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Effectiveness of Turmeric Green Tea and Commercial Green Tea on Physiological Parameters and Quality of Life Among Women with Uterine Fibriod: A Narrative Review

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Abstract:

About 20-40% of women worldwide suffer with uterine fibroids (UFs), the most prevalent benign tumors in women of reproductive age. The incidence is higher in Asian and African cultures. The whole quality of life of women can be negatively impacted by these fibroids, which are frequently hormonally affected and can cause serious physiological symptoms like menorrhagia, pelvic discomfort, and pressure impacts. There is a demand for non-invasive, natural therapeutic options because traditional pharmaceutical and surgical treatments have a number of drawbacks and restrictions. Epigallocatechin gallate (EGCG) from green tea and curcumin from turmeric have both shown anti-inflammatory, antioxidant, and anti-fibrotic properties on their own; however, little study has examined their combined effects in a natural form, like herbal tea. The objective is to assess and compare the effects of commercial green tea and turmeric green tea on the quality of life and physiological markers of women with uterine fibroids. Methods: Women with uterine fibroids will participate in a randomized controlled experiment. Three groups—Group A (turmeric green tea), Group B (commercial green tea), and Group C (control/placebo)—will be randomly selected from among the participants. Physiological parameters (menstrual bleeding, pelvic discomfort, cycle regularity, and hemoglobin level) and quality of life will be evaluated using validated tools during baseline and post-intervention evaluations. To assess differences within and between groups, data will be evaluated using the proper statistical tests. Results (Anticipated): Compared to commercial green tea and a placebo, it is predicted that turmeric green tea will show higher efficacy in reducing physiological symptoms and enhancing quality of life because of the synergistic action of curcumin and EGCG. Conclusion: By presenting data on the therapeutic



advantages of herbal teas as accessible, safe, and non-invasive solutions for treating uterine fibroids and enhancing women's health outcomes, this study seeks to close important research gaps.

Keywords: Uterine Fibroids, Turmeric Green Tea, Commercial Green Tea, Physiological Parameters, Quality Of Life, Randomise Control Trial, Herbal Intervention.

Introduction

Uterine fibroids, also known as uterine leiomyomas, are the most common benign tumors of the female reproductive tract, affecting around 20% to 40% of women during their reproductive years. The uterine smooth muscle tissue is the source of these non-cancerous growths, which might differ in size, quantity, and anatomical location. Fibroids can form intramural (within the uterine wall), subserosal (on the outside), submucosal (just below the endometrium), or in rare instances, inside the cervix. Their existence may be asymptomatic or linked to a variety of symptoms, such as anemia, infertility, pelvic pressure or pain, and heavy menstrual flow. According to histology, fibroids are made up of fibrous connective tissue and smooth muscle cells, and they are frequently impacted by growth factor and hormonal cues, particularly those related to estrogen and progesterone. (ACOG, 2023,Neelam et al, 2017 and Anupama, 20214)

African and Asian women are more likely to have uterine fibroids, with a peak prevalence seen in those between the ages of 35 and 45. Obesity, hypertension, nulliparity, red meat consumption, and family history are risk factors. On the other hand, it has been demonstrated that using oral contraceptives and getting pregnant lowers the chance of developing fibroid. Despite being often recommended, pharmaceutical treatments including selective progesterone receptor modulators and GnRH agonists may not be as effective due to their expense, side effects, and transient symptom relief. Surgical procedures such as myomectomy and hysterectomy, while successful, are intrusive and might not be appropriate for women who want to become pregnant in the future. (ACOG, 2023, Anupama, 2014 and Sandeep, 2021) Alternatives to traditional fibroids treatments that are natural and non-invasive have gained popularity recently. Turmeric's bioactive ingredient, curcumin, has shown anti-inflammatory, antioxidant, and anti-proliferative effects in investigations on both humans and animals. Similarly, it has been demonstrated that the main catechin in green tea, epigallocatechin gallate (EGCG), inhibits the development of fibroid cells and triggers apoptosis. However, the majority of research to date has concentrated on pharmaceutical-grade extracts or isolated chemicals, with no clinical data demonstrating their efficacy when taken through natural food sources like herbal teas.

Green Tea and Uterine Fibroids

Recent studies have spotlighted green tea, particularly its bioactive compound epigallocatechin gallate (EGCG), as a potential therapeutic ally for those struggling with uterine fibroids. In a pilot randomized controlled trial, 39 women of reproductive age, each experiencing symptomatic uterine fibroids, participated in an innovative study aimed at exploring the effects of green tea extract. Over a duration of four months, these participants were administered a daily dose of 800 mg of green tea extract, which contained a concentrated 45% EGCG. The results were quite striking: those consuming the green tea extract showcased a remarkable 32.6% reduction in the volume of their fibroids compared to their counterparts in the placebo group. These women also enjoyed a substantial 32.4% decrease in the severity of their fibroid-related symptoms, which can include discomfort, heavy menstrual bleeding, and



other distressing issues. Furthermore, their health-related quality of life (HRQoL) scores improved by an encouraging 18.53%, highlighting the positive impact on their overall well-being (Roshdy et al., 2013).

Turmeric and Uterine Fibroids

Curcumin, the active compound in turmeric, has potent anti-inflammatory and antioxidant properties that can significantly impact uterine fibroid development. A thorough systematic review and meta-analysis of five studies involving 379 participants conclusively demonstrated that curcumin supplementation effectively reduces the severity of dysmenorrhea and overall premenstrual syndrome (PMS) symptoms. These impressive effects stem from curcumin's ability to modulate inflammatory pathways and lower oxidative stress. Although direct evidence linking turmeric to relief from uterine fibroid symptoms is somewhat limited, the compelling findings clearly indicate potential benefits that deserve further exploration (Foruzan et al., 2024).

