



An Evaluation of Hot Water Intake and Relief from Menstrual Cramps among Healthy Females - A Cross Sectional Study

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Authors' contributions

This work was carried out in collaboration among all authors. Author AR managed the literature searches, collected experimental data and analysed wrote the first draft of the manuscript. Author GS designed the study, verified data, drafted of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background: Primary dysmenorrhea is menstrual pain that very women undergo during her menstrual phase. It may vary in its frequency and duration in each and every woman. Many home remedies have been followed by females to combat these menstrual cramps. One such treatment is intake of hot water for three days during the menstrual phase

Objective: To aim of the study is to observe the changes experienced by female who consume hot water regularly during menstruation

Methods: The study was conducted in 100 female subjects with regular cycles of menstruation. The participants were administered with a self developed questionnaire consisting of 16 questions relating to the menstrual cramps and the remedies they chose and their regularity of hot water intake and the relief they obtained. The responses were collected using google forms. Descriptive statistics, frequency analysis and chi square test was used to analyze the data.

Results: The study observed that female subjects experienced better results after regular hot water intake during menstruation. It relieves menstrual cramps and improves mental health.

Conclusion: The present study concluded that the majority of the population had a regular habit of taking hot water and experienced improvement and relief from menstrual cramps.

Keywords: Hot water intake; menstrual cramps; muscle contraction; mental health.

1. INTRODUCTION

Menstrual cramps happen when a chemical called prostaglandin makes the uterus contract (tighten up) [1]. The uterus, the muscular organ where a baby grows, contracts throughout your menstrual cycle [2]. During menstruation, the uterus contracts more strongly [3]. If the uterus contracts too strongly, it can press against nearby blood vessels, cutting off the supply of oxygen to muscle tissue. You feel pain when part of the muscle briefly loses its supply of oxygen [4].

The burden of dysmenorrhea is greater than any other gynecological complaint [5]. Dysmenorrhea is the leading cause of gynecological morbidity in women of reproductive age [6]. The effects extend beyond individual women to society, resulting annually in an important loss of productivity [7,8]. Thus, the World Health Organization estimated that dysmenorrhea is the most important cause of chronic pelvic pain from the follicular phase to the luteal phase [9]. Elevated prostaglandin levels were found in the endometrial fluid of women with dysmenorrhea and correlated well with the degree of pain [7]. An increase in endometrial prostaglandins further increase occurring during menstruation [10]. The increase in prostaglandins in the endometrium following the fall in progesterone in the late luteal phase results in increased myometrial tone and excessive uterine contractions [11].

Taking pain medication such as ibuprofen or paracetamol may help to relieve menstrual cramps and pain [12]. Using a heating pad may also help. NSAIDs are commonly used as an effective treatment for dysmenorrhea, but it poses a greater risk of adverse effects namely indigestion, headaches, and drowsiness [13]. Our team has extensive knowledge and research experience that has translate into high quality publications [14–18,19–23].

The aim of the study is to observe the variations seen in the female subjects taking warm water regularly during menstruation.

2. MATERIALS AND METHODS

The study involved 100 participants who had regular cycles of menstruation. A descriptive cross-sectional study was done to analyze the . The survey was conducted among 100 healthy

female subjects who take hot water regularly during menstruation. Female subjects with PCOS and other health issues were excluded. A self-developed questionnaire was prepared consisting of 16 questions relating to the menstrual cramps and the remedies they chose and their regularity of hot water intake and the relief they obtained. The responses were collected using google forms and analysed using SPSS Software version 23. Descriptive statistics, frequency analysis and chi square test was used to analyze the data. The results were represented in pie charts and bar charts.

