*Original Research Article*

**Nutraceuticals: A Potential Therapeutic Approach Using Natural Ingredients Towards Relieving Menstrual Pain among Young Bangladeshi Women**

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ABSTRACT

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| **Introduction:** Nutraceuticals are substances considered as foods/parts of foods that provide medical and health benefits in terms of disease prevention and treatment. Nutraceutical is generally extracted from herbal products, matched with dietary supplements and diet-specific nutrients, and reduce dysmenorrhea and menstrual cramping. Asia has a profound history of using nutraceuticals for many remedies. Especially, Iranian ethnobotany and Chinese herbal medicine have been used for treating primary dysmenorrhea for centuries.**Objective:** To assess perceived knowledge, attitude and common practices among young women on using nutraceuticals as predefined food or herbs, assuming they are effective pain relievers during menstrual cramps.**Methods and materials:**This observational study explored the knowledge, attitudinal trend, and practice level (KAP) of nutraceuticals used by 130 randomly selected girls from 18-25 years old suffering from regular/recurrent menstrual pain. Data were randomly collected from four women's colleges in Dhaka city using a pre-tested close-ended questionnaire between November 2022 to January 2023, with written consent.**Data analysis plan:** Primary data were recorded, cross-checked, and entered into SPSS version 22. A *P*-value of <0.05 was considered statistically significant. **Results:** Of the 130 participants, most were between 21 and 26 years of age, and most (68.5%) were graduate. Among them, half (51.5%) had moderate, and 31.5% had severe menstrual cramping. There was no association between being overweight and having a menstrual cramp (p=0.63). Almost 30% (n=38) of participants reportedly took some herbal medicines and/or nutraceuticals to relieve their menstrual pain. While 36 strongly believed that taking herbal remedies in their primary dysmenorrhea gave them relief from pain than those who did not (p>0.001).**Conclusion:** The study found a plausible association between taking nutraceuticals during primary dysmenorrhea or menstrual cramping and getting better relief.  |

*Keywords:* Menstrual Cramping, Dysmenorrhea, Herbal Medicine, Nutraceuticals, Ginger, Chamomile,

1. INTRODUCTION

The main focus behind discovering nutraceuticals is to epitomize prevention, as stated by Greek physician Hippocrates, the father of medicine, who said, "Let food be your medicine". [1] Nutraceuticals' dietary therapeutics will be utilized as a corresponding treatment when we take a nutritious eating routine to recuperate. When anybody accepts food that can give them health advantages as well as nourishment and energy, it will fill in as a treatment for them. Nutraceutical and nutritional therapy theory's efficacy lies in detoxifying the body, avoiding vitamin and mineral depletion, and repairing healthy digestion and dietary habits. Phytonutrients are plant-based nutrient elements that have specific biological benefits in supporting human health. [2]

It should be noted that there might be a lot of confusion related to the terminology of nutraceuticals, such as phytochemicals, pharmafoods, medical foods, functional foods, dietary supplements, designer foods, etc. There is a thin dividing line in their interchangeable usage by different people on different occasions. Pharmaceuticals are mostly considered medications that are used mainly to treat diseases, however, nutraceuticals are substances that are mostly considered to prevent diseases.[3]

Nowadays, nutraceuticals have received high interest due to their potential nutritional and safety profile, other than therapeutic capability. Pharmaceutical and nutritional companies are aware of the changing trends which are due to the advantages of these compounds. Most of the nutraceuticals possess multiple therapeutic benefits.[4]

 The word dysmenorrhea originated from the Greek word dys, meaning difficult/painful/abnormal, men's meaning month and rrhoea, meaning flow. This is a medical term defined when tormenting uterine pain during menstruation occurs. When this pain starts hampering regular activities and requires medication, then it's dysmenorrhea. Nowadays, this is the most common gynecological problem among women, especially young women. One of the most common reasons behind this disorder is the toxic condition of the human system in general and of the sex organs in particular due to a wrong diet, wrong style of living, and restless exhaustion. More than half of the women in menstruating states are suffering from dysmenorrhea. [5]Usually, this pain arises between the first 20 years and after the age of 35. Dysmenorrhea typically appears among those women who lead a sedentary lifestyle with fewer social activities associated with affective symptoms such as headache, fatigue, nausea and vomiting, diarrhea, irritability, chills, and muscle cramps.[6]

