

Effect of Microwave Diathermy and Aerobic Exercise in Females with Primary Dysmenorrhea

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Abstract: A randomized control trial was conducted to study the effect of microwave diathermy & aerobic exercise in females with primary dysmenorrhea. 30 participants of age group 18-25 years were randomly divided in group A (MWD + EX) and group B (EX ONLY) for 8 weeks. The outcome measures of VAS and M-MDQ were compared before and after intervention using paired and unpaired t test for both the groups, which showed that pain and quality of life significantly improved in both the group especially in group A with p value <0.0001. The study concluded that MWD given along with aerobic exercises is more effective.

Keywords: MWD, Dysmenorrhea, Aerobic Exercise.

1. Introduction

Menstruation is the monthly discharge of blood from the uterus through the vagina, while the first onset of menstruation is known as menarche. Menstruation for young women is a normal part of life, and a symbol for femininity and fertility. By menstruation, girls are passing their journey into womanhood where they start to realize their capability to play their future reproductive role. Menstruation is an essential part in a woman's life¹. In healthy pubertal girls, the menstrual period varies in flow heaviness and may remain irregular in occurrence for up to 2 years following menarche. After that time, the regular menstrual cycle should be established. Most women will experience 300 to 400 menstrual cycles within their lifetime. Normal, regular menstrual cycles vary in frequency from 21 to 36 days (with the average cycle lasting 28 days), bleeding lasts 3 to 7 days, and blood loss averages 20 to 80 ml. Irregular menses can be associated with irregular ovulation, stress, disease, and hormonal imbalances. The reproductive cycle, also referred to as the menstrual cycle, results from a functional hypothalamic-pituitary-ovarian axis and a precise sequencing of hormones that lead to ovulation².

Menstrual disorders are common gynecological problem for medical visits among women of reproductive age. It may be defined as any

variation from the normal menstrual cycle such as changes in regularity and frequency, duration of flow or amount of flow³. There are several types of menstrual disorders like amenorrhea, oligomenorrhea, Polymenorrhoea, menorrhagia, metrorrhagia, menometrorrhagia, hypomenorrhoea, Dysmenorrhea⁴. Patient with irregular menstrual cycle are likely to impact quality of life, mood, potentially precipitate depression and anxiety. Indeed, it has a significant effect on adult women, resulting in diminished quality of life, dysfunction in the family and work environment⁵.

Dysmenorrhea means painful cramping pain accompanying menstruation. It can be divided into two groups of primary and secondary for understanding the pathogenesis of this distressing condition. Primary dysmenorrhea refers to one that is not associated with any identifiable pelvic pathology whereas secondary dysmenorrhea refers to the one associated with presence of organic pelvic pathology i.e. fibroids, endometriosis⁴. A dysmenorrhea incidence of 33.5% among adolescent girls in India was reported by Nag George and Bhaduri found dysmenorrhea to be a common problem in India with prevalence of 87.87%⁶.

Symptoms of primary dysmenorrhea are spasmodic pain and is usually felt in the lower abdomen, although sometimes the pain radiates to the back and thighs; the pain usually begins just before or at the onset of menstruation; and other symptoms may include nausea, vomiting, headache, diarrhea, low back pain, dizziness, and, in severe cases, syncope and collapse. The symptoms last from several hours to several days, rarely exceeding 3 days, and tend to decrease or disappear after the individual has experienced childbirth the first time and to decrease with age. Primary dysmenorrhea has been estimated to cause the loss of 140,000,000 work hours annually. It is the single greatest cause of absence from school and work among women of menstruating age worldwide⁷. It is widely prevalent, more than 70% of teenagers and 30 to 50% of menstruating women suffer from varying degrees of discomfort⁴.

Treatment of Primary dysmenorrhea includes counseling, psychotherapy to modify patient's

perception of her problem and alter behavioral attitude, medical measures to relieve pain and surgical interventions. Medical measures consist of analgesics like paracetamol, antispasmodics like hyoscine, prostaglandin synthetase inhibitors are cyclooxygenase inhibitors, NSAIDS like mefenamic acid; Indomethacin. Also vitamin E 200mg b.i.d. starting 2 days before and 3 days during period claims to reduce dysmenorrhea. Oral contraceptive drugs administered cyclically suppress ovulation and are useful in relieving dysmenorrhea. A surgical intervention is indicated when medical measures fail, it includes diagnostic hysteroscopy, diagnostic laparoscopy, laparotomy, hysterectomy⁴. Non-pharmacology approaches such as exercise, heat, behavioural interventions, and dietary/herbal supplements are commonly utilized by women in an effort to relieve dysmenorrhea⁸.