3. RESULTS

The frequency analysis revealed the following results. 68.8% of the female subjects experienced menstrual cramps before menstruation. whereas 13.4% of the female subjects had menstrual cramps on the 1st day of menstruation. 8% of the respondents had menstrual cramps on the 2nd day. 9.8% of the female subjects suffered from menstrual cramps during all the days of the menstruation.75.5% of the female subjects have answered that their menstruation lasts for 7 days. 19.1% of the female subjects have answered that their menstruation lasts 5 days. 3.4 % of the female subjects go through 10 days of menstruation. 45% of the female subjects face emotional disturbances during menstruation. 55% of the female subjects face diarrhea, headache, dizziness and constipation. 86.5% of the female subjects did not have any health issues. 10.8% of the respondents had irregular cycles. 3.5% of the female subjects had PCOS and other health issues. 44.6% of the female subjects use analgesic to relieve menstrual cramps whereas 45.4% of the female subjects do not take analgesic during menstrual cramps.40.4% of the female subjects are not relieved and experience side effects after intake of analgesics during menstrual cramps. 10.6% of the female subjects gets relief of menstrual cramps. 49% of the female subjects get mild relief after intake of analgesics during menstrual cramps. 86.6% of the female subjects are absent from work. 82.9% of the female subjects do regular physical activity during the menstrual cycle. 17.1% of the respondents are not active during menstruation.46.4% of the female subjects bleeding amount is scanty, 42.9% of the female subjects bleeding amount is moderate. 10.7% of the female subjects faced heavy blood flow

during menstruation.69% of the female subjects responded that there is relief after the intake of hot water during menstrual cramps. 31% of the female subjects do not know/ no relief after intake of hot water. 86.5% of the female subjects take hot water regularly whereas 11.5 % of the female subjects take hot water very rarely. (Fig. 1) 87% of the female subjects take hot water regularly. 10% of female subjects rarely take hot water. 3% of the respondents do not take hot water regularly. (Fig. 2) 87% of the female subjects have improved. 8% of the respondents did not have any relief after intake of hot water. 4% of them may have relief after intake of hot water. (Fig. 3) 90% of the female subjects had complete relief from menstrual cramps after intake of hot water. Only 10% of the female subjects had mild relief from menstrual cramps after intake of hot water during menstruation which is represented in green in the pie chart. (Fig. 4).

4. DISCUSSION

Women with primary dysmenorrhea have a significantly reduced quality of life, poorer mood and poorer sleep quality during menstruation compared with their pain-free follicular phase,

and menstruation phase of pain-free control women [24]. The prescribed first-line therapy for menstrual pain remains non-steroidal anti-inflammatory drugs [25]. Menstrual cramps is a natural and physiologic process that is managed based on various socio-cultural habits and home remedial behaviors [26]. Girls develop a negative attitude to menstruation or with less readiness for menarche and are more absent and delete some activities. They seem to be much depressed, irritable and develop more anxiety during episodes of menstrual cramps [27,28].

Menstruation poses a wide variety of uncomfortable symptoms namely the PMS. Premenstrual syndrome (PMS) encompasses common issues like mild cramping and fatigue. The main reason for PMS being higher is the level of prostaglandin, the more severe the menstrual cramps [29,30]. Pain usually begins one or two days in the pelvic region or lower abdomen before you get your period or when bleeding actually starts [31,32]. You may feel pain ranging from mild to severe in the lower abdomen, back or thighs [33].

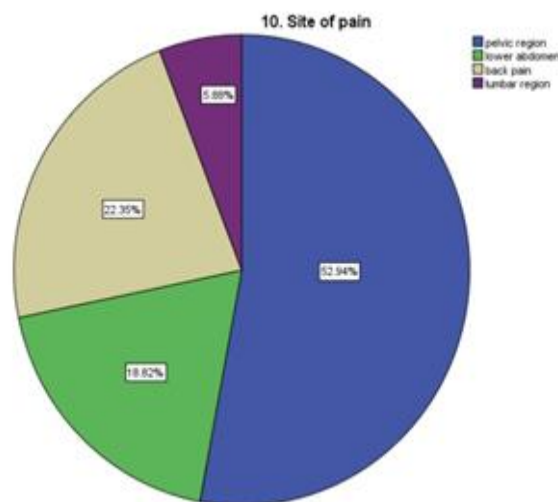


Fig. 1. shows the responses of the site of pain in female subjects. 52.9% of the female subjects have responded to the pelvic region (blue). 22.3% of the female subjects have back pain (brown) during menstruation. 18.8% of the respondents have pain in the lower abdomen (green) . 4 % of the female subjects have pain in the lumbar region.(purple)

