 34$) rested for 20 min, while the control group underwent rest in the school health centre for 20 min without receiving acupressure. Fifty participants (30 experimental, 20 control) completed the 4–6-week follow-up session. Five instruments were used to collect pretest and post-test data at each session: (1) Visual Analogue Scale for pain; (2) the Short-Form McGill Pain Questionnaire; (3) the Menstrual Distress Questionnaire; (4) the Visual Analogue Scale for anxiety; and, for the experimental group only, (5) the Acupressure Self-Assessment Form. Data were analysed using the chi-square test, two-sample *t*-test and repeated measures two-way ANOVA.

Results. Acupressure at Sanyinjiao during the initial session reduced the pain and anxiety typical of dysmenorrhoea. In the self-treatment follow-up session, acupressure at Sanyinjiao significantly reduced menstrual pain but not anxiety. Thirty-one (87%) of the 35 experimental participants reported that acupressure was helpful, and 33 (94%) were satisfied with acupressure in terms of its providing pain relief and psychological support during dysmenorrhoea.

Conclusion. The findings suggest that acupressure at Sanyinjiao can be an effective, cost-free intervention for reducing pain and anxiety during dysmenorrhoea, and we recommend its use for self-care of primary dysmenorrhoea.

Keywords: Sanyinjiao (SP6), primary dysmenorrhoea, anxiety, acupressure, menstrual pain, nursing

Introduction

Dysmenorrhoea is the most common gynaecological disorder among adolescents, with a prevalence of 60–93%. According to two United States of America (USA) based studies, 42% of affected adolescents describe their menstrual pain as severe, 33% as moderate and 25% as mild (Banikarim *et al.* 2000, Taylor *et al.* 2002). A number of studies have shown that, in 10–50% of female students, dysmenorrhoea interferes with daily activities, including school activities (Hillen *et al.* 1999, Banikarim *et al.* 2000, Granot *et al.* 2001). Dysmenorrhoea accounts for 600 million lost work hours and US$ 2 billion in lost productivity annually (Taylor *et al.* 2002).

Primary dysmenorrhoea is defined as cramping pain in the lower abdomen occurring just before or during menstruation without pelvic abnormalities (Taylor *et al.* 2002). It can be associated with vomiting, fatigue, back pain, headaches, dizziness, and diarrhoea (Campbell & McGrath 1997, Golomb *et al.* 1998, Granot *et al.* 2001), and 90% of young women report that the duration of their menstrual cramps is 48 hours or less (Banikarim *et al.* 2000). Primary dysmenorrhoea arises from the release of prostaglandins with menses, which is secreted during the luteal phase and subsequent menstrual flow (Milsom *et al.* 1994, Golomb *et al.* 1998). Excessive release of prostaglandins increases the amplitude and frequency of uterine contractions and causes vasospasm of the uterine arterioles, resulting in ischaemia and cyclical lower abdominal cramps (Golomb *et al.* 1998, Wolf 1999).

Energy, known as 'Qi' in Chinese, is considered to be the motive force of all life. According to Chinese medical theory, Liver-Qi stagnation causes women's blood to stagnate in the uterus, leading to periods of pain. In some cases, stagnant Liver-Qi may turn into Liver-Fire which, in turn, may lead to Blood-Heat. Blood-Heat often combines with Damp-Heat in the uterus. The Sanyinjiao acupoint is located on the inside of the ankle, three finger-breadths above the ankle bone. This acupoint is also known internationally as Spleen6 (SP6). Applying pressure at this acupuncture meridian can invigorate blood supply and reduce pain (Maciocia & Kaptchuk 1998).

Acupressure is one of the best examples of an attempt to meld Eastern and Western theories of medicine. Acupressure is a descendent of traditional Chinese manipulative therapy, which has been considered a legitimate component of Chinese medicine since its origins (Freeman & Lawlis 2001). It also combines traditional Japanese techniques with Western anatomical and physiological knowledge. Acupressure is a general word for the stimulation of acupoints by means of pressure, usually using the hands, fingers or thumbs (Ho 1996, Gentz 2001). Derived from acupuncture, acupressure is a non-invasive technique of traditional Chinese medicine.