Combine effects of Turmeric Green Tea

The synergistic effects of combining turmeric and green tea in the context of uterine fibroids remain an area ripe for exploration. Yet, both turmeric, with its vibrant golden hue, and green tea, known for its refreshing green aroma, have demonstrated remarkable efficacy on their own in alleviating menstrual symptoms and enhancing health-related quality of life (HRQoL). A compelling study on dietary alterations for fibroid pain relief revealed the substantial benefits of integrating a colorful array of anti-inflammatory foods into one's daily meals—think vibrant green vegetables, juicy fruits, hearty legumes, crunchy nuts, and soothing herbal teas. This comprehensive and holistic approach, when complemented with hormone therapy, significantly reduced pain and uplifted overall quality of life. Given the individual strengths of turmeric and green tea, delving into their combined effects could unveil a powerful, natural intervention, offering hope and relief to women navigating the challenges of uterine fibroids (Very well Health, 2024).

Furthermore, there aren't many research comparing the effects of commercial green tea and turmeric green tea, either separately or in combination, on fibroid symptoms and general quality of life. Despite having a significant impact on women's physical, mental, and social well-being, quality of life—a crucial metric in chronic gynecological conditions—is frequently disregarded in fibroid research.

By assessing the efficacy of commercial green tea and turmeric green tea in enhancing physiological indicators and quality of life in women with uterine fibroids, this study seeks to close these gaps. This study aims to add to the increasing amount of data demonstrating the benefits of patient-centered, holistic approaches to women's health care by examining easily accessible and culturally acceptable herbal therapies.

Status of recent research at the National level related to the problem

Goldy et al, 2022. This cross-sectional, descriptive observational study was conducted at Vilasrao Deshmukh Government Medical College (VDGMC), Latur, over a two-year period from October 2019 to October 2021. The study included all women diagnosed with fibroids who were admitted to the tertiary care hospital during this time. Data analysis was performed using IBM SPSS software, version 24.0 (USA), and the findings are presented in percentages. Among the 166 women studied, the largest proportion (34.9%) were aged between 31 and 40 years. A majority (57.2%) were residents of urban areas. Regarding parity, 13.2% were nulliparous, while 14.5% were multiparous or grand multiparous.



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About 19.3% of participants were not using any form of contraception. The most frequently reported symptoms included an abdominal mass (41%), abnormal uterine bleeding (24.1%), and metrorrhagia (21.7%). Ultrasonography (USG) findings showed that submucosal fibroids were the most prevalent, identified in 64 women (38.6%), followed by intramural fibroids in 32 women (19.3%). Fibroids were most commonly found in women aged 31 to 40 years (34.9%). The predominant clinical symptom was an abdominal lump (41%), followed by abnormal uterine bleeding (24.1%). Submucosal fibroids were the most frequent type observed (38.6%), followed by intramural fibroids (19.3%), submucosal polyps (14.5%), seedling fibroids (13.9%), and subserosal fibroids (10.2%).

Afrinbanu et al., 2018. This comparative experimental study was conducted in selected girls' hostels in Vijayapur, using a non-probability purposive sampling technique to select 60 participants. The findings revealed that cinnamon tea and turmeric water both contributed to reducing dysmenorrhea pain. In the cinnamon tea group, pre-test results showed 43.33% had moderate pain, while post-test results indicated 40% had mild to moderate pain and 20% experienced no pain. In the turmeric water group, 73.33% initially reported moderate pain, which shifted to 60% reporting mild pain and 36.66% reporting moderately severe pain post-intervention. Significant differences were observed between pre- and post-test results for both cinnamon tea (t=15.78, df=28) and turmeric water (t=2.11, df=28), although an unpaired t-test showed no significant difference in effectiveness between the two (t=0.5, df=58). Additionally, significant associations were found between pre-test pain scores and demographic factors such as family history of dysmenorrhea, education, religion, and dietary habits. The study concludes that both cinnamon tea and turmeric water are equally effective in alleviating dysmenorrhea pain.

Mohanambal et al, 2017. This study focused on rural women from low socio-economic backgrounds who had dropped out of primary school. The aim was to assess the clinical presentation and prevalence of uterine fibroids, evaluate their awareness of health services, and develop strategies to promote early diagnosis and improve quality of life. Over a three-year period, women aged 26-55 years attending the Gynecology Outpatient Department at SSSMCRI for symptoms such as abdominopelvic mass, pelvic pain, or menstrual disorders were enrolled. The study collected data on socio-demographic characteristics, menstrual history, reasons for seeking medical care, and prior treatments. Women with fibroids during pregnancy or fibroids smaller than 12 weeks as detected by ultrasound were excluded. Clinical and ultrasonographic examinations were used to assess fibroid morphology and compared with histopathological findings for diagnostic accuracy. A total of 362 women presenting with uterine fibroids, menorrhagia, or abdominopelvic masses were included. Among the 136 confirmed cases of uterine fibroids, 66% had menorrhagia with severe anemia, and 23% required blood transfusions. Seventeen patients were nulliparous. Menorrhagia was the most frequent symptom, seen in 58.8% of cases. Large, asymptomatic fibroids presenting as abdominopelvic masses were identified in 46 women (33%), with sizes ranging from 12 to 28 weeks. The average age was 46 years. Surgical interventions included 88 abdominal hysterectomies and 3 in-situ hysterectomies (91 cases, 67% total), 16 polypectomies, and 22 myomectomies in nulliparous women. Laparotomy for torsion of subserous fibroids was performed in 7 cases. There is a need for further research into the biological causes of fibroids, including the role of diet, stress, environmental, and racial factors. Implementing routine screening, raising awareness, and encouraging early medical consultation can significantly reduce morbidity and improve the socio-economic and health outcomes of affected women.



