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EFFECT OF ACUPRESSURE AND CHANGES IN HEART RATE VARIABILITY IN DYSMENORRHOEA

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Abstract

Dysmenorrhoea is a common distressing disorder in women that manifests during menstrual phase especially in young females. The subjects suffering from pain during mensuration are considered to be dysmenorrhoeic. In our studies we have used heart rate variability (HRV) as a sensitive marker of autonomic activity.

Autonomic nervous system activity was assessed by means of heart-rate variability (HRV) power spectral analysis during supine rest. The purpose of this study was to assess the changes in heart rate variability in dysmenorrhoea by assessing sympathetic activity and parasympathetic activity and to find out the effect of acupressure therapy whether it is beneficial or not in alleviating the symptoms of dysmenorrhoea. HRV and intensity of pain was assessed before and after acupressure therapy in dysmenorrhoea. Pain intensity was graded using Visual analogue scale. We have noted a significant alteration in autonomic function which may be an important component of premenstrual syndrome (PMS). Acupressure therapy has been effective in regulating the autonomic alterations. Acupressure therapy is an ancient Oriental healing method that applies pressure through a blunt probe to specific points on the skin surface which helps to prevent and treat illness. Acupressure therapy has also significantly reduced the dysmenorrhoeic pain as observed from our visual analogue scores. Our study has clearly revealed the beneficial effect acupressure on dysmenorrhea. It is a very simple procedure that can easily be taught to be self practiced by the dsymenorrhoeic females to relieve the pain during mensuration. It will be a simple drugless inexpensive method to relieve the pain without any side effects.

Introduction

Acupressure therapy is an ancient Oriental healing method that applies pressure through a blunt probe to specific points on the skin surface which helps to prevent and treat illness. Acupressure has long and distinguished history as an effective healing tool for many centuries to promote the healing of disease[1]. Hormonal changes in the body during menstruation can cause severe pain and increased menstrual blood flow. To ease these symptoms, acupressure is applied on the specific points, to have a strong influence on blood flow and may help stop pain. Acupressure can be applied easily by using a blunt probe. Stimulation of the acupressure points through a probe can be done by the subject or by investigator. It is safe, painless, and does not require the use of needles.

Dysmenorrhoea is a common distressing disorder in women that manifests during menstrual phase. The subjects suffering from pain during mensuration are considered to be dysmenorrhoeic. The symptoms such as head ache, vomiting, nausea, giddiness are considered as associated symptoms[2].

There is some evidence that altered autonomic function may be an important component of premenstrual syndrome (PMS), but few studies have used heart rate variability (HRV) as a sensitive marker of autonomic activity in severe Dysmenorrhoea. Heart rate variability has been used to assess activation of the sympathetic and the parasympathetic nervous systems[3].

HRV represents one of the most promising markers[4]. It is a simple tool for both research and clinical studies. HRV has become the conveniently accepted term to describe instantaneous heart rate and RR interval. Acupuncture therapy has been used to reduce chronic lower abdomen pain and low back pain in different phases of menstrual cycle[5]. Acupressure therapy has not been used effectively in the treatment of dysmenorrhoea.

The present study investigates whether the activity of the autonomic nervous system, which plays a vital role in orchestrating physiological homeostasis within the human body, is altered during the menstrual cycle of women with dysmenorrhoea. Cycle phase was determined by the onset of menstruation. Autonomic nervous system activity was assessed by means of heart-rate variability (HRV) power spectral analysis during supine rest. The purpose of this study was to assess the changes in heart rate variability in dysmenorrhoea by assessing sympathetic activity and parasympathetic activity and to find out the effect of acupressure therapy whether it is beneficial or not in alleviating the symptoms of dysmenorrhoea.

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Materials and Methods

Dysmenorrhoea is a common distressing disorder in women that manifests during menstrual phase. For our study, the subjects suffering from lower abdominal and low back pain during menses were considered to have dysmenorrheic pain. Head ache, vomiting, nausea, giddiness are considered as associated symptoms.

The participants were informed regarding the nature of study and a written consent was obtained from them. In this study 30 female volunteers were taken from Gynaecology department of Saveetha Medical College and Hospital located at Thandalam. The subjects were selected based on inclusion and exclusion criteria given in the methodology.

Inclusion criteria

Women (Unmarried and married) with normal menstrual cycle (28± 3) days in age group of 17 to 30.