Current treatments for dysmenorrhoea include bed rest, exercise, heat, herbs, drugs, biofeedback, surgery (Akin *et al.* 2001, Wilson & Murphy 2001), transcutaneous electrical nerve stimulation (TENS) (Milsom *et al.* 1994, Kaplan *et al.* 1997, Proctor *et al.* 2003), acupuncture (Maciocia & Kaptchuk 1998, Proctor *et al.* 2003), acupressure (Mahoney 1993, Maciocia & Kaptchuk 1998, Chuang 2001, Taylor *et al.* 2002) and analgesic medication (Banikarim *et al.* 2000). It has been reported that dysmenorrhoea can be successfully relieved by acupressure at combinations of acupoints Qihai (CV6), Guanyuan (CV4), Zusanli (S36), Sanyinjiao (SP6), Xuehai (SP10) and Taichong (LIV3) (Chuang 2001), or at a single Ho-Ku acupoint (Mahoney 1993). The Sanyinjiao (SP6) acupoint is commonly used to induce labour and relieve pain during childbirth (Gentz 2001) and to relieve pain after cesarean section (Wei 2001).

Despite renewed interest in the use of acupressure for dysmenorrhoea, few studies have examined the effects of acupressure on primary dysmenorrhoea, hence the motivation for this study. Acupoint Sanyinjiao (SP6) was selected for study because it is the acupoint of choice in gynaecology and is easy for women to locate and apply pressure to without medical assistance (Maciocia & Kaptchuk 1998).

The study

Aim

The aim of this study was to examine the effects of acupressure at Sanyinjiao (SP6) on adolescents' pain perception, anxiety and menstrual distress syndromes during dysmenorrhoea.

Participants

This study was conducted at a medical technology college in Taiwan between December 2000 and August 2001. Adolescent female students with self-reported dysmenorrhoea volunteered to participate. Dysmenorrhoeic participants were randomly assigned either to the control (rest) or experimental (acupressure at the Sanyinjiao point) groups. The criteria for participating in the study were: (a) age less than 20 years, (b) dysmenorrhoea with pain scoring higher than five on the Visual Analogue Scale for pain (VASP: range 0–10), (c) no prior history of gynaecological disease or secondary dysmenorrhoea, and (d) no pain medication taken in the 4 hours before intervention.

Following assessment and allocation, 81 female adolescents were recruited. Twelve participants (acupressure group = 6, control group = 6) failed to complete the study for one of the following reasons: sought medical advice elsewhere, physical discomfort, withdrawal, or falling asleep. The sample size was predetermined in a pilot study using power analysis based on a medium effect size, an alpha of 0·05 and power = 0·80. In the initial session, a total of 69 female adolescents were included, with 35 assigned to the experimental and 34 to the control groups. In the self-treatment follow-up session, a total of 50 participants were included in the analysis, of whom 30 were assigned to the experimental and 20 to the control groups (Figure 1).

Ethical considerations

The protocol received institutional review board approval. Recruited participants in the two groups received a written description of the research purposes, and gave written informed consent after the procedures had been fully explained. Permission to conduct the study and access to the female adolescents were obtained from the director of the medical technology college and head nurse of the school's health centre.

Data collection instruments

The VASP consisted of a 10-cm horizontal scale with the descriptors 'no pain' on the left and 'worst possible pain' on the right. Participants were asked to place a mark on the 10-cm line at a point that corresponded to the level of pain intensity they felt. The distance in centimetres from the low end of the VASP to the participant's mark was used as a numerical index of the severity of pain. The VASP is sensitive to pharmacological and non-pharmacologic procedures that alter the experience of pain (Choiniere *et al.* 1990), and correlates highly with pain measured on verbal and numeric rating scales (Larroy 2002, Proctor *et al.* 2003, Taylor *et al.* 2002).

The Short-Form McGill Pain Questionnaire (SF-MPQ) (Melzack 1975) was developed for use in specific research settings when the time for gathering information from participants is limited and when more information is desired