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Status of recent research at the international level related to the problem Recent research related to Green Tea

Settakorn K., et al., 2024. This study investigated the impact of green tea extract (GTE) tablets on erythropoiesis and oxidative stress in patients with transfusion-dependent β -thalassemia (TDT). Twentyseven TDT patients were randomly assigned to receive either a placebo or GTE tablets containing 50 or 100 mg of EGCG daily for 60 days. Blood samples were analyzed to assess hematological, biochemical, and oxidative stress markers. Results showed that GTE supplementation led to an improvement in hemoglobin levels compared to the placebo group, with a higher number of patients responding positively to GTE treatment. Additionally, non-heme iron levels in red blood cell membranes showed a tendency to decrease in the GTE groups. Notably, GTE intake significantly reduced plasma erythroferrone levels (p < 0.05) and caused a non-significant, dose-independent reduction in bilirubin. These findings suggest that GTE tablets may help improve red blood cell stability and influence regulators of erythropoiesis in patients with transfusion-dependent thalassemia.

B Li et al, 2023. The study aimed to evaluate the global, regional, and national burden of uterine fibroids, analyzing variations by age and Socio-demographic Index (SDI). Data were obtained from the Global Burden of Disease (GBD) 2019 database. Researchers calculated the Estimated Annual Percentage Change (EAPC) to determine trends in uterine fibroid incidence and Disability-Adjusted Life Years (DALYs). Analyses were stratified by age group, country, region, and SDI level to identify their influence on incidence and disease burden. From 1990 to 2019, the global age-standardized incidence rate of uterine fibroids rose, with an EAPC of 0.25 (95% CI: 0.24–0.27). Conversely, the global agestandardized DALY rate declined over the same period, showing an EAPC of -0.27 (95% CI: -0.31 to -0.23). High and low-middle SDI regions reported significantly elevated incidence rates. In 2019, low and low-middle SDI areas also showed the highest DALY rates. Among regions, Eastern Europe had the highest incidence in 2019, while Tropical Latin America saw the largest increase in incidence from 1990 to 2019. On a national scale, Brazil (EAPC = 1.46; 95% CI: 1.35–1.57) and India (EAPC = 1.09; 95% CI: 0.94–1.25) had the steepest rises in age-standardized incidence. The greatest increases in DALY rates were observed in Tropical Latin America, high-income North America, and Oceania. The incidence of uterine fibroids has been steadily rising worldwide, while the related DALY rates have been declining. The burden is especially significant in Eastern Europe, Tropical Latin America, Brazil, and India. Women aged 35-39 and older are particularly affected, as indicated by higher incidence rates in these age groups.

Siblini H, et al., (2023). Epigallocatechin Gallate (EGCG) for Treatment of unexplained infertility associated with Uterine Fibroids (Pre-Friend Trial): Early Safety Assessment. Uterine fibroids are the most common cause of unexplained infertility in reproductive-aged women. Epigallocatechin gallate (EGCG), a green tea catechin, has demonstrated its ability to shrink uterine fibroids in prior preclinical and clinical studies. Hence, we developed an NICHD Confirm-funded trial to evaluate the use of EGCG for treating women with fibroids and unexplained infertility (FRIEND trial). Prior to embarking on that trial, we here conducted the pre-FRIEND study (NCT04177693) to evaluate the safety of EGCG in premenopausal women. Specifically, our aim was to assess any adverse effects of EGCG alone or in combination with an ovarian stimulator on serum liver function tests (LFTs) and folate level. In this randomized, open-label prospective cohort, participants were recruited from the FRIEND-collaborative clinical sites: Johns Hopkins University, University of Chicago, University of Illinois at Chicago, and Yale University. Thirty-nine women, ages ≥ 18 to ≤ 40 years, with/without uterine fibroids, were enrolled



and randomized to one of three treatment arms: 800 mg of EGCG daily alone, 800 mg of EGCG daily with clomiphene citrate 100 mg for 5 days, or 800 mg of EGCG daily with Letrozole 5 mg for 5 days. No subject demonstrated signs of drug induced liver injury and no subject showed serum folate level outside the normal range. Hence, our data suggests that a daily dose of 800 mg of EGCG alone or in combination with clomiphene citrate or letrozole (for 5 days) is well-tolerated and is not associated with liver toxicity or folate deficiency in reproductive-aged women.

