Effect of Hydrotherapy on Primary Dysmenorrhea: Descriptive Review

1Dr.Swathi S, 2Dr.Vineetha AN, 3Harshitha.A, 4Kalindi U. Prajapati, 5Jeethu Jahan
1PG Scholar, 2Associate professor, 3,4,5UG Scholar
Alva’s college of naturopathy and yogic sciences

Abstract: Primary dysmenorrhea is a common gynecological condition in females, prevalence of dysmenorrhea in women of reproductive age ranges from 50% to 87.8% globally, with an estimated frequency of 45% to 95%. Hot or cold compresses, neutral hip baths, neutral douches, warm water drinking, and warm baths are some of the hydrotherapeutic methods that can be utilized to effectively relieve the pain associated with primary dysmenorrhea. This study aims to see the effectiveness of hydrotherapeutic treatments for primary dysmenorrhea. Three major search engines namely med space, PubMed, Google scholar, were searched for articles. Finally, 15 articles matching the inclusion and exclusion criteria, which were included in this review. Among 15 articles 1 cross sectional studies, 6 quasi experimental studies, a content analysis review, Pre and Post design ,4 randomized control trials published between the year 2013 to 2023 were included. A Narrative review article and a systematic review article were also included. This review shows hydrotherapy can help with pain management in primary dysmenorrhea. Hydrotherapy, when used appropriately, has minimal side effects and is a cost-effective treatment option, resulting in a positive influence on the quality of life.

Keywords: Primary Dysmenorrhea, hydrotherapy, neutral douche, hot and cold compress, aquatic exercise.

I. INTRODUCTION

Dysmenorrhea means cramping pain during menstruation, it is classified as primary and secondary dysmenorrhea [1]. In the absence of pelvic disease, painful menstruation is referred to as primary dysmenorrhea. It is the most common reason for gynaecologic visits, it is characterised by persistent, crampy lower abdomen pain during menstruation and affects 50% to 90% of women. Similar clinical characteristics of menstrual discomfort are referred to as secondary dysmenorrhea, which is caused by pelvic pathology like endometriosis, fibroids, adenomyosis, and congenital anatomic anomalies[2]. The varieties of dysmenorrhea include spasmodic type, congestive type, and membranous type of dysmenorrhea. The most common variety, known as spasmodic, causes cramping discomfort that is often worst on the first and second days of menstruation. Congestive type shows up a few days before the start of menstruation as rising pelvic discomfort and pain. Membranous type is a unique group in which endometrium is shed as cast during menstruation and is followed by painful uterine discomfort. This kind is uncommon[3]. According to studies from India, the prevalence of dysmenorrhea in women of reproductive age ranges from 50% to 87.8% globally, with an estimated frequency of 45% to 95%. This condition has a significant negative influence on daily activities, academic performance, productivity at work, and quality of life. Although primary dysmenorrhea (PD) has a significant negative impact on quality of life, its prevalence is underreported, and most women do not frequently seek medical attention because they believe that dysmenorrhea pain is a normal part of menstruation[4]. The overproduction of uterine PGs is the most widely recognised theory for the aetiology of primary dysmenorrhea. It is thought that increased PG release, reportedly from sloughing endometrial cells, leads to myometrial hypercontractility, uterine muscle ischemia and hypoxia, and ultimately discomfort. Arachidonic acid, a common component of cell membrane phospholipids, and other long-chain polyunsaturated fatty acids are the source of PGs, which are widely distributed intracellular molecules. The lysosomal enzyme phospholipase A2 converts phospholipids into arachidonic acid. Progesterone levels are one of numerous variables that control lysosomal activity stability; Lysosome activity is stabilised by high progesterone levels and destabilised by low levels, respectively. As a result, the decline in progesterone that follows the regression of the corpus luteum in the late luteal phase of the menstrual cycle causes the removal of this stabilising effect on endometrial lysosomes, the release of phospholipase A2, the onset of menstruation, and the hydrolysis of phospholipids from the cell membrane to produce more arachidonic acid. Because of this, the creation of PGs is favoured due to the persistent availability of arachidonic acid, intracellular apoptosis, and tissue damage during menstruation.[5] Pharmacological, non-pharmacological, and surgical treatments are the three main methods used to control primary dysmenorrhea. The most popular treatments used to treat menstruation discomfort are non-steroidal anti-inflammatory drugs (NSAIDs) and oral contraceptives. These medications result in systemic adverse effects include nausea, digestive issues, loose stools, renal issues, hepatotoxicity, oedema, bronchospasm, and occasionally fatigue. Furthermore, patients with peptic ulcers or asthmatics who are aspirin sensitive are not allowed to use these medications. Non-pharmacological treatments like
Acupuncture, massage, and transcutaneous electrical nerve stimulation and Exercise has been shown to help with pain management. There are extra advantages when these activities are carried out buoyantly, as in hydrotherapy.[6] Hydrotherapy is also one of the non alternative methods which can be used for effective relief of symptoms of primary dysmenorrhea.[7] Hydrotherapy is the external or internal use of water in any of its forms (water, ice, steam) for health promotion or illness treatment at various temperatures, pressures, durations, and locations. It is a naturopathic therapy approach that was widely employed in ancient societies such as India, Egypt, and China.[8] Water remedies have been practised since antiquity. Water was thought to have extraordinary healing properties by the Greeks. The Romans constructed public baths that served as recreational and social centres for cities, forerunners to today's health resorts. In the nineteenth century, Vincenz Priessnitz and Sebastian Kneipp, in particular, emphasised the usesic treatments, its popularity has waned, but it remains an essential aspect of the treatment of people with chronic pain.[9]

