Original Article

EFFECTIVENESS OF TENS VERSUS STRETCHING EXERCISES ON PRIMARY DYSMENORRHEA IN STUDENTS

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Abstract

Background: *Primary dysmenorrhea is health related problem with high prevalence causing effects on different aspects of life affecting different activities and in turn work productivity.*

Aim: *To compare the effectiveness of tens vs. stretching exercises on primary dysmenorrhea.*

Design*: Randomized controlled trial (RCT) (double blinded).*

Setting*: Royal group of colleges Gujranwala, Pakistan.*

Population*: sixty six female students with confirmed diagnosis of primary dysmenorrhea were included. The ages of them were 16-25 year.*

Methods*: sixty six females were divided into two groups. The group A was treated with TENS while group B was treated with stretching exercises. The data was collected from the subjects through structured questionnaire, VAS scale and SF-36. The demographic data was presented in the form of tables. Intervention-induced changes within the groups were investigated using paired sample t-test while independent sample t-test was used to compare the two groups. Correlation was used to observe relationship of pain and different domains of quality of life.*

Results*: Significant changes within tens group ($p \leq 0.05$) was observed for pain. Additionally, significant differences in some domains of quality of life were found between both groups. However, some domains did not demonstrate significant changes in both groups likely because duration of intervention was less.*

Conclusion*: It is concluded from the results that TENS is more effective for pain improvement but to improve quality of life stretching exercises are more effective.*

Keywords*: primary dysmenorrhea, tens, stretching exercises quality of life.*

Introduction

Dysmenorrhea is derived from a Greek word which means difficult menstrual flow. Primary dysmenorrhea is defined as recurrent, cramp pain occurring immediately before or with menses in adolescence after the establishment of ovulatory cycles in the absence of identifiable pelvic pathology caused by myometrial activity lasting for minutes producing pressure more than 60 mm Hg, resulting in uterine ischemia. This myometrial activity is modulated and augmented by prostaglandin synthesis which triggers contractions in the uterine and intestinal walls.(1) Cramps usually begin one to two years after a woman starts menstruating. They usually become less painful with aging or after the woman has her first baby. The symptoms of menstrual cramps include aching pain or feeling of pressure in the lower abdomen, may be radiating to the hips, lower back, and inner thighs. As severity of pain increases it also includes upset stomach, vomiting and loose stools as well. Multiple factors play a role in the perception and the severity of the pain e.g behavioral and psychological factors, stress, low body mass index (BMI), smoking, early menarche, prolonged or aberrant menstrual flow and genetic influence. Ninety percent of women present for primary menstrual pain. Population surveys suggest that prevalence rates vary considerably by geographical location; complaints of dysmenorrhea vary between 43-90% with one third to one half reporting moderate or severe symptoms(2). It represents public health problem associated with negative attitudes and experiences having its effects on individual's psychological status, health-related quality of life, stress level, limitations on sporting events, and other social activities even up to disabling extent so it becomes a common cause of sickness absenteeism from both classes and work by the female student community affecting their educational performance so there is need for educating girls on effective management of dysmenorrhea.(3,4,5,6,7,8)Cultural variables and personality traits are related to dysmenorrhea more than the perceptual and cognitive levels.(9)

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There is dire need to give attention to management of primary dysmenorrhea. To relieve menstrual cramps pharmacological treatment is aspirin or any other pain reliever, Oral contraceptives, Presacral neurectomy, local anesthetics and life style. Physical therapy treatments include: TENS, aerobic exercises, manual physical therapy, stretching exercises and connective tissue massage. Other forms of treatment usually used are acupuncture, acupressure, microwave diathermy, sham and softness techniques. Each of these modalities is thought to act by stimulating endogenous opioid pain-modulating systems. It can also be managed effectively by natural methods without resorting to medicines, provided one is psychologically prepared to face it without anxiety[8].

Both transcutaneous electrical nerve stimulation and interferential current appear to be effective in primary dysmenorrhea. Different studies support the use of medium and high frequency currents[13].Effects of stretching exercises on primary dysmenorrhea in adolescent girls are reduction in pain intensity, duration, and the amount of painkillers used by girls [16].