Adham et al., (2022). Green tea is a natural product, commonly used by women for multiple purposes. Epigallocatechin gallate (EGCG), the major catechin in green tea, exhibits several useful biological effects, including anti-inflammatory, antiproliferative, and antioxidant effects. A study conducted by the US Department of Agriculture reported that green tea has potent anticancer effects against a wide range of human cancer cells. Green tea's polyphenols are considered responsible for these positive effects, and most notably EGCG has been shown to inhibit key pathways of tumor growth. Objective: Aim of the work was to study the effects of epigallocatechin gallate (EGCG), an extract of green tea on human leiomyoma and quality of life in women with symptomatic uterine fibroids. Patients and methods: A Prospective, sealed envelopes, randomized control trial was conducted including 75 reproductive-age women with symptomatic uterine fibroids (UF) were recruited for this study. All subjects had at least one fibroid lesion ≥ 2 cm³, as confirmed by transvaginal ultrasonography. The subjects had been randomized by SNOSE (Sequentially Numbered Opaque Sealed Envelopes); to oral daily treatment with either 900 mg of green tea extract or only symptomatic treatment for 4 months. The duration of study was about 3 years. The use of green tea in the treatment of symptomatic uterine fibroid: a randomized controlled trial. There was statistically significant difference (P < 0.001) in the mean UFV after three month treatment between groups (Study group = 178.6 ± 21.9 cm³ vs. symptomatic treatment group = $3117 195.9 \pm 23.5$ cm³). There was statistically insignificant difference (p =0.830) in the mean SS after four months of treatment between groups (Study group = $47\% \pm 7\%$ vs. symptomatic treatment group = 46% \pm 5%). Conclusions: Green tea extract (EGCG) has a significant positive effect on the reduction of UF burden, and shrinkage in total fibroid volume. Thus, green tea extract could possibly be an effective oral treatment for UF.

Rebekka B. et al. (2022). The study investigated the effects of daily ingestion of green tea extract (GTE) capsules in women with oligo- or asymptomatic uterine myomas over a six-month period, specifically examining quality of life, associated complaints, and any potential side effects. Participants were assessed at the beginning of the study (T1) and again after six months (T3). Quality of life was evaluated using the SF-12 questionnaire, while myoma-related symptoms were documented using a self-developed questionnaire. Changes in myoma size were measured through vaginal sonography. Side effects were systematically recorded after three months (T2) and at the six-month mark. A total of 25 participants, with a median age of 45 years, were enrolled in the study. Analysis of the SF-12 questionnaire revealed a statistically significant improvement in the physical component score over the six-month period of GTE capsule ingestion (T1: mean value (M) = 52.731; 95% confidence interval (C195%): 49.791-55.671; T3: M = 55.862; C195%: 55.038-56.685; p = 0.019). However, the mental component score did not demonstrate a significant change (p = 0.674). Additionally, no significant correlations were found between GTE ingestion and variations in the symptom questionnaire, laboratory parameters, or myoma size. Importantly, no relevant adverse side effects were reported by the participants. Women who consumed GTE capsules showed a significant improvement in their physical



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quality of life score as measured by the SF-12; however, there was no change in the global quality of life score. Furthermore, no alterations were observed in myoma size or other objective clinical parameters.

Sana et al., 2022. Premenstrual syndrome (PMS), which includes both physical and psychological symptoms, is a widespread health concern. This cross-sectional observational study aimed to explore the link between green tea consumption and the physical symptoms of PMS among young female medical and dental students at the University College of Medicine and Dentistry, University of Lahore. A total of 100 students aged 18–26 were enrolled through convenience sampling, with 78 reporting physical symptoms of PMS. Participants were instructed to drink three cups of green tea daily for three months, and data were collected using a self-administered questionnaire. The average age of participants with PMS symptoms was 22 ± 1.6 years, and the average weight was 60.5 ± 7.7 kg. Abdominal bloating was the most frequently reported symptom (48.7%), followed by acne (32.1%). After the three-month green tea regimen, a significant reduction in all physical PMS symptoms was observed (p=0.001), suggesting that green tea intake may help alleviate physical discomfort associated with PMS.

Jannah M and Prihatin S., 2021. Drinking green tea offers a non-pharmacological, side effect-free, and cost-effective method for relieving pain. This is especially relevant for managing dysmenorrhea, which can negatively impact adolescent girls by disrupting school activities and impairing concentration due to pain. Green tea promotes relaxation and stimulates endorphin release, which may help alleviate menstrual discomfort. A preliminary study at SMAN 1 Negeri Agung Way Kanan showed a high rate of student absences due to dysmenorrhea. This study aimed to evaluate the effect of green tea consumption on menstrual pain among adolescent girls using a quantitative, quasi-experimental one-group pretest-posttest design. Out of 93 students in class XXII who experienced dysmenorrhea, 30 were selected through simple random sampling. Data were analyzed using a paired t-test. Results showed a significant reduction in pain intensity, with average scores dropping from 7.67 (SD = 2.42) before green tea consumption to 4.67 (SD = 1.93) afterward. The change was statistically significant (p-value = 0.000), indicating that green tea effectively reduced dysmenorrhea pain. The findings suggest that green tea can be recommended as a simple and accessible option for menstrual pain relief among adolescent girls.

Porcaro et al., 2020. This pilot study investigated the effects of combined oral supplementation with vitamin D, EGCG, and vitamin B6 on women with symptomatic uterine myomas. Participants were divided into two groups: one received a daily supplement containing 25 μ g of vitamin D, 150 mg of EGCG, and 5mg of vitamin B6 for four months, while the control group received no treatment. Results showed a significant 34.7% reduction in total myoma volume in the treated group, compared to a 6.9% increase in the control group. Additionally, the treatment group experienced improved quality of life and reduced symptom severity. These findings suggest that the combination of vitamin D and EGCG may offer a promising and effective non-invasive option for managing uterine myomas and their associated symptoms.