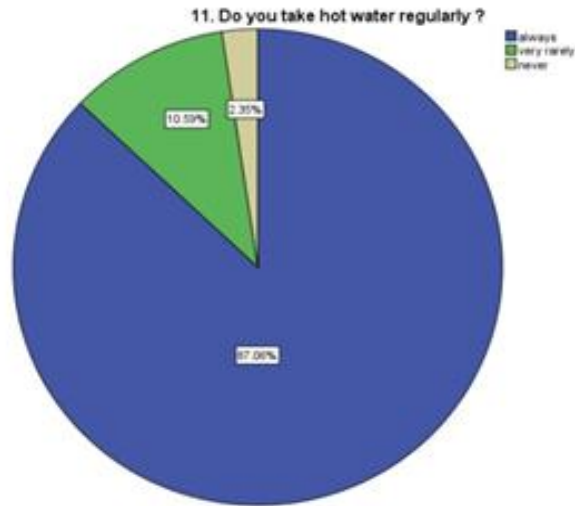


Fig. 2. shows the responses of intake of water during menstrual cramps of the female subjects. 87% of the female subjects take hot water regularly(blue). 10% of female subjects take hot water rarely(green) 3% of the respondents do not take hot water regularly(brown)

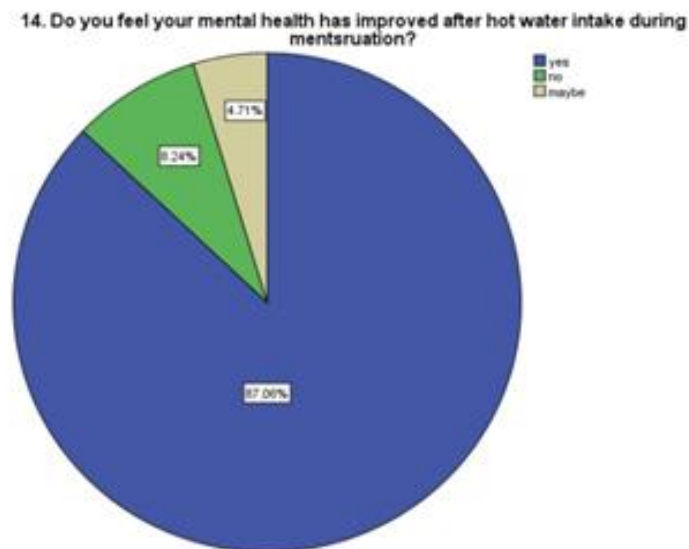


Fig. 3. shows the responses of the female subjects to improvement of mental health after intake of hot water during menstruation. 87% of the female subjects have improvement. (blue) 8% of the respondents did not have any relief after intake of hot water(green). 4% of them may had relief after intake of hot water (brown)

Pain can typically last 12 to 72 hours, and you might have other symptoms, such as nausea and vomiting, fatigue, and even diarrhea [34]. Common menstrual cramps may become less painful as you get older and may stop entirely after pregnancy [35]. Hot water keeps your body

healthy and hydrated.[36,37].Some people claim that hot water specifically can help improve digestion, relieve congestion, and even promote relaxation [38]. drinking hot water helps improve central nervous system functions, further improves mental health [29,39].

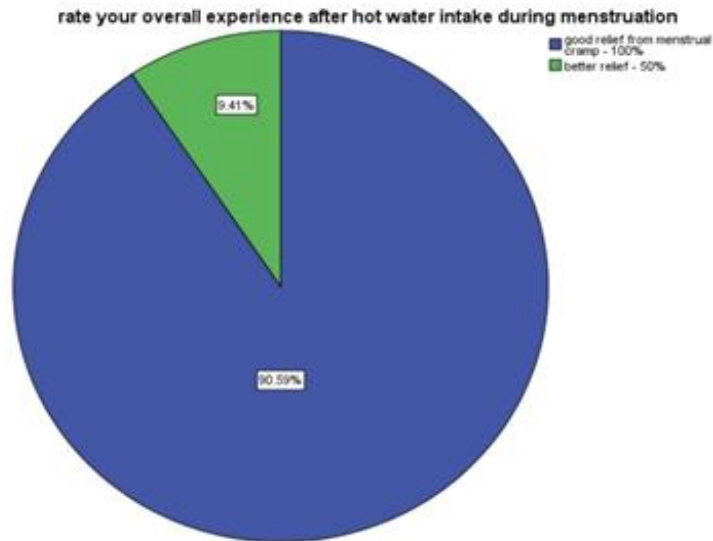


Fig. 4. shows the overall experience of the female subjects after hot water intake during menstrual cramps. Over 90% of the female subjects had complete relief from menstrual cramps after intake of hot water(blue). Only 10% of the female subjects had mild relief from menstrual cramps after intake of hot water during menstruation (green)
Cross tab evaluation