Stretching exercises cause increase in vasodilatation, release of endogenous opiates, shutting of blood flow from viscera resulting in less pelvic congestion. They also improve flexibility, restore mobility, relax tense uterine muscles and maintain good abdominal tone. Stretch-based exercises have been found to lower the excitability of the motoneuron pool as well.[17] One of the systematic reviews was conducted by Priya Kannan and recommended that Physiotherapists could consider using heat, transcutaneous electrical nerve stimulation, and yoga in the management of primary dysmenorrhea. While benefits were also identified for acupuncture and acupressure in no-treatment controlled trials[18]. Stretching and core strengthening exercises are effective in Primary Dysmenorrhea[22]. In 2005 primary consensus guideline from physical therapy treatments recommended the use of TENS [18].

Primary dysmenorrhea represents public health issue as it affects quality of life. There is dire need to give attention to management of primary dysmenorrhea. Normal TENS reduces pain through pain gate mechanism. Stretching exercise reduce menstrual discomfort through increase in vasodilatation, release of endogenous opiates, specially beta endorphins and suppression of prostaglandins and shutting of blood flow from viscera resulting in less pelvic congestion. They also smoothen an aching back, relieving pain, improving flexibility, restoring mobility increasing circulation in the spinal tissues and joints, relaxing tense uterine muscles and maintaining good abdominal tone. Stretch-based exercises have been found to lower the excitability of the motor neuron pool as well. Literature recommends for further need of researches. This study did comparison between two treatment techniques to find out effective and best one associated with relieving pain and improving quality of life.

Materials & Methodology:

Double blinded randomized controlled trial was carried out at Royal Group of Colleges Gujranwala. 66 patients were included and then randomly divided into two groups (Group A and group B) with 33 patients in each group. Group A was treated with TENS while group B was treated with stretching exercises. The treatment was given for 1 month. Data was collected pre and post treatment. The effects of them were compared for pain and quality of life. After informed consent 66 eligible participants with confirmed diagnosis of primary dysmenorrhea were recruited and were allocated to groups with simple random sampling. Demographic data (i.e. age, ethnicity) of all participants was recorded. Data was taken through structured questionnaire. VAS was used for pain and SF 36 was used for quality of life. The results of study are described in form of frequency, percentages, mean±SD and p-value. Data is compared before and after the intervention period. The intervention period for each patient was one month. Females with confirmed diagnosis of primary dysmenorrhea with age of 16-25 years and non-athletes were included. Females with secondary dysmenorrhea or child bearing or married and pregnant were excluded. Age, weight and BMI are shown in form of charts. Within group comparison paired t test is applied and to compare both groups independent t test is applied. Changes were observed in pain and major domains of quality of life as it consist of 36 questions which constitute 8 major domains for quality.

Students were divided into two groups by simple random sampling. Each group filled structured questionnaire and tools performas initially and then after intervention. Group A was applied TENS which is high frequency twice a day for 30 min each session.it was applied as the pain started.it was applied with four pads two at lower abdominal area and two at thigh muscles. TENS setting was 100 pulses per second with 100-microsecond pulse widths. Group B was given stretching exercises with warm up and cool down exercises thrice a week for whole month except for the days of menstruation.

Results

Within Tens group pain reduced significantly with p=0.00 (and mean differences 6.09--5.69). Energy level improved as p value is significant (p=0.00) with mean difference from 40.49 to 13.17. General body pains also improved with significance level of 0.042.changes within tens group can be seen within table (I). There is positive relationship between pain and limitation of activities due to physical health, as pain improves LOA also improves (r=0.329).There is negative correlation between pain and social function as Pain decreases social function improves (r -0.359). As menstrual pain increases general body pains also increase (r = 0.32). Significance level and correlation of pain with all domains of quality of life can be seen in table 2.

Table 1: Overview Of Intervention Based Changes Within Groups

	Tens Group			Stretching Group		
	Mean±SD		P-value	Mean±SD		P-value
	Pre	Post		Pre	Post	
VAS	6.02 ±2	5.69 ±1.77	0	6.24±2.16	6±1.87	0.354
Physical Function	54.28±14.09	54.54±16.09	0.874	48.18±18.4	51.81±19.11	0.021
LOA due to Physical health	35.6±30.63	38.63±28.7	0.379	49.24±23.7	50±20.7	0.813
LOA due to Emotional Health	41.44±33.32	41.41±31.21	0.994	54.54±18.29	49.52±20.5	0.172
Energy/Fatigue	40.49±11.32	50.15±12.59	0	38.5±11.9	50.90±12.95	0
Emotional Well Being	54.18±12.29	52.6±12.92	0.554	53.81±12.1	49.57±11.9	0.127
Social Function	44.56±23.93	49.74±17.46	0.261	40.22±25.32	59.46±15.68	0
Pain	39.03±24.52	47.72±26.51	0.042	39.84±28	54.31±18.2	0
General Health	47.98±12.72	53.89±11.3	0.066	40.39±15.31	49.84±14.86	0.005