Xioyu Z., et al. 2019. This cross-sectional study, based on data from the Shanghai Birth Cohort Study, examined 1,183 women of reproductive age who sought preconception care at two clinics in Shanghai between August 2013 and April 2015. Participants reported whether they had experienced menstrual-related pelvic pain in the past 12 months and rated its severity as mild, moderate, or severe. The study used multinomial logistic regression to analyze the association between tea consumption and dysmenorrhoea, while also accounting for demographic and lifestyle factors. Overall, 57.8% of women reported dysmenorrhoea, with 10.4% experiencing moderate and 3.5% experiencing severe pain. Tea drinkers were found to have a lower prevalence of menstrual pain, with adjusted odds ratios (aOR) of



0.68 (95% CI: 0.50–0.93) for mild and 0.59 (95% CI: 0.32–1.04) for moderate-to-severe dysmenorrhoea. Green tea and oolong tea in particular were associated with greater reductions in pain; for mild dysmenorrhoea, the aORs were 0.63 (95% CI: 0.44–0.90) and 0.60 (95% CI: 0.35–1.03), respectively, and for moderate-to-severe cases, 0.42 (95% CI: 0.20–0.85) and 0.34 (95% CI: 0.11–1.09). The findings suggest that consumption of green tea, and potentially oolong tea, may be linked to a lower prevalence of dysmenorrhoea.

Shannon et al, 2017. This review on incidence and prevalence suggest that fibroids tend to be less prevalent in pregnant women, likely because they can impair fertility. Uterine fibroids have been the leading indication for hysterectomy in the United States for several decades. Studies of older women estimate the cumulative incidence by age 50—a strong indicator of lifetime risk—is around 70% for white women and over 80% for Black women. Data from Italy closely match those of white women in the U.S., while significantly lower rates have been reported among Swedish women, a difference not attributed to ultrasound techniques. Other available estimates are limited by small sample sizes or lack of representation. In southern U.S. Hispanic pregnant women aged 18–42, the prevalence is about 10%, indicating similarities with white populations rather than Black. Among Finnish twins aged 40–47, fibroid prevalence is 67%, aligning with the U.S. white population.

Roshdy, E. et al. (2013). Uterine fibroids (UFs), or leiomyomas, affect up to 70% of women of reproductive age and can seriously impact quality of life. However, there are currently no effective medical treatments for women with symptoms. This study aimed to test the safety and effectiveness of green tea extract (EGCG) in treating fibroids and improving quality of life. In a double-blind, placebocontrolled trial, 39 women aged 18–50 with fibroids at least 2 cm³ in size were randomly assigned to take either 800 mg of green tea extract (containing 45% EGCG) or a placebo (brown rice) daily for 4 months. Fibroid size was measured by ultrasound, and symptoms and quality of life were tracked monthly using questionnaires. Of the 39 participants, 33 completed the study. In the placebo group, fibroid size increased by 24.3%, while in the green tea group, it decreased by 32.6% (P = 0.0001). Women taking EGCG also reported a 32.4% reduction in symptoms (P = 0.0001), an 18.5% improvement in quality of life (P = 0.01), and better anemia levels (increase in hemoglobin by 0.7 g/dL, P = 0.02). Monthly blood loss was also reduced from 71 mL to 45 mL (P = 0.001). No side effects or endometrial problems were reported. Overall, green tea extract appears to be a safe, affordable, and effective treatment for managing fibroid symptoms.

Ibrahim H., et al., 2008. Spontaneous leiomyomas of the oviduct are common tumors in Japanese quail, and fibroid tumors in laying hens closely resemble human fibroids in their expression of estrogen and progesterone receptors, making quail a valuable animal model for testing potential treatments for human uterine fibroids. Previous research has shown that antioxidant supplements like lycopene and soy isoflavones reduce the incidence of leiomyomas in quail. Since many health benefits of green tea are linked to its major catechin, epigallocatechin-3-gallate (EGCG), this study examined the effect of EGCG supplementation on leiomyoma development in Japanese quail. One hundred eighty eight-month-old quail were divided into three groups receiving either a control diet or diets supplemented with 200 or 400 mg EGCG/kg for 12 months. At the end of the study, quail receiving EGCG had significantly fewer and smaller leiomyomas compared to controls (P = .001). Additionally, EGCG reduced serum and liver levels of malondialdehyde and TNF- α (P = .001), markers of oxidative stress and inflammation. These findings suggest that dietary EGCG lowers both the occurrence and size of spontaneous leiomyomas in



quail, supporting the need for clinical trials to evaluate EGCG's potential in preventing and treating uterine fibroids in humans.

Recent studies related to Turmeric (Curcumin)

Malik M. et al., (2023). This laboratory animal study evaluated the effects of a curcumin-supplemented diet on the growth of uterine leiomyomas using a mouse xenograft model. The results showed that curcumin was well tolerated, with both free curcumin and its metabolites detected in the blood. Mice receiving curcumin experienced approximately 60% less tumor growth, along with disruption of the extracellular matrix structure surrounding the tumors. There was also a notable decrease in matrix proteins like collagen and an increase in tumor cell apoptosis. When the xenografts were placed within the uterine wall, the apoptotic response to curcumin was even more pronounced. These findings suggest that dietary curcumin can reach effective blood levels to significantly reduce fibroid growth, indicating its potential as both a preventive and therapeutic oral treatment for uterine leiomyomas.

Safitri and Gustina, 2023. Puberty in adolescent girls is marked by the onset of menstruation, but many experience dysmenorrhea, which can interfere with daily activities and lead to school absenteeism. Herbal remedies, such as turmeric-tamarind, are often used as non-pharmacological alternatives due to their accessibility and lack of side effects. This observational analytical study, using a cross-sectional design, aimed to assess the impact of regular turmeric-tamarind herb consumption on dysmenorrhea among adolescent girls in Pondok Meja Village. A total of 76 participants were selected through purposive sampling based on specific inclusion and exclusion criteria. Data were collected via online questionnaires from December 2021 to April 2022 and analyzed using the Chi-Square test. The findings revealed a significant association between routine consumption of turmeric-tamarind herb and reduced incidence of primary dysmenorrhea. Girls who did not consume the herb regularly were 0.035 times more likely to experience dysmenorrhea compared to those who did, with none of the regular consumers reporting menstrual pain.