Exclusion criteria

Women who were mentally challenged, sensitive to acupressure, suffering from cardio respiratory diseases and who had implantment of intrauterine device.

The demographic data was collected from all participants. General information about name, age, height and weight of the participant, was obtained.

Medical history was collected using a standard questionnaire. After anthropometric measurements, clinical examination was carried out.

The procedure was carried in the Research room in the Department of Physiology, Saveetha Medical College. The room has an ambient temperature of 28 to 32 deg cel, closed with no external noise disturbance.

Heart rate variability (HRV) was measured and acupressure therapy was given for 2 minutes and again heart rate variability was recorded using digital physiograph. HRV was recorded using Digital Physiograph (INCO – Naviquire , Version - 56)

HRV was measured by Frequency Domain Method4 according to the standard norms set by The European society of Cardiologist and North American Society of Pacing and Electrophysiology.

Frequency domain methods

Power spectral density (PSD) analysis provides provides the basic information of how power (variance) distributes as a function of frequency.

PSD is generally classified as parametric and non parametric .The advantages of parametric methods used are (1) smoother spectral components that can distinguish independent of ore selected frequency bands. (2) Easy post processing of the spectrum with an autonomic calculation of Low- and High frequency power components with an easy identification of the central frequency of each component. (3) An accurate estimation of PSD even on a small number of samples on which the signal is supposed to maintain stationary.

Short –term recordings. Three main spectral components are calculated from short –term recordings of 2 to 5 minutes. Very low frequency (VLF), Low frequency (LF), and High Frequency (HF) components. The distribution the power and the frequency of LF and HF are not fixed but may vary in relation to changes in autonomic modulations of heart period.The measurement of VLF, LF, and HF power components is usually made in absolute values of power (milliseconds squared).LF and HF may also be measured in normalized units.

Low frequency (LF) - (.04Hz- .155Hz), indicates sympathetic activity. High frequency (HF) – (.15Hz-.40Hz), indicates parasympathetic activity.

Groups

Heart rate variability (HRV) was measured in the following three groups:

Group I : Control Group

HRV was measured when the subject was not menstruating and not experiencing dysmenorrhoea.

Group II: Pre therapy group (Pain)

Heart rate variability was measured by when the subject was experiencing pain (dysmenorrhoea) during the period of menstruation before the administration of acupressure therapy.

Group III : Post therapy group (Acupressure + Pain)

Acupressure therapy (2 minutes) was given during dysmenorrhoeic pain & then Heart rate variability was measured after the administration of acupressure therapy.

Pain assesment

Pain in Dysmenorrhoea (low back pain and abdominal pain) was assessed by using a VISUAL ANALOGUE SCALE[6]. Visual analogue scale (VAS) has been used to measure the level of dysmenorrheic pain in women[7].The pain assessment was made in the pre therapy (group II) and post therapy group (group III).

Visual analogue scale

A Visual Analogue Scale (VAS) is used to measure a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured. For example, the amount of pain that a patient feels ranges across a continuum from none to an extreme amount of pain. From the patient's perspective this spectrum appears continuous ± their

pain does not take discrete jumps, as a categorization of none, mild, moderate and severe would suggest.

Operationally a VAS is usually a horizontal line, 100 mm in length, anchored by word descriptors at each end, as illustrated in Fig. 1. The patient marks on the line the point that they feel represents their perception of their current state. The VAS score is determined by measuring in millimeters from the left hand end of the line to the point that the patient marks.

Acupressure therapy for dysmenorrohoea

Stimulation of the acupressure points through a blunt probe can be done either by subject itself or by investigator following simple instructions. It is safe, painless, and does not require the use of needles.

Acupressure points

The Acupressure points were selected after consulting experienced and practising acupressure therapist. Following are the acupressure points used in alleviating pain in dysmenorrhoea [1]:

1. SP6 - Located on the inside leg, just above your ankle, spleen 6 is thought to have a strong influence on blood flow and may help stop pain in abdomen.
2. LIV 4 – Located on the ankle 1 t-sun (1 inch) anterior to the medial malleolus in between the tendon of the extensor hallusis longus muscle.
3. St 41: Located on the ankle crease, midway between the tips of the malleoli between the extensor digitorum longus and extensor hallicis longus tendon.