It is proved that physical activity improve pelvic and extra pelvic organ functioning by adjusting metabolism, hydroelectric balance, hemodynamic condition and blood flow, which promote the phenomenon called analgesia by physical exercise. Aerobic exercise is physical activity of low to high intensity that depends primarily on the aerobic energy generating process. Aerobic exercise increase blood circulation which helps cramps to go away stimulate sympathetic activity. Thus aerobic exercise helps to reduce symptoms of primary dysmenorrhea⁹.

Microwave diathermy utilizes higher-frequency electromagnetic waves than does Short wave diathermy (2,450 MHz versus 27.12MHz). These higher-frequency transmissions, generated by a magnetron, are focused and beamed into the tissues from varying distances. It raise tissue temperature, increase extensibility of deep collagen tissue, decrease joint stiffness, relieve deep pain and muscle spasm, increase blood flow, and assist in the resolution of inflammation. The frequencies used for MWD are too fast to depolarize nerve or muscle membranes. Thus, neither innervated nor denervated muscles contract. And it is believed that the pain of primary dysmenorrhea is caused by the contraction of the muscles of the uterus and thus, further contraction of these muscles would not be desired. Deeper heating technique more effectively heat the uterus and have a better pain-relieving effect by improving blood flow through the myometrium, thereby facilitating "washout" of the presumed pain-producing substance, prostaglandins. Although haemorrhage or uncontrolled bleeding, is considered a contraindication for deep heating⁷.

Visual analog scale and Moos menstrual distress questionnaire are used to measure pain and quality of life in this study. Visual analog scale (VAS) attempt to represent measurement quantities in

terms of a straight line placed horizontally or vertically on paper. The endpoints of the line are labelled with descriptive or numeric terms to anchor the extremes of the scale and provide a frame of reference for any point in the continuum between them. The patient is asked to bisect the line at a point representing self-assessed position on the scale. The patient's score is then obtained by measuring from the zero mark to the mark bisecting the scale¹⁰. The Menstrual Distress Questionnaire (MDQ) was developed by Rudolph. H Moos (1968). The Menstrual Distress Questionnaire is a standard method for measuring cyclical premenstrual symptoms. A MDQ is self-report inventory for use in the assessment and treatment of premenstrual and menstrual symptoms. The MDQ can distinguish cyclical from noncyclical changes in physical symptoms, mood and behaviour, and arousal. This questionnaire is composed of seven factors that Moos found to be stable recurrent (pain, concentration, behavioral changes, autonomic balance, water retention, negative effect, and arousal). It is a six point scale in which according to severity patient has to score it, 1- no reaction at all to 6 is acute or partially disabling¹¹.

2. Method

2.1. Study Design

A randomized controlled study was conducted on 30 participants from Dr. APJ Abdul Kalam College of Physiotherapy by using simple random sampling. The participants were screened for the inclusion and exclusion criteria. The inclusion criteria were Females with primary dysmenorrhea, Unmarried females, Age group 18 -25 years, Subjects willing to participate. And the exclusion criteria were Females having any gynaecological related surgeries, pregnancy, pelvic inflammatory diseases, thyroid problems, polycystic ovarian disease, Females unable to follow instructions, not willing to participate.

2.2. Procedure

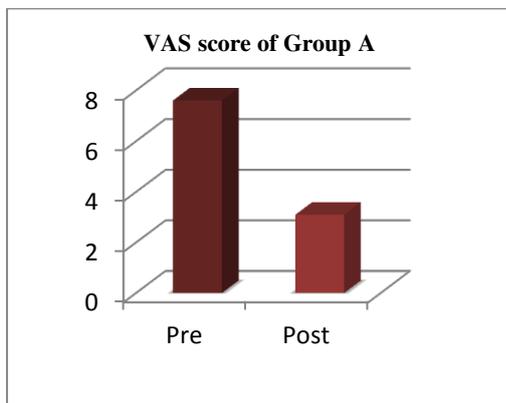
An informed written consent form was given to all the selected participants. After obtaining demographic data and detailed assessment, participants were divided in experimental group and control group. The participants of both groups underwent aerobic training for 3 days a week up to 8 weeks i.e. 2 months while MWD were given to the experimental group on the premenstrual symptom day for the consecutive two cycles. The outcome measures for pain (VAS) and quality of

life (M-MDQ) were taken before and after the intervention.