Afsane et al., 2023. A randomized, triple-blind, placebo-controlled clinical trial was conducted between December 2019 and March 2020, involving 124 women diagnosed with both premenstrual syndrome (PMS) and dysmenorrhea. Participants were randomly assigned to either a curcumin group or a placebo group, with 62 individuals in each. Each participant took a daily capsule containing either 500 mg of curcuminoid or a placebo for 10 days during each of three menstrual cycles (starting 7 days before and continuing through 3 days after the onset of menstruation). Cognitive function was assessed using a questionnaire evaluating seven specific areas, and adverse effects were monitored throughout the study. Results showed that curcumin significantly improved cognitive performance, including memory (P=0.002), inhibitory control and selective attention (P=0.020), and overall cognitive abilities (P=0.024). Specifically, improvements in memory (3.5 ± 3.1 vs. 0.4 ± 3.8), inhibitory control and selective attention (3.0 ± 3.7 vs. 0.4 ± 3.7), and total cognitive scores (8.3 ± 12.3 vs. 2.2 ± 12.4) were significantly greater in the curcumin group compared to placebo. Curcumin was also found to be safe and well-tolerated, suggesting its potential to enhance cognitive function in women suffering from PMS and dysmenorrhea.

Amir T., et al. (2023). Effect of curcumin on inflammatory biomarkers and iron profile in patients with premenstrual syndrome and dysmenorrhea: A randomized controlled trial. This triple-blind, placebocontrolled clinical experiment involved 76 participants as a sample. Curcumin (n = 38) and control groups (n = 38) were assigned to participants at random. For three consecutive menstrual cycles, each subject took one capsule (500 mg of curcuminoid+piperine or placebo) every day from seven days prior



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to menstruation until three days following. White blood cell, lymphocyte, neutrophil, platelet counts, mean platelet volume (MPV), red blood cell distribution width (RDW), ferritin, serum iron, total ironbinding capacity (TIBC), and high-sensitivity C-reactive protein (hsCRP) were measured. Additionally, the RDW: platelet ratio (RPR), platelet: lymphocyte ratio (PLR), and neutrophil: lymphocyte ratio (NLR) were computed. While there was no difference in neutrophil, RDW, MPV, NLR, PLR, and RPR values (p > 0.05), curcumin significantly reduced the median (interquartile range) serum levels of hsCRP [from 0.30 mg/L (0.0-1.10) to 0.20 mg/L (0.0-1.3); p = 0.041] when compared to placebo. The curcumin group did not see any statistically significant changes in iron metabolism markers during the intervention, and the treatment regimen was well tolerated (p > 0.05). In healthy women with PMS and dysmenorrhea, curcumin administration may improve serum hsCRP, an indicator of inflammation, without altering iron homeostasis.

Khadijeh. F., et al., (2023). The effects of curcumin on nitric oxide levels in women with premenstrual syndrome and dysmenorrhoea: randomized controlled trail. The study found that curcuminoid supplementation significantly reduced serum NOx levels from 93.3 ± 37.4 to 85.9 ± 28.9 (P = 0.048), while the placebo group showed no significant change (72.4 ± 42.5 to 68.4 ± 32.9 ; P = 0.32). However, there were no significant differences in NOx levels between the groups (P = 0.36). Importantly, within the curcumin group, a significant correlation was found between PMS pain and NOx levels (Pearson's r = 0.34; P = 0.042), suggesting higher NOx levels may be linked to increased PMS pain.

Afsane et al., 2022. In this triple-blind, placebo-controlled clinical trial, 80 participants were randomly assigned to either a curcumin group (n = 40) or a placebo group (n = 40). Each participant took a daily capsule containing either 500 mg of curcuminoid with piperine or a placebo, starting seven days before menstruation and continuing until three days after, for three consecutive menstrual cycles. Baseline comparisons showed no significant differences in age, BMI, or dietary intake between the two groups. Blood samples were analyzed using ELISA to measure serum levels of IgE, IL-10, and IL-12. The curcumin-piperine group showed a significant reduction in mean serum IgE levels, decreasing from 223.6 \pm 258.7 IU/mL to 161.3 \pm 240.7 (P = 0.001), while the placebo group showed no significant change (P = 0.12). However, there were no significant differences in IL-10 and IL-12 levels in either group. These findings suggest that curcumin combined with piperine may help lower serum IgE levels in healthy young women with PMS and primary dysmenorrhea, though further research using higher doses and longer treatment durations is needed to validate these effects.

Afsane B., et al., 2021. Premenstrual syndrome (PMS) and primary dysmenorrhea are common issues affecting young women, and this study assessed the impact of curcumin supplementation on related pain symptoms. Conducted as a randomized, triple-blind, placebo-controlled clinical trial, the study included women experiencing both PMS and dysmenorrhea, who were randomly assigned to either a curcumin group (n = 62) or a placebo group (n = 62). Participants took one capsule daily (500 mg of curcuminoid or placebo) from seven days before menstruation until three days after, over three consecutive cycles. Pain severity was measured using the Premenstrual Syndrome Screening Tool (PSST) and a visual analog scale. Baseline data were similar between both groups. By the end of the trial, both groups showed significant reductions in PSST scores—curcumin (32.5 ± 9.8 to 21.6 ± 9.8) and placebo (31.7 ± 9.4 to 23.4 ± 12.8)—along with notable decreases in dysmenorrhea pain, with reductions of 64% in the curcumin group and 53.3% in the placebo group. The findings suggest that curcumin was as effective as placebo in reducing PMS and dysmenorrhea symptoms, highlighting the need for further research using higher doses, longer treatment durations, or combination therapies.