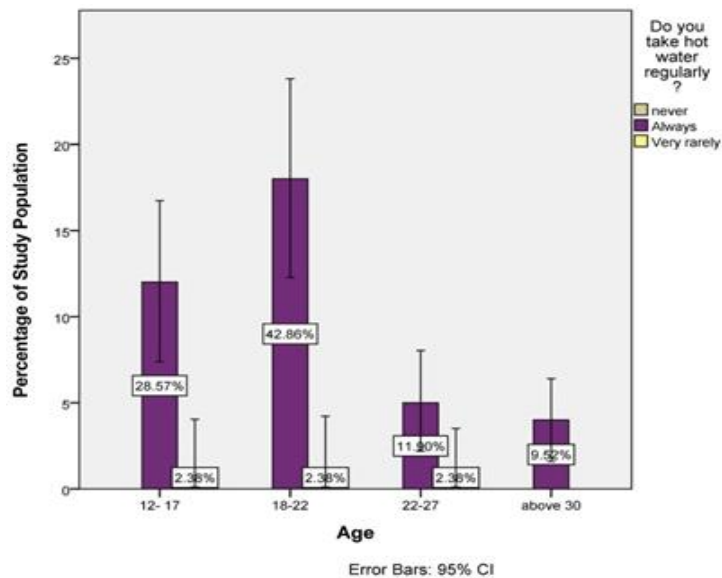


Fig. 5. bar graph showing comparison of responses between different age groups and female subjects who consume hot water during menstrual cramps. X- axis represents the age groups (12-17, 18-22 , 22-27,above 30) of the respondents and Y- axis represents the number of responses who consume hot water regularly during menstruation (blue - always, green- very rarely, beige- never) . Female subjects of the age group 18-22 yrs always had the habit of taking hot water regularly compared to all other age groups and the association was found to be statistically significant. Pearson chi- square test value $p = 0.022$ ($p < 0.05$)

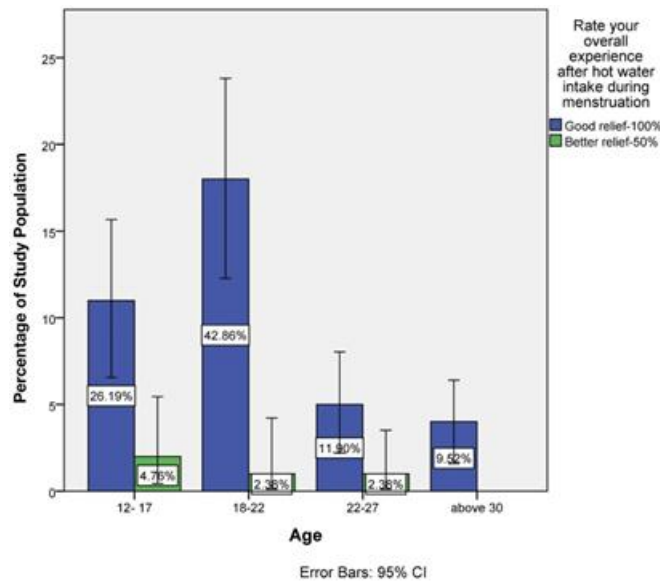


Fig. 6. Bar graph showing comparison of responses between different age groups and female subjects overall experience after hot water intake during menstruation. X-axis represents the age groups(12-17, 18-22, 22-27, above 30) of the female subjects. Y-axis represents the number of responses for overall experience after hot water intake. (green - better relief. Blue - good relief) Subjects of the age group 18-22 yrs had good relief from menstrual cramps after hot water intake compared to the other age groups and the association was found to be statistically significant. Pearson chi-square value $p= 0.015$ ($p<0.05$)

Female subjects experienced positive results after hot water intake [40]. It relieved menstrual cramps [41]. Hot water is usually better for cramps [42]. Drinking hot water can reduce bloating during your period and alleviate some of the pain it causes [43]. Also, drinking hot water can increase blood flow throughout your body and relax your muscles [43,44]. This can lessen cramps caused by uterine contractions.

5. LIMITATIONS OF THE STUDY

The limitation of study includes only students of age group 12-30 years were included in the study. This population does not represent the total female population. But this survey reported that overall relief from menstrual cramps was obtained after hot water intake.