Table 2: Correlation between pain and domains of quality of life post intervention

Correlations	TENS Group Month 1		Stretching Group Month 1	
	r	p-value	r	p-value
VAS--Physical Function	-0.071	0.696	-0.17	0.343
VAS--LOA Due To Physical Health	0.329	0.062	0.06	0.738
VAS--LOA Due To Emotional Health	0.233	0.191	-0.216	0.227
VAS--Energy/Fatigue	0.302	0.087	-0.09	0.617
VAS—Emotional Well Being	0.117	0.516	-0.196	0.274
VAS--Social Function	-0.359	0.04	-0.011	0.953
VAS--Pain	0.322	0.068	-0.234	0.191
VAS--General Health	0.048	0.793	-0.079	0.664

Within stretching group after one month of stretching exercises physical function improved significantly p=0.021 (mean difference= 48.18--51.81). Energy level improved as p value is significant. Social function improved significantly. With stretching exercises general body pains improved significantly (p =0.00, mean 39.84--54.31) and also general health improved significantly (p =0.005). There is negative relationship between pain and physical function and limitation of activities due emotional health (r = -.17, r= -0.216). Emotional well-being is indirectly related to pain (r = -.19). As menstrual pain is decreasing, general body pain is also decreasing (r = -.23) with stretching exercises. Significance levels and correlation of pain with all domains of quality of life are given in table 2.

There is non-significant difference for pain reduction between two groups but pain is reduced in tens group which is obvious from mean difference (6.09--5.69). Between groups is non-significant difference but as mean value shows, physical function improved in stretching group only (p =.533, mean=48.18--51.81). There is variation at base line for LOA due to physical health. although there is non-significant difference between groups but individually within groups there is marked improvement in LOA which is shown by mean difference. There is non-significant difference between groups for LOA due to emotional health but individually within stretching group there is marked improvement which is shown by mean difference (54.54--49.52). There is non-significant difference in energy level between groups but within both groups energy level improved markedly from baseline. Although there was marked variation at baseline for emotional well-being but still it is giving significant difference (p=0.02) and mean difference 53.81--100.68. There is marked improvement in social function within stretching group (p value=0.02). For all other domains of quality of life table 3 is given under.

TABLE 3: Post Intervention Comparison of Groups

Independent T Test	Pre/Post	Tens Group	Stretch Group	P Value
	Pre	6.09±2	6.24±2.16	.769
VAS	Post	5.69±1.77	6±1.81	.502
	Pre	54.28±14.9	48.182±18.4	.144
Physical Function	Post	54.54±16.07	51.81±19.11	.533
	Pre	35.606±30.6	49.24±23.78	.048
LOA Due To Physical Health	Post	38.63±28.7	50±20.72	.070
	Pre	41.44±33.32	54.54±18.29	.052
LOA Due To Emotional Health	Post	41.41±31.21	49.52±20.59	.217
	Pre	40.49±11.32	38.5±11.9	.490
Energy/Fatigue	Post	50.15±12.59	50.90±12.95	.810
	Pre	54.18±12.29	53.81±12.16	.904
Emotional Well Being	Post	52.6±12.9	56.07±15.86	.334
	Pre	44.56±23.93	40.22±25.32	.478
Social Function	Post	49.84±17.42	59.46±16.83	.026
	Pre	39.03±24.52	39.84±28.0	.900
Pain	Post	47.72±26.51	49.84±14.86	.690
	Pre	47.98±12.72	40.39±15.31	.032
General Health	Post	53.89±11.30	49.84±14.86	.218

Discussion

Pain is reduced in tens group which is obvious from mean difference but within stretching group pain on VAS scale did not improve significantly. Tens is specific device for reduction of pain that is the reason for improvement of pain more in tens group but there is non-significant difference between two groups. Previous studies also have shown that high frequency tens is effective for improvement of pain[2,3,4] In placebo controlled studies tens not only improved pain but also decreased the no. of medications being used for pain in dysmenorrhea.[24] TENS improved generalised body pain but there is no clear explanation for this improvement as tens gives local effects but may be due to location of pads, back pain or thigh pains might have also improved because thigh pain and back pain is associated with dysmenorrhea so these effects can be the cause of improvement of generalised pains. Regarding stretching group after one month of stretching session pain did not improve significantly but other studies show significant improvement in pain but the duration for which stretching were done was longer from 8 to 12 weeks [16] In one of the previous study after stretching exercises pain intensity, pain duration, and amount of consumed medications decreased significantly ($p<0.001$) but session was given for 8 weeks.one study conducted on nurses showed that after 8 weeks, pain severity and pain duration decreased significantly.[17]