John Harvey Kellogg's "Rational Hydrotherapy" was the first definitive book on hydrotherapy, outlining its methodology and results.[10] Naturopathic methods work primarily by increasing blood circulation to the reproductive organs and decreasing congestion. Depending on the kind of dysmenorrhea, therapy may include revulsive compress over the pelvic area, neutral hip bath, revulsive hip bath, mud pack to abdomen and abdominal pack etc.[11] Hydrotherapy has three physiological effects: thermal, mechanical, and chemical. The use of water at temperatures above or below body temperature produces thermal effects, with the extent of variation from body temperature predicting therapeutic benefits. The action of water operating on the body surface in the form of sprays, douches, frictions, immersions, whirlpools, and so on produces mechanical consequences. Water produces chemical effects when consumed orally, through nasal/sinus irrigation, vaginal douching, or colon irrigation.[12] Warm water sitz baths are widely known for being a safe and low morbidity means of treating anorectal and gynaecological problems. Most physicians, including colon and rectal surgeons, suggest warm sitz baths to relieve pain in the perineal region and to promote wound healing, even though there is no rational clarification for this maneuver.[13] The uterine contraction that occurs during menstruation is accompanied with other symptoms such as tiredness, painless/ tender breasts, supra pubic cramping, backache, general pain and vomiting.[2] Hydrotherapy can also assist in the treatment of these symptoms. The purpose of this descriptive review is to understand the management of primary dysmenorrhea through hydrotherapy.

### II. METHODOLOGY
Three major search engines namely med space, PubMed, Google scholar, were searched for articles that matched the key words: Primary Dysmenorrhea or (dysmenorrhea) or (menstrual pain), NOT (secondary dysmenorrhea), NOT (heat patch), hydrotherapy, sitz bath, hip bath, neutral douche, coldcompress, hot compress, cold pack, aquatic exercise, foot bath.

Out of a total of 493 articles 15 articles matching the inclusion and exclusion criteria, which were included in this review. Among 15 articles 1 cross sectional studies, 6 quasi experimental studies, a content analysis review, Pre and Post design, 4 randomized control trials published between the year 2013 to 2023 were included. A Narrative review article and a systematic review article were also included. Research articles before the year 2013, articles on use of heat patches, articles in languages other than English and articles that were not accessible without subscription were excluded.
### III. LITERATURE REVIEW