6. CONCLUSION

The study concluded that the majority of the female subjects had a regular habit of taking hot water and experienced an improvement of mental health and cramps during menstruation. Drinking hot water can reduce bloating and alleviate menstrual cramps. Also increases blood flow throughout your body and relaxes the contraction of uterine muscles. Women suffering

from cramps are encouraged to take hot water instead of analgesics which may cause side effects.

ETHICAL APPROVALS

We conducted our research after obtaining proper IEC approval.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Egbuna C, Mishra AP, Goyal MR. Preparation of phytopharmaceuticals for

- the management of disorders: the development of nutraceuticals and traditional medicine. Academic Press; 2020.
2. Clarizia G, Bernardo P. Diverse applications of organic-inorganic nanocomposites: emerging research and opportunities: emerging research and opportunities. IGI Global; 2019.
 3. Wahab PUA, Abdul Wahab PU, Madhulaxmi M, Senthilnathan P, Muthusekhar MR, Vohra Y, et al. Scalpel versus diathermy in wound healing after mucosal incisions: A split-mouth study. *Journal of Oral and Maxillofacial Surgery*. 2018;76:1160–4. DOI:<https://doi.org/10.1016/j.joms.2017.12.020>.
 4. Banikarim C, Chacko MR, Kelder SH. Prevalence and impact of dysmenorrhea on Hispanic female adolescents. *Arch Pediatr Adolesc Med*. 2000;154:1226–9.
 5. Ezhilarasan D. Critical role of estrogen in the progression of chronic liver diseases. *Hepatobiliary & Pancreatic Diseases International*. 2020;19:429–34. DOI:<https://doi.org/10.1016/j.hbpd.2020.03.011>.
 6. Shabgah AG, Ezzatifar F, Aravindhan S, Zekiy AO, Ahmadi M, Gheibihayat SM, et al. Shedding more light on the role of Midkine in hepatocellular carcinoma: New perspectives on diagnosis and therapy. *IUBMB Life*. 2021;73:659–69. DOI:<https://doi.org/10.1002/iub.2458>.
 7. Wadhwa R, Paudel KR, Chin LH, Hon CM, Madheswaran T, Gupta G, et al. Anti-inflammatory and anticancer activities of Naringenin-loaded liquid crystalline nanoparticles in vitro. *J Food Biochem*. 2021;45:e13572.
 8. Patra JK, Fraceto LF, Das G, Campos EVR. Green nanoparticles: Synthesis and biomedical applications. Springer Nature; 2020.
 9. Daley AJ. Exercise and Primary Dysmenorrhoea. *Sports Medicine*. 2008;38:659–70. DOI:<https://doi.org/10.2165/00007256-200838080-00004>.
 10. Izzo A, Labriola D. Dysmenorrhoea and sports activities in adolescents. *Clin Exp Obstet Gynecol* 1991;18:109–16.
 11. J PC, Pradeep CJ, Marimuthu T, Krithika C, Devadoss P, Kumar SM. Prevalence and measurement of anterior loop of the mandibular canal using CBCT: A cross sectional study. *Clinical Implant Dentistry and Related Research*. 2018;20:531–4. DOI:<https://doi.org/10.1111/cid.12609>.
 12. Marjoribanks J, Ayeleke RO, Farquhar C, Proctor M. Nonsteroidal anti-inflammatory drugs for dysmenorrhoea. *Cochrane Database of Systematic Reviews*. 2015. DOI:<https://doi.org/10.1002/14651858.cd01751.pub3>.
 13. Andersch B, Milsom I. An epidemiologic study of young women with dysmenorrhea. *American Journal of Obstetrics and Gynecology*. 1982;144:655–60. DOI:[https://doi.org/10.1016/0002-9378\(82\)90433-1](https://doi.org/10.1016/0002-9378(82)90433-1).
 14. Sathish T, Karthick S. Wear behaviour analysis on aluminium alloy 7050 with reinforced SiC through taguchi approach. *Journal of Materials Research and Technology*. 2020;9:3481–7.
 15. Campeau PM, Kasperaviciute D, Lu JT, Burrage LC, Kim C, Hori M, et al. The genetic basis of DOORS syndrome: an exome-sequencing study. *Lancet Neurol*. 2014;13:44–58.
 16. Dhinesh B, Niruban Bharathi R, Isaac JoshuaRamesh Lalvani J, Parthasarathy M, Annamalai K. An experimental analysis on the influence of fuel borne additives on the single cylinder diesel engine powered by Cymbopogon flexuosus biofuel. *J Energy Inst*. 2017;90:634–45.
 17. Parthasarathy M, Isaac JoshuaRamesh Lalvani J, Dhinesh B, Annamalai K. Effect of hydrogen on ethanol-biodiesel blend on performance and emission characteristics of a direct injection diesel engine. *Ecotoxicol Environ Saf*. 2016;134:433–9.
 18. Gopalakannan S, Senthilvelan T, Ranganathan S. Modeling and Optimization of EDM Process Parameters on Machining of Al 7075-B4C MMC Using RSM. *Procedia Engineering*. 2012;38:685–90.
 19. Lekha L, Raja KK, Rajagopal G, Easwaramoorthy D. Synthesis, spectroscopic characterization and antibacterial studies of lanthanide(III) Schiff base complexes containing N, O donor atoms. *J Mol Struct*. 2014;1056-1057:307–13.
 20. Neelakantan P, Cheng CQ, Mohanraj R, Sriraman P, Subbarao C, Sharma S. Antibiofilm activity of three irrigation protocols activated by ultrasonic, diode laser or Er:YAG laser in vitro. *Int Endod J*. 2015;48:602–10.