Acupressure was given by applying pressure using a blunt probe in the above mentioned regions for 2 minutes.

Statistical analysis

All the values obtained were expressed as mean ± SD.The results were analysed using Paired "t" test. P value < 0.05 was considered to be statistically significant.

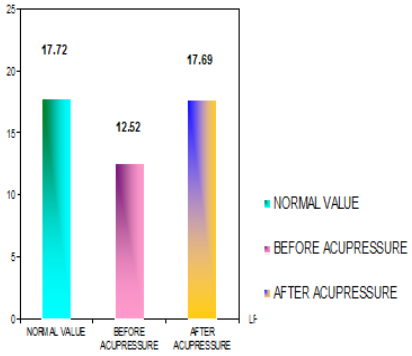
Results

The pre therapy values were compared with the post therapy values and the control values. Measurement of heart rate variability showed a significant decrease in the low frequency value in the pre therapy group (group II) which indicates sympathetic activity. Acupressure therapy significantly brought it back to the normal control value (group III)

Results – Hrv

	Low Frequency Value		
	Normal Value	Before therapy	After therapy
LF (Hz)	17.72±1.8	12.52±1.2	17.69±2.2

Data expressed as mean SD,



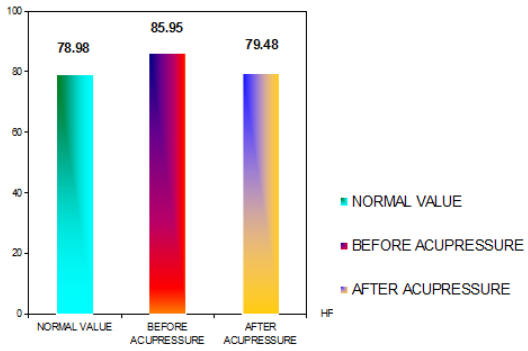
Parasympathetic activity as indicated by high frequency value was significantly higher in dysmenorrheic women (group II) which was lowered significantly to the control value(group I) in the post therapy group (group III).

Results – Hrv

High frequency value

	Normal Value	Before therapy	After therapy
HF (Hz)	78.98±2.9	85.75±3.3	78.48±4.1

Data expressed as mean± SD,



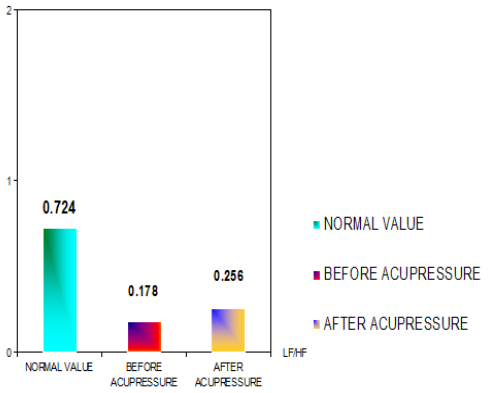
The low frequency, high frequency (LF/HF) ratio was reduced significantly in dysmenorrhoeic women (group II). Acupressure therapy increased the LF/HF ratio (group III).

Results – HRV

Low frequency- high frequency ratio value

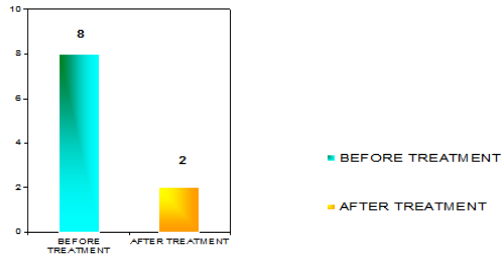
	Normal Value	Before therapy	After therapy
LF/HF	0.724±0.01	0.178±0.01	0.256±0.01

Data expressed as mean± SD,



Pain was assessed with the help of visual analogue scale. Pain intensity which was high in the pre therapy group (group II) was significantly reduced after the application of acupressure (group III) as observed from the decreased visual analogue scale score.