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Naghmeh T., et al., 2020. This double-blind, randomized controlled clinical trial evaluated the effectiveness of curcumin in managing dysmenorrhea among girls who had experienced menstrual pain for the past two months. After a two-month screening period, participants completed demographic and menstrual history questionnaires, and their dysmenorrhea severity was assessed using the Verbal Multi-Dimensional Scoring system. Those diagnosed with grade 2 dysmenorrhea were randomly assigned to either a curcumin group or a placebo group, with 37 participants in each. The curcumin group received two 500 mg capsules of turmeric extract produced by Karen Pharmaceutical Company, taken with food during the first three days of menstruation over two cycles. The placebo group received visually identical capsules containing 10 grams of corn starch from Shahid Beheshti University. Pain intensity and duration were self-reported by participants using the Visual Analog Scale (VAS) before and three hours after taking the capsules in both cycles. The results showed a significant reduction in both pain intensity and duration in the curcumin group compared to the placebo group (p < 0.001). Specifically, post-intervention pain intensity averaged 4.6 ± 1.5 in the curcumin group and 5.8 ± 1.82 in the placebo group. These findings suggest that curcumin is effective in alleviating the severity and duration of dysmenorrhea and may be considered a beneficial herbal remedy for menstrual pain relief.[48]

Utami R., et al., 2020. Dysmenorrhea, commonly experienced by women worldwide, is characterized by painful menstrual cramps without any identifiable organic abnormalities. This study aimed to evaluate the effectiveness of Curcuma longa (turmeric) beverages in alleviating dysmenorrhea pain by comparing preparations made by local home industries with formulations developed through research. The study employed an experimental design involving pre-test and post-test measurements. The participants consisted of 32 adolescent girls aged 15 to 18 years, residing in a dormitory in Pontianak, who volunteered to take part in the study. Findings revealed a statistically significant reduction in menstrual pain following the consumption of Curcuma longa drinks, with a p-value of less than or equal to 0.001, indicating the potential of turmeric-based beverages as a natural remedy for dysmenorrhea in young women.

Picardo E., et al., 2020. Primary dysmenorrhea is a prevalent condition that significantly impacts women's daily activities, often leading to missed work or school. While NSAIDs are commonly used for treatment, they are not effective for all, with around 18% of women either not responding or experiencing adverse reactions. Curcumin, known for its antispasmodic, analgesic, and anti-inflammatory properties, has shown promise as a safer alternative, yet no prior clinical trials have specifically assessed its effectiveness for dysmenorrhea pain. This study is a phase II, randomized, triple-blind, placebo-controlled trial designed to evaluate the efficacy and safety of curcumin (500 mg every 12 hours) in women aged 18–35 with primary dysmenorrhea. Following an observational run-in cycle, 108 participants will be randomly assigned to either curcumin or placebo groups, with outcomes measured using the visual analogue scale (VAS), Cox Menstrual Symptom Scale (CMSS), and the need for rescue pain medication. Given curcumin's mechanisms of action, this trial aims to explore its potential as a novel and effective treatment for alleviating dysmenorrhea symptoms.

Hamed F.,et al., 2016. Premenstrual syndrome (PMS) involves a range of physical, emotional, and behavioral symptoms that emerge in the late luteal phase and subside with the onset of menstruation. Research suggests that women with PMS show greater fluctuations in serum brain-derived neurotrophic factor (BDNF) levels during this phase, which may contribute to their symptoms. Curcumin, known for its neuroprotective properties and ability to elevate BDNF levels, was investigated in this randomized, double-blind, placebo-controlled clinical trial. The study involved 70 women with PMS, randomly



assigned to either a curcumin or placebo group, each receiving two capsules daily for seven days before menstruation and three days after, over three consecutive cycles. Symptom severity was recorded daily, and BDNF levels were measured on the fourth day of each cycle using ELISA. Initially, there were no significant differences in BDNF levels or PMS symptom scores between groups. However, following the intervention, the curcumin group showed significantly higher BDNF levels and reduced PMS symptom scores across all three cycles compared to the placebo group, suggesting curcumin's beneficial effects may be partially mediated through increased BDNF levels.

Sukonthanonta A., et al., 2015. The objectives of the study were to determine effects of curcumin in decreasing size of leiomyoma and to determine adverse effects of curcumin. The study was a prospective study conducted in reproductive women with leiomyoma in Bhumibol Adulyadej Hospital. 35 women with 81 leiomyoma lumps were recruited to participate by convenience sampling. Ultrasound measurement size of leiomyoma was done before treatment with curcumin. Patients were taken curcumin 1,200 milligrams orally per day for 6 months. Ultrasound measurement size of leiomyoma were compared between before and after taken curcumin for 6 months. The mean diameter of leiomyoma was statistically different at before and after 3 (4.74 ± 2.78 centimeters VS 4.64 ± 2.75 centimeters) and 6 months (4.74 ± 2.78 centimeters VS 4.46 ± 2.61 centimeters) curcumin intake. And both mean volume of leiomyoma was statisticallydifferent at before and after 3 and 6 months curcumin intake. Adverse effect of curcumin wasnot found. Curcumin decreased size of myoma uteri after taken 6 months with statistically significant.