21. Sahu D, Kannan GM, Vijayaraghavan R. Size-dependent effect of zinc oxide on toxicity and inflammatory potential of human monocytes. *J Toxicol Environ Health A*. 2014;77:177–91.
22. Kavitha M, Subramanian R, Narayanan R, Udhayabanu V. Solution combustion synthesis and characterization of strontium substituted hydroxyapatite nanocrystals. *Powder Technol*. 2014;253:129–37.
23. Vijayakumar GNS, Devashankar S, Rathnakumari M, Sureshkumar P. Synthesis of electrospun ZnO/CuO nanocomposite fibers and their dielectric and non-linear optic studies. *J Alloys Compd*. 2010;507:225–9.
24. Kamath SM, Manjunath Kamath S, Jaison D, Rao SK, Sridhar K, Kasthuri N, et al. In vitro augmentation of chondrogenesis by Epigallocatechin gallate in primary Human chondrocytes - Sustained release model for cartilage regeneration. *Journal of Drug Delivery Science and Technology*. 2020;60:101992. DOI:https://doi.org/10.1016/j.jddst.2020.10.1992.
25. Marjoribanks J, Proctor M, Farquhar C, Derks RS. Nonsteroidal anti-inflammatory drugs for dysmenorrhoea. *Cochrane Database of Systematic Reviews* 2010. DOI:https://doi.org/10.1002/14651858.cd001751.pub2.
26. Mudigonda SK, Murugan S, Velavan K, Thulasiraman S, Krishna Kumar Raja V. Non-suturing microvascular anastomosis in maxillofacial reconstruction- a comparative study. *Journal of Cranio-Maxillofacial Surgery*. 2020;48:599–606. DOI:https://doi.org/10.1016/j.jcms.2020.04.005.
27. Dysmenorrhea (Painful Menstrual Cramps or Periods), Family. *Family Practice Guidelines*; 2020. DOI:https://doi.org/10.1891/9780826153425.0025bd.
28. Chapron C, Lafay-Pillet M-C, Monceau E, Borghese B, Ngô C, Souza C, et al. Questioning patients about their adolescent history can identify markers associated with deep infiltrating endometriosis. *Fertility and Sterility*. 2011;95:877–81. DOI:https://doi.org/10.1016/j.fertnstert.2010.10.027.
29. Ryan SA. The treatment of dysmenorrhea. *Pediatric Clinics of North America*. 2017;64:331–42. DOI:https://doi.org/10.1016/j.pcl.2016.11.004.
30. Brawn J, Morotti M, Zondervan KT, Becker CM, Vincent K. Central changes associated with chronic pelvic pain and endometriosis. *Human Reproduction Update*. 2014;20:737–47. DOI:https://doi.org/10.1093/humupd/dmu025.
31. Barabadi H, Mojab F, Vahidi H, Marashi B, Talank N, Hosseini O, et al. Green synthesis, characterization, antibacterial and biofilm inhibitory activity of silver nanoparticles compared to commercial silver nanoparticles. *Inorganic Chemistry Communications*. 2021;129:108647. DOI:https://doi.org/10.1016/j.inoche.2021.108647.
32. Website n.d. R H, Hannah R, Ramani P, Ramanathan A, Jancy MR, Gheena S, et al. CYP2 C9 polymorphism among patients with oral squamous cell carcinoma and its role in altering the metabolism of benzo[a]pyrene [Internet]. Vol. 130, *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*. 2020;130:306–12. DOI:http://dx.doi.org/10.1016/j.oooo.2020.06.021.
33. Dorn LD, Negriff S, Huang B, Pabst S, Hillman J, Braverman P, et al. Menstrual symptoms in adolescent girls: association with smoking, depressive symptoms, and anxiety. *Journal of Adolescent Health*. 2009;44:237–43. DOI:https://doi.org/10.1016/j.jadohealth.2008.07.018.
34. Nambi G, Kamal W, Es S, Joshi S, Trivedi P. Spinal manipulation plus laser therapy versus laser therapy alone in the treatment of chronic non-specific low back pain: a randomized controlled study. *European Journal of Physical and Rehabilitation Medicine*. 2019;54. DOI:https://doi.org/10.23736/s1973-9087.18.05005-0.
35. Prakash AKS, Devaraj E. Cytotoxic potentials of *S. cumini* methanolic seed kernel extract in human hepatoma HepG2 cells. *Environmental Toxicology*. 2019;34:1313–9. DOI:https://doi.org/10.1002/tox.22832.
36. Rajakumari R, Volova T, Oluwafemi OS, Rajesh Kumar S, Thomas S, Kalarikkal N. Grape seed extract-soluplus dispersion and its antioxidant activity. *Drug Dev Ind Pharm* 2020;46:1219–29.
37. Sridharan G, Ramani P, Patankar S,