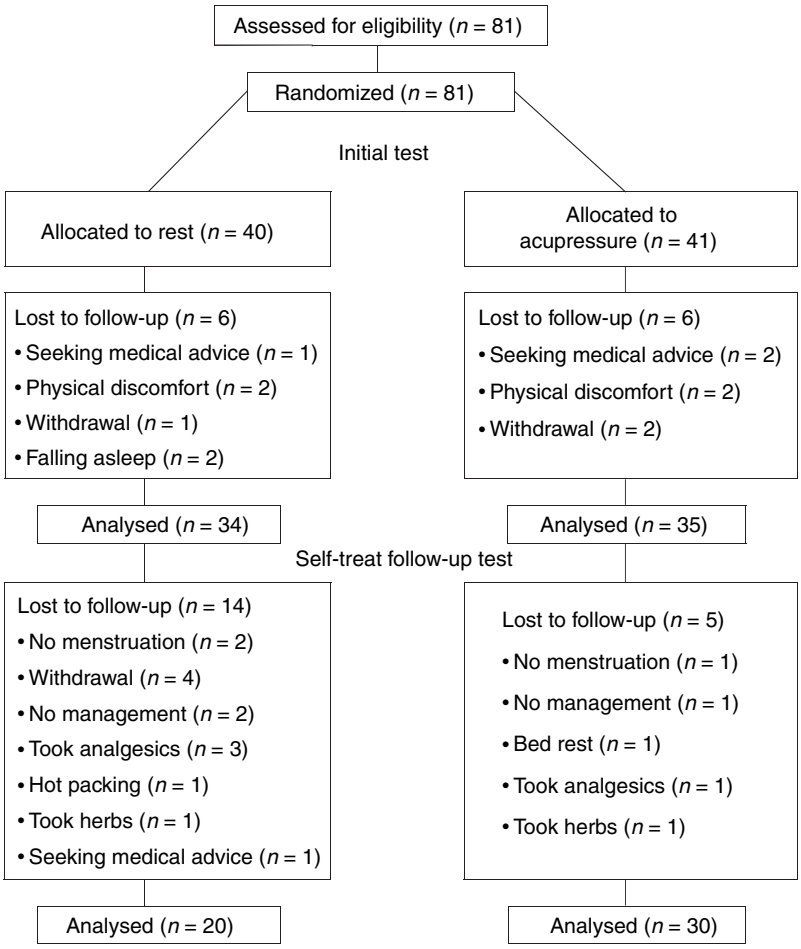

Figure 1 Flow diagram of subject progress through the phases of randomized trial.

than that provided by intensity measurement. The SF-MPQ consists of 15 descriptors representing the sensory ($n = 11$) and affective ($n = 4$) dimensions of pain. Next to each descriptor is an intensity selection scale of 0–3, with 0 representing no pain, 1 representing mild, 2 representing moderate, and 3 representing severe pain. The tool has been used in studies of diverse types of chronic pain (Burckhardt *et al.* 1992) and acute pain (Harden *et al.* 1991, King 1993, Thomas *et al.* 1995). In the present study, it was found to have adequate internal consistency (Cronbach $\alpha = 0{\cdot}87$).

The Menstrual Distress Questionnaire (MDQ) (Moos 1968) contains 47 symptoms grouped into eight categories, six of which measure negative perceptions (pain, impaired concentration, behaviour changes, autonomic reactions, water retention, and negative affect). The seventh category (arousal) measures positive experiences, such as excitement. The eighth category measures control symptoms infrequently reported during menstruation and reflecting a general tendency to complain of a variety of symptoms. Participants were asked to report the symptoms experienced during their most recent menstrual period, using a rating scale in which responses ranged from 1(no experience of the symptom) to 4 (severe or partially disabling symptoms). This questionnaire has been shown previously to be internally consistent (correlations = 0·53–0·89) and to have split half reliabilities of 0·74–0·98 (Moos 1968). The MDQ Short-Form was composed of 16 items from the full scale translated into Chinese and used for the Chinese adolescent population (Wang 1991). Sixteen symptoms were grouped into three categories (pain, autonomic reactions, and water retention). In this study, the MDQ Short-Form had good internal consistency (Cronbach $\alpha = 0{\cdot}83$–$0{\cdot}84$).

The Visual Analogue Scale for Anxiety (VASA) consisted of a 10-cm horizontal line with the descriptors 'no anxiety' at the left and 'worst possible anxiety' at the right. Anxiety involves subjective feelings such as worry and a sense of threat. Participants were asked to indicate how anxious they felt 'right now' by marking the appropriate place on the line. Higher values indicated increased levels of anxiety. The VAS is a reliable, valid, and sensitive self-reported measure for subjective experiences including pain, nausea, fatigue, and dyspnoea (Gift 1989).

Twenty minutes after acupressure, adolescents in the experimental group were asked to evaluate their satisfaction with and the helpfulness of acupressure (e.g. 'How effectively did the acupressure help you reduce your menstrual pain?') using 5-point scales ranging from 'none' to 'extremely', and to answer an open-ended question about the advantages of acupressure. Five experts examined the content validity of all instruments.