3. Data analysis and Result

Table 1. Shows VAS values of pre and post intervention in Group A

Group A	Mean+-SD	T value	P value
Pre intervention	7.6+-1.032	9.55	<0.0001, considered extremely significant
Post intervention	3.1+-1.908		

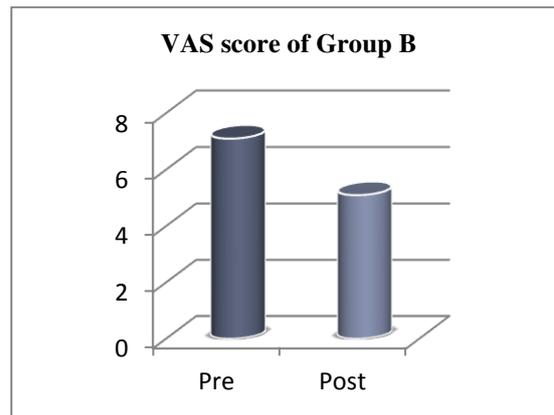


Graph 1. Shows VAS score of pre and post intervention in group A.

Result: graph 1 shows that on comparison of mean of pre and post intervention of VAS scores in group A using paired t test, T value is 9.55 and P value is <0.0001 which indicates extremely significant.

Table 2. Shows VAS values of pre and post intervention in Group B.

Group B	Mean+-SD	T value	P value
Pre intervention	7.1+-0.9871	2.899	<0.0001, considered extremely significant.
Post intervention	5.1+-0.9871		

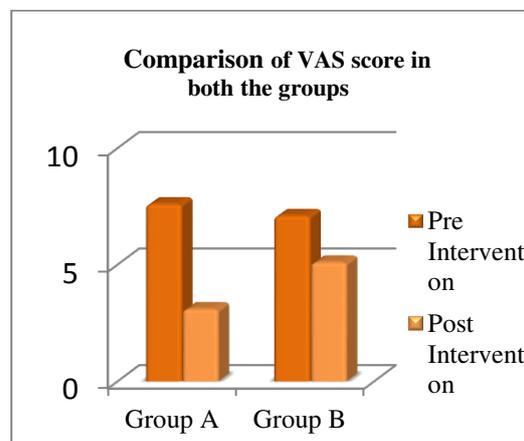


Graph 2. Shows VAS score of pre and post intervention in group B.

Result: graph 2 shows that on comparison of mean of pre and post intervention of VAS scores in group B using paired t test, T value is 2.899 and P value is <0.0001 which indicates extremely significant.

Table 3. Shows VAS values of pre and post intervention in both group A and B

	Pre intervention	Post intervention	T value	P value
Group A	7.6+-1.032	3.1+-1.908	3.357	0.0026, considered very significant
Group B	7.1+-0.9871	5.1+-0.9871		

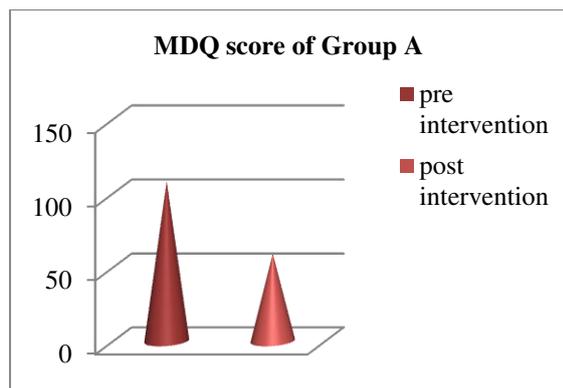


Graph 3. Shows VAS scores comparison of pre and post intervention in both group A and Group B.

Result: graph 3 shows that on comparison of mean of post interventions of VAS scores in both group A and group B using unpaired t test, T value is 3.357 and P value is <0.0026 which indicates very significant.

Table 4. Shows MDQ scores of Pre and Post intervention in group A

Group A	Mean+-SD	T value	P value
Pre intervention	108.15+-16.02	16.083	<0.001, considered extremely significant
Post intervention	59+-9.485		

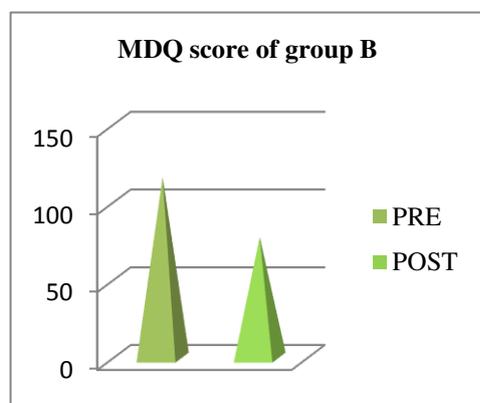


Graph 4. Shows MDQ scores of pre and post intervention in group A

Result: graph 4 shows that on comparison of mean of pre and post intervention of MDQ scores in group A using paired t test, T value is 16.083 and P value is <0.0001 which indicates extremely significant.

Table 5. Shows MDQ score of pre and post intervention in group B.