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>AUTHOR</th>
<th>TITLES</th>
<th>YEAR</th>
<th>RESULTS</th>
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<tbody>
<tr>
<td>1</td>
<td>Abhijna, Vanitha Shetty</td>
<td>A Comparative Study on the Effect of Acupuncture and Neutral Hip Bath among Young Females with Primary Dysmenorrhea – A Prospective Randomised Trial. [14]</td>
<td>2023</td>
<td>Analysis of variance (RMANOVA) on Visual analogue scale and Menstrual symptom questionnaire scores revealed considerable difference between conditions in this research. Tukey's post hoc test revealed a significant drop in mean scores for both the acupuncture and neutral hip bath groups. and indicating that acupuncture and neutral hip bath are equally beneficial in treating primary dysmenorrhea.</td>
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<td>2</td>
<td>Gyan Karla</td>
<td>Effects of cold versus hot compress on pain in university students with primary dysmenorrhea. [15].</td>
<td>2020</td>
<td>Both groups had a significant decline on the visual analogue scale immediately following the application and 30 minutes after the intervention ended. Nonetheless, the group that got the cold compress experienced a more substantial reduction in pain intensity both immediately after usage and 30 minutes later (p=0.002 and p=0.004, respectively).</td>
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<td>3</td>
<td>Mukhoirotin, Kurniawati, Diah Ayu Fatimawati</td>
<td>The Influence of Slow Back Stroke Massage, Cold-compress and Warm-compress to the Level of Prostaglandin F2α (PGF2α) in Primary Dysmenorrhea. [16]</td>
<td>2020</td>
<td>The Paired Sample T-Test, One-Way Anova, and Kruskal-Wallis tests were used to analyse the data. In primary dysmenorrhoea, SSBM, cold-compresses, and warm-compresses are helpful at reducing discomfort and PGF2 levels.</td>
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<td>4</td>
<td>Mukhoirotin, Kurniawati, Diah Ayu Fatimawati</td>
<td>The Effectivity of Cold Compress and Warm Compress to Intensity Level of Menstrual Pain (Dysmenorrhea). [17]</td>
<td>2018</td>
<td>Menstrual pain intensity reduced considerably from 5.95 to 2.75 in the cold compress group and from 6.80 to 3.55 in the warm compress group (p 0.05).</td>
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<td>5</td>
<td>Dr.ppremalatha</td>
<td>Evaluate the efficacy of Cold Hip Bath in Primary Dysmenorrhea. [18]</td>
<td>2018</td>
<td>The severity of discomfort in primary dysmenorrhoea was significantly reduced (P&lt;0.05) at the subsequent visit. The spasmodic and congestive components of primary dysmenorrhoea were also considerably decreased (P&lt;0.05).</td>
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<td>6</td>
<td>Agnes M. Schitter ID, Johannes Fleckenstein, Peter Frei, Jan Taeymans, Nico Kurpiers, Lorenz Radlinger</td>
<td>Applications, indications, and effects of passive hydrotherapy WATSU (Water Shiatsu)—A systematic review and meta. [19]</td>
<td>2020</td>
<td>Meta-analyses indicate that WATSU has a pain-relieving effect (overall Hedge's g = -0.71).</td>
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<td>7</td>
<td>Desta Ayu Cahya Rosyida, Agus Suwandono, Ida Ariyanti</td>
<td>Comparison of effects of abdominal Stretching exercise and cold compress therapy on Menstrual pain was reduced from 7.04 to 1.91 (5.09 difference) in the abdominal stretching exercise group and from 6.74 to 5.52 (1.22 difference) in the cold compress group after intervention, with p-value 0.000 (0.05), indicating a statistically significant difference in menstrual pain before and after intervention, both</td>
<td>2017</td>
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<td>Sonya Arshad, Muhammad Faisal Qureshi, Farah Deeba</td>
<td>To compare the effectiveness of taping technique and hydrotherapy in treatment of primary dysmenorrhea.[21]</td>
<td>The mean Present Pain Intensity (PPI) ratings were 4.33±0.61 in the taping group and 4.26±0.7 in the hydrotherapy group, respectively, and were decreased to 1.66±0.81 and 2.26±1.57 in the hydrotherapy group.</td>
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<td>Saeideh Rezvani, Farzaneh Taghian, Mahboubeh Valiani</td>
<td>The effect of aquatic exercises on primary dysmenorrhoea in non-athlete girls.[22]</td>
<td>According to the findings of this study, 12 weeks of aquatic workouts reduced the degree and duration of menstrual discomfort.</td>
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<td>Graziele Diniz Silva, PT, Natyeli Alexsievena Henrichsen Canova, PT, Polyna Bortoledo</td>
<td>Cryotherapy Produces Pain Relief in Young People with Primary Dysmenorrhea.[23]</td>
<td>The CryoG revealed an immediate reduction in pain intensity, and the score on the last day was much lower than before treatment on day one.</td>
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<td>Dian Nurafifah, Ihda Mauliyah, Atiul Impartina</td>
<td>Warm compresses to decrease dysmenorrhea among adolescents.[24]</td>
<td>The majority of the adolescents in the therapy group (93.3%) reported less discomfort.</td>
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<td>Sataz Rahmania, Vanitha Shetty and Balakrishnan Raghavendra Swamy</td>