Procedures

Participants in the experimental group were given a detailed description of the acupressure protocol. Following this, the primary researcher gave acupressure therapy during each person's menstrual period. All participants were allowed 10–15 minutes to adjust to room temperature before the initial assessment of the Sanyinjiao (SP6) acupressure therapy. In the initial assessment, the participant was placed in the prone position on a treatment table with pillows under her head, shoulders and knees. Participants received acupressure alternating between each leg at the Sanyinjiao (SP6) acupoint. Two complete 5-minute cycles of pressure were performed on each leg for a total of 20 minutes (Chen 1993, Fraser & Kerr 1993). The force applied to the acupoint was initially 1·21 kg, increasing to 3·53 kg at the end of therapy. For each pressure cycle on each side, SP6 was pressed with a thumb for 6 seconds and released for 2 seconds without pressure. This was continued for 5 minutes on each leg, and repeated four times to bring the total treatment time to 20 minutes (Snyder 1992).

When cramping occurred in the initial session, participants in the experimental group underwent SP6 acupressure for 20 minutes, administered by the researcher, whereas those in the control group were asked to rest in the school health centre for 20 minutes but received no other treatment. After receiving the 20-minute acupressure treatment, experimental group participants completed a brief menstrual history questionnaire, the VASP, SF MPQ, MDQ, and VASA. These dependent variables were evaluated to assess the immediate effects of the acupressure. Participants in the experimental group were taught to use acupressure at home after the initial post-test and before their next menstrual period. The accuracy of the acupoint was confirmed if the participant felt a slight ache, dull pain, tingling and/or an electrical sensation (Mahoney 1993, Maciocia & Kaptchuk 1998). This feeling is what acupuncturists describe as the 'De Chi' sensation, which means that the chi has been accessed. During the next menstrual period and actual episode of dysmenorrhoea (self-treatment follow-up session) at home, each person in the experimental group performed SP6 acupressure by herself for 20 minutes, while those in the control group underwent rest for 20 minutes without any other treatment. After the 20-minute acupressure treatment, the dependent variables were again evaluated. Participants in the control group underwent the same assessments as the experimental group in both sessions. A research assistant unaware of the group assignment administered all the instruments in the health centre.

The primary investigator had taken 10 credits in Chinese traditional medicine and learned acupressure treatment prior to the study. In the pilot study, the acupressure force was validated by applying thumb pressure on a 6-kg scale calibrated to national standards to measure the force of finger pressure between 1 and 4 kg. An expert evaluated the accuracy of acupoints selected for the study.

Data analysis

The demographic and menstrual data were summarized with descriptive statistics such as frequencies, percentages, and means. Repeated measures two-way ANOVA was used to test the interaction of group (experimental vs. control) and time (pretest vs. post-test). The accepted level of significance for all analyses was $P < 0{\cdot}05$. Data analyses were carried out using the Statistical Software Package for the Social Sciences (SPSS), version 10.0.

Results

Description of sample

A total of 69 adolescents with primary dysmenorrhoea were enrolled in the study. Their mean age was 17·78 ± 1·43 years (range, 17–19 years). There were no significant differences in demographic (Table 1) and menstrual (Table 2) characteristics of the two groups. The measured parameters of the groups before the interventions were also similar.

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To test the effects of acupressure on the outcome measures, repeated measures two-way ANOVA was used to analyse the scores on the VASP, SF-MPQ, MDQ, and VASA initial and self-treatment follow-up tests and Table 3 lists the means (± SD) for the control and acupressure groups. Table 4 presents a summary of 2 (time) × 2 (group) two-way ANOVA. Time indicates pretest and post-test at each session. Three of the interactions between the two independent variables were statistically significant. Interactions were significantly different for the initial VASP test [$F(1) = 4{\cdot}09$, $P = 0{\cdot}04$], the initial VASA test [$F(1) = 8{\cdot}93$, $P \leq 0{\cdot}001$], and the self-treatment follow-up VASP test [$F(1) = 4{\cdot}61$, $P = 0{\cdot}003$]. The acupressure group returned very positive evaluations: 31 (89%) of the 35 participants reported that acupressure was more than moderately helpful, and 33 (94%) were more than moderately satisfied with acupressure during dysmenorrhoea. In response to the open-ended questions, those who received acupressure reported that it effectively reduced abdominal discomfort and promoted comfort and relaxation.