For quality of life SF 36 was used as tool in this study. it covers the quality of life from aspects of physical function, limitation of activities, energy, social activities, general health and general pain. According to previous studies Health-related quality of life is a multidimensional concept that encompasses physical, emotional, and social aspects.[25] Very few studies have assessed the functioning and wellbeing of women with primary dysmenorrhea. But It is well known that diseases accompanied by pain are associated with low quality of life scores.[26]

Same in this study there was negative correlation between pain and physical function but according to the results of this study, physical function did not improve significantly in tens group inspite of improvement of pain but within stretching group although pain of menstruation did not improve significantly but physical function improved significantly. There were already variation at base line for LOA due to physical health and also individually within groups there was limited improvement in activity level although there is positive correlation specially in tens group but in spite of improvement of pain more within tens group LOA due to physical health did not improve. But also there is variation at base line, so non-significant difference between groups. There are some studies which have found no relationship between physical activity level and dysmenorrhea[27].

There is non-significant difference between groups for LOA due to emotional health but individually within stretching group there is some improvement. Energy level improved significantly in both groups but this effect did not help in improvement of activities. There is significant difference showing much more improvement in social functioning after stretching exercises, although within tens group social function improved shown by mean difference but it is non-significant. Generalized body pains and general health also improved in both groups at same level.

There are studies where the impact of primary dysmenorrhea on quality of life was analyzed using the SF-36 test, showing low scores for physical function, physical pain, general health perception, vital function, with no differences in social functioning, emotional and mental parameters.[28] Exercise and regular physical activity have been able to be considered as an effective method in preventing and treatment of dysmenorrheal.[29,30] The level of discomfort due to dysmenorrhea was accompanied by intensity of physical activity. Therefore, the results obtained from their study illustrated that physical activity could lead to improvement of painful dysmenorrhea by reducing depression; however, doing physical activity did not directly affect the reduction of symptoms of dysmenorrhea.[31]

In this study there is inverse relation between pain and activity level so in correlation also as pain is decreasing activity level is improving in both of groups and as activity level is improving social function is improving. Regarding general body pains

and general health they were improved within both groups but within stretching group they improved more significantly. Overall pain improved more in TENS group but in spite of improvement of pain quality of life remained independent of pain but within stretching group although local pain did not improve but even with one month of stretching exercise 5 domains out of 8 domains of quality of life improved significantly.

According to Izzo and Labriola[30] women involved in heavy sport activities experienced fewer signs and symptoms of dysmenorrhea in comparison with women who had occasional sport practice and According to Metheny and Smith[23], after adjusting for depression and mood changes, dysmenorrhea, and that sportswoman who had participated in heavy physical activities had less symptomatic menstrual cycles. [29,30,31]

Conclusion:

It is concluded from the results that TENS is more effective for pain improvement but to improve quality of life stretching exercises are more effective. Although in correlation pain is affecting the domains of quality of life but still within stretching group physical function, energy level, social function, generalized pain and general health improved more than tens group.

Limitation of the Study

The limitation of the study is that the patients of severe pain might have to take medicine so it can alter the results. Life style changes, ethnicity and hereditary factors can affect the results. Only students are included so generalizability to all females can be a question. Intervention was given only for one month.in this study only pain was considered and other associated symptoms of dysmenorrhea were not considered.

Recommendations:

This study should be conducted with long duration. In future studies affects of life style changes, hereditary factors, and ethnicity should be controlled to avoid changes in results. Further studies should be conducted to see effects of pain on further aspects of life like psychological effects. Effectiveness of interventions should be studied on pain according to its severity. Effectiveness on associated symptoms should also be seen to have a broader picture of effectiveness of interventions.

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Raheela Kanwal: Conception and design of the work, acquisition, analysis, and interpretation of data, drafting the work and revising it critically for final approval. Accountable for all aspects of the work

Tahir Masood: Conception and design of the work, revising it critically for important intellectual content for final approval. Drafting the work and revising it critically for final approval. Accountable for all aspects of the work

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Muhammad Naveed Babur: Drafting the work, interpretation of data and revising it critically for important intellectual content for final approval. Accountable for all aspects of the work

Mirza Shamim Baig: Conception and design of the work, revising it critically for important intellectual content for final approval. Accountable for all aspects of the work