<td>Neutral douche: a hydrotherapeutic tool to manage pain and systemic symptoms in primary dysmenorrhea - a randomized controlled study.[25]</td>
<td>When compared to the control group, neutral douche resulted in a substantial improvement in pain [p &lt;0.0005], intensity of discomfort.</td>
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<td>Orestis Tsonis Fani, Gkrozou Zoi, Barmpalia Annamaria, Makopoulou, Vassiliki Siafaka</td>
<td>Integrating Lifestyle Focused Approaches into the Management of Primary Dysmenorrhea: Impact on Quality of Life.[26]</td>
<td>The absence of adverse effects in CAM therapy increased the QoL of CAM users.</td>
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<td>Rebecca Reid, N.D, Amie Steel, PhD</td>
<td>Naturopathic Medicine for the Management of Endometriosis, Dysmenorrhea, and Menorrhagia: A Content Analysis.[27]</td>
<td>There were seven hydrotherapy therapies for dysmenorrhea among the ten sources. The most often used treatments were a hot bath, a hot sitz bath, and a warm bath.</td>
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The body,
fluence on primary dysmenorrhea because it lessens the degree of discomfort and symptoms associated with primary dysmenorrhoea. According to the gate control hypothesis, skin stimulation activates A fibers with quicker transmission. This procedure reduces pain transmission across C and del alpha (PGF2). In women with primary dysmenorrhea, cold and warm compresses help to reduce discomfort and PGF2 levels. Aquatic exercises with combination of water and heat cause physiological changes in the body, which can be employed as a non-pharmacological management strategy. Floating in warm water are quite similar to those to local heat, although with less intensity, and decreased gravitational power and hydrostatic resistance in water provides strengthens the muscles, tendons, and ligaments and improves the muscle relaxation and flexibility. As a result, water workouts can help to alleviate the symptoms of primary dysmenorrhea. According to a study, passive hydrotherapy - Water shiatsu may be useful for pain management because of the relaxation that comes following sensory overabundance, which is caused by the activation of unmyelinated c-tactile fibres. During menstruation, Warm compresses were applied to the abdomen for 20 minutes using a bag filled with warm water at a temperature of 40-45 degrees Celsius, resulting in dilatation of blood vessels and decreased muscular tension, and in the end, dysmenorrhea discomfort will lessen or eliminate. Skin stimulation causes endorphins to be released, which then blocks the transmission of pain stimuli. According to the gate control hypothesis, skin stimulation activates A-Beta nerve fibers with quicker transmission. This procedure reduces pain transmission across C and delta-A fibers with short diameters, causing the synaptic gate to collapse and pain transmission to impulaselieving pain associated with dysmenorrhea. A study that compared the efficacy of cold and warm compresses on the intensity level of menstrual pain found similar evidence explaining the effect of cold therapy. Cold therapy also creates an analgesic effect by slowing nerve conduction, allowing fewer pain impulses to reach the brain, causing cold perception to dominate and reducing pain perception. Cryotherapy reduces the speed of nerve fibre conduction through asynchronous transmission in pain fibres, stimulates endorphin production, and increases the refractory period, blocking spinal neurons. A cold hip bath therapy for one month has a good influence on primary dysmenorrhea because it lessens the degree of discomfort and symptoms associated with primary dysmenorrhea. Hot water treatment is based on the idea of vasodilation which increases blood flow, and efficiently decreases pain. Hot bath, a hot sitz bath, warm compress , enema and hot water compresses are common hydrotherapy treatment used for dysmenorrhea, are cost effective methods. In comparison to cold and warm temperatures, there is little support for using neutral temperature like one evidence suggests that a neutral-temperature underwater massage enhances cutaneous circulation due to

| 15 | Catherine Samba Conney, Irene Akwo Kretchy Michelle Asiedu-Danso Grace Lovia Allotey-Babington | Complementary and Alternative Medicine (CAM) Use for Dysmenorrhea among Senior High School Students in the Western Region of Ghana. | Overall, 79.3% of the students utilised CAM to address dysmenorrhea, with the majority (53.7%) coming from the rural institution. |
peripheral vasodilation caused by increased parasympathetic activity.[25] As a result, more clinical trials are needed to verify the efficacy of hydrotherapy for primary dysmenorrhea at various temperatures.

V. CONCLUSION
This review shows that hydrotherapy is beneficial for pain management in primary dysmenorrhea. Recent research explains the pathophysiology of primary dysmenorrhea as well as the mechanism of hydrotherapy in relieving symptoms. When used properly, hydrotherapy has no negative effects and is also a cost-effective treatment modality, resulting in a beneficial impact on quality of life.

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About the author:
Dr. Swathi S, Post graduation (Clinical naturopathy) at Alvas college of naturopathy and yogic sciences.