Table 1 Comparison of demographic characteristics between intervention and control groups

	Acupressure group ($n = 35$)			Control group ($n = 34$)		
Characteristics	Mean	SD	Range	Mean	SD	Range
Age (years)	18·06	1·28	15–20	17·50	1·54	15–20
Age at menarche (years)	12·37	1·35	10–16	12·50	1·38	10–16
Menstrual duration (days)	5·49	1·31	1–7	5·24	1·13	1–7
Menstrual cycle (days)	32·20	1·31	25–45	31·60	1·31	25–45

Two-sample t-test was used to assess differences between the groups. All $P > 0{\cdot}05$.

Table 2 Menstrual characteristics before intervention by group

Characteristics	Acupressure group	Control group	χ^2	P value
Limited daily activity			3·26	0·35
None	0	1		
Mild	8	13		
Moderate	14	11		
Severe	13	9		
Analgesic usage			8·69	0·07
No	7	15		
Sometimes (1–2 times)	16	6		
Usually (3–4 times)	9	10		
Absent from class			7·29	0·06
No	17	25		
Sometimes	13	6		
Usually	2	3		
Always	3	0		
Always (5–6 times)	3	3		
Self-care*			1·85	0·61
Bed rest	23	22		
Chest-knee position	6	6		
Heating pad	13	11		

*Participant could choose more than one response.

Discussion

The initial tests found that 20 minutes of acupressure at SP6 were effective for reducing menstrual pain and anxiety levels during menstruation. However, there was no significant group difference in menstrual distress on the MDQ. In the self-treatment follow-up tests, acupressure was also effective in reducing menstrual pain, but no significant group differences were found in anxiety and menstrual distress. Although the applied acupressure point in our study differed

Table 3 Pre- and post-test means (SD) by group

	Acupressure group		Control group	
Scales	Pretest	Post-test	Pretest	Post-test
VASP				
Initial test	6·45 (1·81)	3·88 (1·83)	6·47 (1·54)	4·79 (1·84)
Self-treat follow-up test	4·60 (2·41)	2·92 (1·68)	3·64 (2·35)	3·04 (2·54)
SF-MPQ				
Initial test	20·30 (8·96)	11·08 (8·75)	15·36 (8·90)	9·79 (8·85)
Self-treat follow-up test	14·28 (11·69)	14·23 (11·49)	9·21 (9·08)	9·20 (9·08)
MDQ				
Initial test	27·43 (4·88)	23·60 (4·72)	25·35 (4·05)	23·76 (6·57)
Self-treat follow-up test	27·03 (5·64)	23·73 (5·61)	24·85 (6·86)	23·05 (5·89)
VASA				
Initial test	5·04 (1·54)	3·13 (2·19)	4·28 (1·85)	3·74 (1·94)
Self-treat follow-up test	3·66 (2·13)	3·26 (2·23)	3·31 (1·83)	2·76 (2·16)

VASP, Visual Analogue Scale for pain; SF-MPQ, Short-Form McGill Pain Questionnaire; MDQ, Menstrual Distress Questionnaire; VASA, Visual Analogue Scale for anxiety.

Table 4 Results of repeated measures two-way ANOVA

Dependent variables	Group	Time†	Interaction
VASP			
Initial test	1·66	90·36*	4·09*
Self-treat follow-up test	0·47	19·58*	4·61*
SF-MPQ			
Initial test	3·15	62·19*	2·67
Self-treat follow-up test	2·83	22·79*	0·12
MDQ			
Initial test	0·83	16·93*	2·89
Self-treat follow-up test	0·87	13·13*	1·04
VASA			
Initial test	8·93*	28·75*	8·93*
Self-treat follow-up test	0·54	6·28*	0·11

*$P < 0{\cdot}05$.
†Time indicates pretest to post-test for each session.
VASP, Visual Analogue Scale for pain; SF-MPQ, Short-Form McGill Pain Questionnaire; MDQ, Menstrual Distress Questionnaire; VASA, Visual Analogue Scale for Anxiety.

from those used in studies by Chuang (2001) and Mahoney (1993), the reported effect of acupressure on dysmenorrhoea is consistent among the studies. Possible explanations for the effectiveness of acupressure in relieving pain include a spinal gate control mechanism, in which somatic stimulation interferes with the transmission of pain stimuli (Melzack & Wall 1965, Mahoney 1993), and activation of the endogenous opioid system (Kaptchuk 2002). In Chinese traditional medicine, the effectiveness of acupressure is attributed to invigoration of blood circulation and vital energy, which relieves cramping pain in the uterus.