 Certain plants are used to treat dysmenorrhea and menstrual pain in Iranian traditional medicine and ethnobotany. Sumac (Rhus coriaria L.), savory (Satureja hortensis), pursuant to (Juniperus commonis), Tiger's Tail (Leonurus cardiaca), marjoram or oregano (Origanum vulgare), sage (Salvia sclarea L.), pennyroyal (Mentha longifolia), Ballota nigra, mountain ash (Sorbus boissieri), and nettle (Urtica dioica L.) are among the plants that are effective on menstruation and dysmenorrhea in the Arasbaran region of North West Iran. In the ethnobotany of Sīstān, located in the southeast of Iran, fennel (Foeniculum vulgare Mill.) is used to control the menstrual cycle [7]

Ginger (Zingiber), has been used for the treatment of numerous illnesses for at least 2,500 years. Ginger has long been used to treat gastrointestinal symptoms like nausea, vomiting, and diarrhea, as well as pain associated with osteoarthritis, rheumatoid arthritis, migraines, and dysmenorrhea. American Food and Drug Administration registered it as a herbal medicine [8]

 Chamomile (*Matricaria chamomilla*) contains Spiroether, a very strong antispasmodic agent that relaxes aching, relaxes the muscle, and reduces premenstrual torment. [9]Chamomile was compared with MA (Mefenamic Acid) for treating PMS, which reported that there is no significant difference between Chamomile extract and MA in reducing menstrual cramps. [10] Chamomile tea contains Apigenin, which helps reduce the impact of excitatory neurotransmitters and hormones on the mind and body, soothes the over-firing sympathetic nervous system, and also helps modulate the actions of dopamine and serotonin, helping to offset the impact of depressive symptoms. [11]

 Mint has muscle relaxant, anti-inflammatory, and analgesic properties.[12] Thyme has anti-smooth muscle spasm properties and is conventionally used as a medical herb. Cinnamon contains a good amount of amidoun, mucilage, tannins, a dye, calcium oxalate, sugar, cinnamon, essential oils, and resins. The physiological effects of essential oils and tannins of cinnamon in folk medicine induce the energy sector, sedative, antispasmodic, and anti-inflammatory and are used to reduce menstrual pain [13]Tamarind has active ingredients such (as) antioxidants, anti-inflammatory, antipyretic, and tranquillizers [14]

 The current knowledge regarding nutraceuticals provides a significant challenge for medical professionals, food technologists, nutritionists, and food chemists. To prevent and treat acute and chronic diseases caused by malnutrition and to promote good health, longevity, and quality of life. Public health authorities consider the use of nutraceuticals as an effective method for sustaining health.[15]

2. Methods and materials

**2.1 Study Site:** Four girls' colleges in Dhaka city

**2.2 Study Design:** Observational study

**2.3 Study Period:** From November 2022 to January 2023

**2.4 Sample Size:** 130 respondents

**2.5 Sampling technique:** The Sample size was calculated using the n= pq(z2)/d2 formula. After their written consent, data was collected randomly using a pre-tested close-ended questionnaire.

**2.6 Inclusion Criteria:**

* Women from 18-25 years old
* Participants who were suffering from recurrent menstrual pain/cramping
* Living inside Dhaka city
* Participants who signed the written consent form

**2.7 Exclusion Criteria:**

* Women of <18 years and >25 years old,
* Participants who were not suffering from menstrual pain/cramping,
* Living outside Dhaka city
* Participants who didn't give written consent

**2.8 Ethical Consideration:** The Government College of Applied Human Science, Azimpur, Dhaka, provided the authority to conduct the research, and ethical clearance was obtained from the Institutional Review Board (IRB) of Ad-din Women's Medical College.

**2.9 Data Analysis:** Collected data was edited and entered into an SPSS version 22. The data was analysed using appropriate descriptive statistics and tabulated using frequency, percentage, and mean. Throughout the data analysis, a P-value <0.05 was considered statistically significant.