Result – Visual analouge scale



	Before treatment (Group II)	After treatment (Group III)
Visual Analouge Score (mm)	8±0.7	2±0.3

Discussion

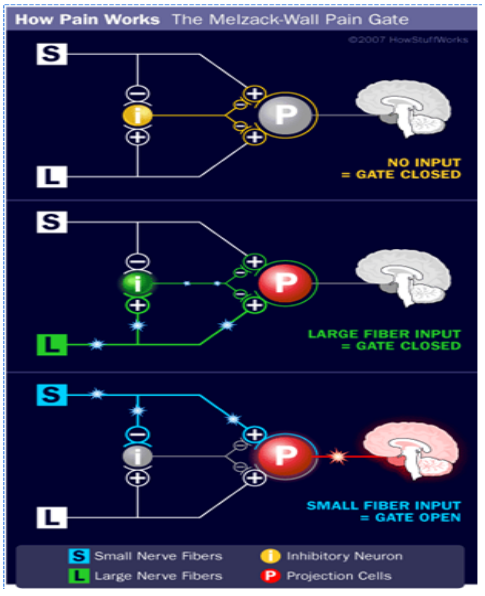
Our study demonstrates that application of acupressure had shown significant reduction in dysmenorrheic pain and alterations induced in the sympathetic and parasympathetic activity. Thus application of acupressure on traditional points, influences the autonomic nervous system.

Autonomic functions were studied in female healthy human subjects during the menstrual phases[8]. Women with severe menstrual pain have decreased parasympathetic activity during sleep in association with their premenstrual symptoms[9]. Thus dysmenorrhoea is known to alter autonomic activity.

According to Jun et al.[10], complementary and alternative acupuncture therapy may alleviate dymenorrhoea and improve work performance and quality of life in females Acupuncture therapy is effective in decreasing the pain with dysmenorrhoea in young women.Acupuncture is used for dysmenorrhoea – chronic abdominal pain in young women to reduce the pain [11]. Acupuncture treatment has lowered pain intensity in dysmenorrhoea [12]. Acupuncture is effective in treating primary dysmenorrhoea [13].Few studies exist on the effect of acupressure on dysmenorrhoea. Lewers et al in 1989 have shown that acupressure therapy relieves the pain of primary dysmenorrhoea[14].

According to Gate control theory [15], perception of pain is modulated by a functional gate within the central nervous system. Under normal circumstances this gate is widely opened and pain impulses (via the small diameter fibres) get through quite easily[16].

When acupressure is carried out a second stream of non-painful impulses is set up from the inside of acupressure points (via large diameter fibres).



In other words there is competitive inhibition of pain impulses and no pain (or less pain) is felt after treatment. The autonomic nervous system play an important role in acupressure therapy along the

sympathetic plexuses surrounding blood vessels that some of the acupressure impulses travels to the spinal cord and brain.

Naturally occurring chemical transmitters endorphins play a prominent part by binding on the opiate receptors in the brain cells. The endorphins released by acupressure produces the analgesic effect.

The enkephalin inhibiting pain may be indirect. Instead of acting directly on the receiving nerve cell the substance block the release of directly acting neurotransmitters such as acetylcholine, glutamate, thereby reducing the receiving cell's excitatory input.

Enkephalin is released from pituitary gland. Enkephalin released from a neuron bind to the opiate receptors on the terminal of excitatory neuron partially depolarized the terminal membrane and reducing a net depolarization produced by the arrival nerve of impulse. The receiving cell is then exposed to less excitatory stimulation and reduces its firing rate, the phenomenon is called pre-synaptic inhibition[1].

In this study it's scientifically proved that acupressure treatment relieves pain in dysmenorrhea which is common disorder for females.

Conclusion

Dysmenorrhoea is a common distressing disorder in women that manifests during menstrual phase especially in young females. The subjects suffering from pain during menses are considered to be dysmenorrhoeic. The symptoms such as head ache, vomiting, nausea, giddiness are considered as associated symptoms. In our studies we have used heart rate variability (HRV) as a sensitive marker of autonomic activity in severe Dysmenorrhoea. We have noted a significant alteration in autonomic function may be an important component of premenstrual syndrome (PMS). Acupressure therapy has been effective in regulating the autonomic alterations. Acupressure therapy is an ancient Oriental healing method that applies pressure through a blunt probe to specific points on the skin surface which helps to prevent and treat illness. Acupressure therapy has also significantly reduced the dysmenorrhoeic pain as observed from our visual analogue scores. Our study has clearly revealed that acupressure has beneficial effect on dysmenorrhea which is a most common disorder in females. It is a very simple procedure that can easily be taught to be self practiced by the dsymenorrhoeic females to relieve the pain during mensuration. It will be a simple drugless inexpensive method to relieve the pain without any side effects.

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