Group B	Mean+-SD	T value	P value
Pre intervention	116.23+-11.90	32.624	<0.0001, considered extremely significant
Post intervention	77.46+-8.752		

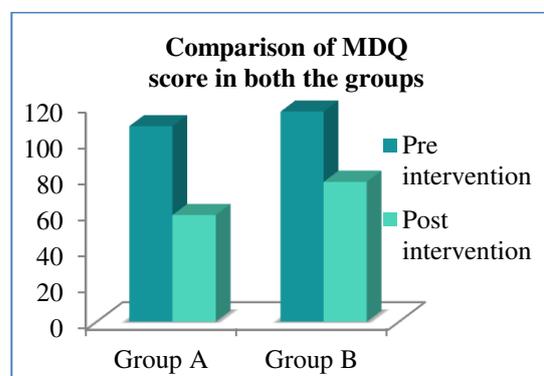


Graph 5. Shows MDQ scores of pre and post intervention in group B

Result: graph 5 shows that on comparison of mean of pre and post intervention of MDQ scores in group B using paired t test, T value is 32.624 and P value is <0.0001 which indicates extremely significant.

Table 6. Shows MDQ score of pre and post intervention in both groups A and B.

	Pre intervention	Post intervention	T value	P value
Group A	108.15+-16.083	59.15+-9.48	5.114	<0.0001, considered extremely significant
Group B	116.23+-11.90	77.46+-8.75		



Graph 6. Shows MDQ scores comparison of pre and post intervention in both group A and group B.

Result: graph 6 shows that on comparison of mean of post interventions of MDQ scores in both group A and group B using unpaired t test, T value is 5.114 and P value is <0.0001 which indicates extremely significant.

4. Discussion

This study evaluated the effectiveness of Microwave Diathermy and aerobic exercise in reducing the pain intensity and improving the quality of life in females with primary dysmenorrhea. The results of this study showed that there was significant difference in pain intensity and quality of life after 8 weeks of intervention in both group A(MWD+EX) and group B(only EX) in females with primary dysmenorrhea.

The mean baseline value for pain using Visual Analogue Scale (VAS) before intervention in group A was 7.6+-1.032 and in group B was 7.1+-0.9871. After intervention the mean pain value in

group A was 3.1+-1.908 and in group B was 5.1+-0.9871 respectively. There was extremely significant difference found in pain intensity within these groups and on comparison of both the groups the pain intensity was very significantly reduced in females with primary dysmenorrhea.

In group A, the mean baseline value for quality of life using MOOS menstrual distress questionnaire(M-MDQ) pre intervention was 108.15+-16.02 and post intervention was 59.15+-9.485. In group B, the mean baseline value for quality of life using M-MDQ pre and post intervention was 116.23+-11.9 and 77.46+-8.75 respectively. The result of this study showed that there was extremely significant improvement in quality of life among females with primary dysmenorrhea in both the groups.

The result of the present study showed that intervention was effective in both the groups but the additional effect found in group A was may be because of MWD. Thus, the study concluded Microwave Diathermy given along with Aerobic exercise is more effective in reducing pain and improving quality of life in females with primary dysmenorrhea

For almost half a century, exercise has been thought to relieve or even cures primary dysmenorrhea and in the last 15 to 20 years, researches for the link between physical activity and menstrual disorders have increased significantly¹². A study done by Nategheh Dehghanzadeh et al showed that aerobic exercises reduces psychological and physical symptoms of primary dysmenorrhea¹³. The symptoms of dysmenorrhea may be due to increased levels of prostaglandins in endometrium during menstrual cycle also falling progesterone level during the luteal phase brings about these elevations, specifically of PGF2 α and PGE2. These result in increased contractions leading to ischemia. It seems that women who exercise have a reduced incidence of dysmenorrhea. These may be due to exercise related hormonal effects on the lining of the uterus or increased level of circulating endorphins from the brain¹². As aerobic exercise increases uterine blood flow and metabolic activities, helps in excretion of prostaglandin and waste thus relieves symptoms of dysmenorrhea. Also increase blood circulation improves ischemia and reduces pain¹³.

As dysmenorrhea increases uterine contractions which cause pain thus MWD a deep heating modality given provides deep heat and help relieves deep pain and muscle spasm, perhaps uterine relaxation occurred with a concomitant decrease in pain. Furthermore, MWD results in

increased blood flow caused by heating the uterus which facilitates "washout" of the prostaglandins, which also have been implicated in causing the myometrial contraction further helps in reducing pain during menstruation. A case study done by Vance et al shows that MWD has been effective in alleviating pain in patients with primary dysmenorrhea⁷.

5. Conclusion

The present study concluded that Microwave Diathermy along with aerobic exercise was more effective than aerobic exercise only in reducing pain and improving quality of life in females with primary dysmenorrhea.

6. References

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