- Vijayaraghavan R. Evaluation of salivary metabolomics in oral leukoplakia and oral squamous cell carcinoma. *Journal of Oral Pathology & Medicine*. 2019;48:299–306. DOI:<https://doi.org/10.1111/jop.12835>.
38. Srivastava SK. Role of Capsaicin in Oxidative Stress and Cancer. Springer Science & Business Media; 2013.
39. Bharath B, Perinbam K, Devanesan S, AISalhi MS, Saravanan M. Evaluation of the anticancer potential of hexadecanoic acid from brown algae *Turbinaria ornata* on HT–29 colon cancer cells. *Journal of Molecular Structure*. 2021;1235:130229. DOI:<https://doi.org/10.1016/j.molstruc.2021.130229>.
40. Santhakumar P, Roy A, Mohanraj KG, Jayaraman S, Durairaj R. Ethanolic Extract of *Capparis decidua* Fruit Ameliorates Methotrexate-Induced Hepatotoxicity by Activating Nrf2/HO-1 and PPAR γ Mediated Pathways. *Indian Journal of Pharmaceutical Education and Research* 2021;55:s265–74. DOI:<https://doi.org/10.5530/ijper.55.1s.59>.
41. Saraswathi I, Saikarthik J, Senthil Kumar K, Srinivasan KM, Ardhanaari M, Gunapriya R. Impact of COVID-19 outbreak on the mental health status of undergraduate medical students in a COVID-19 treating medical college: a prospective longitudinal study. *Peer J*. 2020;8:e10164. DOI:<https://doi.org/10.7717/peerj.10164>.
42. J Donald Monan Sj Professor of Higher Education and Director Philip G Altbach. *Student Political Activism: An International Reference Handbook*. Greenwood; 1989.
43. Tahmasebi S, Qasim MT, Krivenkova MV, Zekiy AO, Thangavelu L, Aravindhan S, et al. The effects of oxygen–ozone therapy on regulatory T-cell responses in multiple sclerosis patients. *Cell Biology International*. 2021;45:1498–509. DOI:<https://doi.org/10.1002/cbin.11589>.
44. Vivekanandhan K, Shanmugam P, Barabadi H, Arumugam V, Daniel Raj Daniel Paul Raj D, Sivasubramanian M, et al. Emerging Therapeutic Approaches to Combat COVID-19: Present Status and Future Perspectives. *Front Mol Biosci*. 2021;8:604447.

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