3. results and discussion

**Table 1: Demographic Status of Study Participants (n=130)**

|  |  |  |  |
| --- | --- | --- | --- |
| Demographic Characteristics |  | Frequency | Percentage (%) |
| Age (mean±SD, years) |  | 22.85±1.70 |  |
| Age (years) | 18-20 | 9 | 6.9% |
| 21-23 | 60 | 46.2% |
| 24-25 | 61 | 46.9% |
| Educational Status | Higher Secondary Certificate | 22 | 16.9% |
| Graduate | 89 | 68.5% |
| Post Graduate | 19 | 14.6% |
| Marital Status | Married | 14 | 10.8% |
| Unmarried | 116 | 89.2% |
| Anthropometric Measurement | Height (mean±SD, cm) | 158.5±5.09 |  |
| Weight (mean±SD, kg) | 53.67±8.53 |  |
| BMI (mean±SD, kg/m2 ) | 21.44±3.07 |  |

**Table 2: Attribution of Menstrual Recurrence and Changes in Cycle Patterns (n=130)**

|  |  |  |  |
| --- | --- | --- | --- |
| Outcome |  | Frequency | Percentage (%) |
| Menstruation Regularity | Yes | 116 | 89.2% |
| No | 14 | 10.8% |
| Menstruation Interval (mean±SD, days) |  | 30.12±7.9 |  |
| Usual length of menstruation (mean±SD, days) |  | 5.27±1.3 |  |
| Having twice or thrice menstrual cycles in one month | Yes | 30 | 23.1% |
| No | 100 | 76.9% |
|  | Never | 100 | 76.9% |
| Attributes of having twice or thrice menstruation | Once | 10 | 7.7% |
| 2-3 times | 15 | 11.5% |
| 4-5 times | 3 | 2.3% |
| More | 2 | 1.5% |
|  | 130 | 100% |

**Table 3: Intensity of Menstrual Pain (n=130)**

|  |  |  |  |
| --- | --- | --- | --- |
| Outcomes |  | Frequency | Percentage (%) |
| Pain Intensity | Mild | 22 | 16.9% |
| Moderate | 67 | 51.5% |
| Severe | 41 | 31.5% |

**Fig.1.The pie chart shows the timeframe of experiencing severe pain during menstruation (n=130)**

**Table 4: Association Between Painful Menstruation with BMI Range (n=130)**

|  |  |  |  |
| --- | --- | --- | --- |
| BMI | Having painful menstruation | Total | Chi-square test (P-value) |
| **Yes** | **No** |
| Underweight | 18 | 0 | 18 | *P*= 0.63 |
| Normal | 88 | 1 | 89 |
| Overweight | 21 | 1 | 22 |
| Obesity | 1 | 0 | 1 |
| Total | 128 | 2 | 130 |

**Table 5: Medication Usage for Pain Management and Side Effects (n=130)**

|  |  |  |  |
| --- | --- | --- | --- |
| Medicinal help | Yes | 55 | 42.3% |
| No | 75 | 57.7% |
| Medicinal Side-effect | Yes | 7 | 5.4% |
| No | 44 | 33.80% |
| Didn’t Take Medicine | 79 | 60.8% |

**Fig.2. The bar chart illustrates the participant's common sources of medical recommendations**

Fig.3. The pie chart represents the gap between having knowledge about nutraceuticals and being unaware of their effectiveness.

Fig.4. The bar diagram shows the common sources of recommendation the participants had for having some sort of nutraceuticals.