Melzack *et al.* (1977) suggested that acupuncture's mechanism of pain relief is similar to that of TENS units, in that stimulation of large, myelinated fiberes blocks the smaller fibres from transmitting painful stimuli. Previous studies indicate that a single treatment of acupuncture-like TENS significantly reduces the pain associated with primary dysmenorrhoea (Milsom *et al.* 1994, Proctor *et al.* 2003). In a randomized cross-over study of the effectiveness of high-intensity TENS in 12 women with primary dysmenorrhoea, Milsom *et al.* (1994) found a 60% reduction in menstrual pain severity. Proctor *et al.* (2003) also found that high frequency TENS was effective in the treatment of dysmenorrhoea.

We found that the application of acupressure at both the initial and self-treatment follow-up tests significantly lowered VASP scores. Our findings are similar to those of Taylor *et al.* (2002), who found that acupads (pressure pads) pressed against multiple point locations on the abdomen and lower back significantly decreased menstrual pain in a randomized clinical trial. The results of our study were also consistent with those of Maciocia and Kaptchuk (1998) and Chuang (2001). Maciocia and Kaptchuk (1998) applied acupressure at various points to relieve menstrual pain. However, they failed to include a control group for comparison. Furthermore, their participants had difficulty identifying the various acupoints for self-treatment. Chuang (2001) used a combination of six acupoints to relieve menstrual pain but did not carry out follow-up to observe any change in effects. Our study, in contrast, focused on the effects of acupressure at a single point (Sanyinjiao SP6), and participants were monitored for 4–6 weeks to observe any possible changes in response to self-treatment. After the initial application of acupressure at SP6, scores on the SF-MPQ and MDQ decreased, but the decrease did not achieve statistical significance; this result is similar to the

What is already known about this topic

- Dysmenorrhoea is the most common gynaecological disorder among adolescents.
- The prevalence of dysmenorrhoea means that it commonly interferes with girls' daily activities, including school activities.
- Few studies have examined the effects of acupressure on primary dysmenorrhoea.

What this paper adds

- Acupressure at SP6 has immediate effects on reducing pain and anxiety during dysmenorrhoea.
- Self-treatment follow-up also showed acupressure at SP6 to be effective in reducing menstrual pain.
- Single Sanyinjiao (SP6) acupoint pressure is easy for adolescent girls to learn and practise and is recommended for self-care of primary dysmenorrhoea.

findings of Mahoney (1993), who applied acupressure at Hegu (LI4).

Primary dysmenorrhoea is the most common reason for adolescent girls to consult a gynaecologist in Taiwan. It may lead to severe anxiety, and therefore, if pain during menstruation can be relieved, anxiety levels may also be reduced (Alonso & Coe 2001). Participants in our acupressure group reported significantly less post-test anxiety during the initial session. The results of the initial session show that Sanyinjiao (SP6) acupressure intervention not only relieves menstrual pain, but also reduces anxiety caused by dysmenorrhoea. In the follow-up session, those in the acupressure group had less anxiety than the controls, but the difference was not significant. Table 3 illustrates that at follow-up after 4–6 weeks, pretest anxiety scores for those in both the experimental and control groups were lower than in the previous cycle. Since anxiety levels were already low, further reduction was limited, which might explain why post-test scores were lower but not significantly lower during follow-up.

Study limitations

One limitation of the study was that we could not rule out the possibility of a control group member learning to apply acupressure to herself during the follow-up stage. If this occurred, it may have had an influence on the outcome of the study. Blinding was not practical in the home setting where acupressure was self-administered by the participants; this form of self-care remains another possible source of bias.

One other possible limitation was that it must have been obvious to participants that acupressure was being tested for its efficacy, while the control group's rest was merely an ordinary alternative. In other words, the experimental group, having read about the purpose of the study and about acupressure, must have had heightened expectations relative to the control group, and this could have had psychosomatic effects. Further testing of the physiological outcomes, such as heart rates, respiration rates, blood pressure or endorphin levels, with a larger sample size is recommended.

Conclusions

Acupressure is an effective and safe form of therapy for adolescents with primary dysmenorrhoea. Single acupoint pressure at Sanyinjiao (SP6) is cost-free and easy to learn. It can be integrated into clinical practice and health education in order to enhance the quality of life for adolescents with primary dysmenorrhoea. In this study, the primary investigator delivered acupressure treatment to control for significant confounding variables such as pressure, acupressure dose and point specificity. Clinically, community nurses and adolescents with primary dysmenorrhoea could easily be trained to administer acupressure.

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