Ali F and Laila A, 2013). The aim of this work is to use for the first time the literature curcumin for treatment of uterine myoma The main objective was to assess the efficacy (reduce uterine volume, myoma volume, and uterine bleeding, and it's safety regarding the adverse effect and the cost of the treatment.Current pharmacological therapies include gonadotrophin releasing hormone GnRH agonists/antagonists, oral contraceptive, progestin selective modulator of progesterone receptor(Aspprisnil) and mifipristone. The aim of this work is to use for the first time in the literature curcumin for treatment of uterine myoma. A total of 50 women had uterine myoma were enrolled in the study, the inclusion criteria were age between 20-35 yrs mean age 32 ± 3.25 , no more than (3) intramural myomas the main diameter at 3 D transvaginal ultrasound >5mm. Curcumin is used in the tablet form each tablet 450 mg one tablet after meal 3 times daily for 12 weeks, assessment of uterine bleeding by using daily bleeding diapers and Hb concentration, uterine dimensions and myoma dimensions are measured by 3D ultrasound. Result we found statistically significant decrease in the uterine volume and myoma volume (cm3) p<0.001, again we find statistically significant increases in Hb percentage after treatment (p <0.05) the bleeding stop completely in 88% after 2 weeks treatment and after 4 weeks in 12% of the cases. In conclusion, curcumin is a new drug with multiple pharmacological actions, no reported side effects of significances for treatment of myoma.

Malik M. et al., (2009). The study conducted proliferation tests at curcumin concentrations ranging from 5 to 40 μ M to evaluate the impact of curcumin exposure on human immortalized leiomyoma and myometrial cell lines. At curcumin doses as low as 5 μ M, we observed that curcumin treatment led to a statistically significant decrease in leiomyoma cell concentrations; at concentrations at or above 20 μ M, however, cell concentrations of both cell lines were decreased. Results show that curcumin suppressed the growth of uterine leiomyoma cells by controlling the apoptotic pathway and preventing the synthesis of fibronectin, an ECM component. Curcumin offers a new approach to treating leiomyoma.



RESEARCH GAP

- 1. Lack of Comparative Studies: Few or no studies directly compare the effectiveness of turmeric green tea and commercial green tea in managing physiological parameters related to uterine fibroids.
- 2. Limited Clinical Trials: There is a scarcity of randomized controlled trials specifically evaluating these herbal teas' impact on physiological parameters (e.g., pain, bleeding, cycle regularity) in women with diagnosed uterine fibroids.
- 3. Synergistic Effects Not Explored: The combined therapeutic potential of turmeric (curcumin) and green tea (EGCG) in a single formulation has not been adequately investigated.
- 4. Focus on Isolated Compound: Most existing research focuses on isolated curcumin or EGCG supplements, not on their natural consumption through tea or dietary sources.
- 5. Quality of Life Measures Understudied: There is limited evidence on how turmeric green tea or commercial green tea impacts the overall quality of life in women with uterine fibroids.
- 6. Natural, Non-Invasive Options Needed: There is a growing demand for accessible, non-pharmacological alternatives, yet research on herbal interventions like these remains insufficient.

OBJECTIVES

- 1. To assess physiological parameters among women with uterine fibroid
- 2. To assess the quality of life among women with uterine fibroid
- 3. To assess the effectiveness of turmeric green tea on physiological parameters and quality of life among women with uterine fibroid
- 4. To assess the effectiveness of commercial green tea on physiological parameters and quality of life among women with uterine fibroid
- 5. To compare the effectiveness of experimental group and control group among women with uterine fibroid

Method:

A narrative-style evaluation was written. Through a systematic computerized search, pertinent studies were discovered. Only the original research publications were included in the study. The electronic databases that were searched were PubMed, EBSCO, Research Gate, Google Scholar, Shodhganga, and Scopus. The selection of existing material for this narrative review was done with care.

Inclusion Criteria

- 1. Women aged 20 to 55 years
- 2. Women with uterine fibroids confirmed by ultrasound
- 3. Uterine fibroid stages from types 0 to types 7
- 4. Regular menstrual cycles (21–35 days)
- 5. Willing to consume the assigned tea daily for 12 weeks
- 6. Able to provide informed consent

Exclusion Criteria

- 1. History of hormonal therapy, myomectomy, or hysterectomy
- 2. Presence of malignancy, endometriosis, or pelvic inflammatory disease
- 3. Current use of iron supplements, anticoagulants, or other herbal remedies



- 4. Known allergies to turmeric, green tea, or herbal ingredients
- 5. Pregnant or lactating women
- 6. Chronic illnesses such as diabetes, hypertension, or renal disease

Expected outcome:

The study is expected to show that turmeric green tea significantly reduces fibroid size, menstrual blood loss, and pain, while improving haemoglobin levels and quality of life in women with uterine fibroids. These effects are anticipated to be greater than those seen with commercial green tea or placebo. The intervention is also expected to be safe and well tolerated, supporting its use as a natural complementary therapy for symptom management in uterine fibroid cases.

Ethical consideration:

- 1. Approval from Institutional Ethics Committee
- 2. Informed consent from all participants
- 3. Data confidentiality and anonymity will be ensured

Limitation of study:

This study may face several limitations. The relatively short intervention period of 12 weeks may not fully capture long-term effects on fibroid size and recurrence. The open-label design could introduce bias in self-reported outcomes, such as quality of life and symptom severity. Variations in individual adherence to tea consumption, lifestyle factors, and dietary habits may influence results. Additionally, the use of ultrasound for fibroid measurement may have operator variability. The sample size, while adequate for detecting moderate effects, may limit the generalizability of findings to broader populations.

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