**Table 6: Association Between Taking Herbal Medicine and Menstrual Pain Relief (n=130)**

|  |  |  |  |
| --- | --- | --- | --- |
| Taking any herbal medicine or home remedy for pain relief | Pain relieved  | Total | Chi-square test (*P*-value) |
| **Yes** | **No** | *P*<0.001 |
|  Yes | 36 | 2 | 38 |
| No | 0 | 92 | 92 |
| Total | 36 | 94 | 130 |

**Fig.5. This chart shows the majority (74%) consumed nutraceuticals in liquid form. A smaller portion (16%) took them in their natural form after cleaning, and 10% preferred them as powder.**

**Table 7: Association Between Junk Food Eating and Menstrual Pain Intensity.**

|  |  |
| --- | --- |
| Junk Food Eating Frequency | The Level of Pain |
| **Mild** | **Moderate** | **Severe** | **Total** |
| Once in a week | 0 | 13 | 10 | 23 |
| 2-3 times in a week | 8 | 30 | 12 | 50 |
| 4-5 times in a week | 5 | 15 | 8 | 28 |
| Everyday | 2 | 6 | 6 | 14 |
| Total | 15 | 64 | 36 | 115 |

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| **Table 8: Association Between Junk Food Consumption and Menstrual Pain Severity.**

|  |  |  |  |
| --- | --- | --- | --- |
| Level of Pain | Junk Food Intake | Total |  Chi-square test (*P*-value) |
| **Yes** | **No** |
| Mild | 15 | 7 | 22 | *P*<0.02 |
| Moderate | 64 | 3 | 67 |
| Severe | 36 | 5 | 41 |
| Total | 115 | 15 | 130 |

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**Discussion:**

The study depicts that more than half (51.5%) of the participants had been suffering from moderate menstrual pain, while 31.5% claimed they experienced severe menstrual cramping. 61% of participants stated they had faced this pain in the 1st -2nd days of the period, 26.8% stated 1st-3rd day of the period, and some (12.2%) told to face it the day before starting it to 2nd day of menstruation. There was no association found between being overweight and having menstrual cramps (*p*=0.63).[16]

Around 42.3% of the respondents claimed that they took medicine to get relief from menstrual pain. Others had this recommendation to take medicine from their mother, sister, friends, and other relatives (25.45%, 9.1%, 14.5%, and 20%). It was noted that 5.4% of the respondents who took medicine for menstrual pain management subsequently faced certain side effects such as discontinuation of the period cycle, reduced blood flow, nausea, fatigue, late period cycle, and, more distressing, sometimes gap of the cycle. [17- 20]

The present study identified that 24.60% had mere idea about nutraceuticals or herbal medicine and about 29.20%participants have used some sort of herbal medicine or nutraceuticals for menstrual pain management which mostly (57.8%) had come from their mother and around 3/4th (74%) participants were having these ingredients as a liquid form such as; hot milk, hot water infused with ginger, salt, cinnamon, cardamom or clove powder, honey, bay leaf, lemon, green tea, ginger tea with black pepper, hot coffee. 16% participants claimed that having black cumin, cardamom, cinnamon, clove, ginger as a whole product after cleaning gave them slight relief from menstrual pain and the rest (10%) took raw turmeric powder, ginger and cinnamon powder as an effective remedy. However, the study didn't conclude the exact percentage of taking each ingredient during menstrual pain, whereas in Iran, there was 64% improvement in severe pain with ginger, 66% with ibuprofen and 58% with mefenamic.[21]Even though the present study lacks to find out the exact benefit of different herbal remedies regarding menstrual pain, there was a significant (*P<0.001)* association found to get relief from primary dysmenorrhea pain after taking herbal remedies.[22] Their food habit played a significant role in having recurrent menstrual pain. As the study revealed, those who had eaten junk food(pasta, pizza, burgers, French fries, chicken fry, chips, cold drinks etc)at least once in a week were likely to have moderate to severe menstrual pain.[23] Subsequently, participants who were eating junk food 2-3 times (n=50) and 4-5 times in a week (n=28) suffered more from moderate to severe menstrual pain than others (*P=0.02*).[24]

 4. Conclusion

Natural cures, for example, ginger, honey, black cumin, *Ginkgo biloba*, honey bee dust, mint, chamomile, and so on have been utilized for menstrual pain management for hundreds of years in many countries. The study found a plausible association between taking nutraceuticals during dysmenorrhea or menstrual cramping to get better relief. The participants who had taken these natural remedies were informed to benefit from their pain management. The study can provide evidence that nutraceuticals may treat women with primary dysmenorrhea rather than taking other medicines that have decent side effects.

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