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HERBAL REMEDIES AND CONVENTIONAL THERAPIES FOR ENDOMETRIOSIS: A STUDY ON PAIN RELIEF AND ECONOMIC BENEFITS IN EGYPT

Waleed Ahmad Ali Hussein Atteia[1], Ahmed Abdelkader Ahmed[2], Ahmed Omar Mahmoud[3], Hisham Ahmed Abou-Taleb[4], Norhan Y. A. Hussein[5]

[1]Gynaecology and Obstetric department, New Valley University
[2]Anaesthesia and Intense Care Unite, King Saud University, Riyadh
[3]Department of Anesthesia and Intensive Care, Faculty of Medicine, New Valley University, Egypt.
[4]Gynaecology and Obstetric department, Assiut University, Egypt.
[5]Department of Agricultural Economics, Faculty of Agriculture, Assiut University, Egypt.

[*]**Corresponding author:** NorhanY. A. Hussein
***Email:** nourhanyah@agr.aun.edu.eg

Abstract

Background: Endometriosis is a chronic inflammatory condition characterized by the growth of endometrial-like tissue outside the uterus, affecting approximately 10% of women in the reproductive age range. It is commonly associated with debilitating pain, including dysmenorrhea, chronic pelvic pain, and dyspareunia. Current treatments, including NSAIDs, hormonal therapies, and GnRH analogs, often fail to provide adequate relief or are associated with intolerable side effects. As a result, many patients turn to complementary therapies, including the use of medicinal and aromatic plants (MAPs), which are valued for their anti-inflammatory and analgesic properties. However, there is limited empirical data on the effectiveness and safety of these therapies.

Patients and Methods: A cross-sectional descriptive study was conducted over a two-year period (2020–2022) in Egypt, involving 400 women diagnosed with endometriosis. Data were collected using a structured questionnaire assessing demographic characteristics, symptom profiles, pain management practices, and satisfaction with treatment. The study also included an analysis of the economic feasibility of cultivating MAPs, such as geranium, basil, marjoram, and chamomile.

Results: NSAIDs were the most commonly used conventional treatment (92.0%), with moderate effectiveness (6.5/10) and significant side effects (42.9%). Herbal remedies were used by 58.0% of participants and were perceived to be relatively effective (7.2/10) with minimal side effects (11.2%). The economic analysis revealed that geranium and basil provided the highest clinical effectiveness and net returns per feddan (48,148 EGP and 14,911 EGP, respectively).

Conclusion: This study highlights the significant role of MAPs in the management of endometriosis, providing both clinical and economic benefits. While conventional therapies

remain essential, herbal remedies such as geranium and basil may offer effective, cost-efficient alternatives with fewer side effects. These findings support the promotion of MAPs as a sustainable therapeutic option for endometriosis in Egypt, with potential benefits for both women's health and local agriculture.

Keywords: Endometriosis, Pain Management, Medicinal Aromatic Plants, NSAIDs, Herbal Remedies, Economic Impact, Egypt.

Introduction

Endometriosis is a chronic inflammatory disorder marked by the growth of the endometrial tissue outside the uterus, and it is dependent on estrogen. It affects roughly 10% of women in the reproductive age range and is strongly linked to debilitating symptoms such as dysmenorrhea, chronic pelvic pain, dyspareunia, and infertility (1). The most prevalent symptom is pain, which poses significant burden, impacts physical, psychological, and social to a notable level, and well-being is negatively impacted, often using to (2).

Different NSAIDs, hormonal birth control, and GnRH analogs give some relief to patients; however, almost all patients tend to have inadequate relief or intolerable side effects (3). In addition, the many causes of endometriosis-related pain is multifactorial ranging from inflammation, neuroangiogenesis, peripheral sensitization, and central nervous system changes (4).

To deal with these limitations, a number of patients resort to complementary, alternative, herbal and lifestyle therapies. In particular, medicinal and aromatic plants (MAPs) are among the most widely utilized for their anti-inflammatory and analgesic activities. However, there is still very little information available which empirically documents their effectiveness and safety in endometriosis management (5).

At the same time, some of the less known herbs used by women suffering from endometriosis, like geranium, basil, chamomile, and marjoram, are also important from an agricultural perspective in countries like Egypt (6). These crops serve a dual purpose: they form part of the traditional medicinal system and at the same time, enhance the economic benefits to the growers and exporters (7). There is a noticeable gap in the literature regarding the application of MAPs in women's health and few have used these resources to study their use among endometriosis patients in relation to their clinical and economic value (7).

The identification of increased pain-sensing nerve fibers in the regions surrounding endometriotic lesions has recently been reported, and such anatomical features are believed to participate in pain generation and persistence. This negative aspect makes pain management more difficult and suffers because of the pain’s complex network requiring more sophisticated approaches to care (8).

This study endeavors to explore the pain management practices of women suffering from endometriosis, focusing on the prevalence and perceived efficacy satisfaction deriving from endorsed strategies.

Patients and Methods

Study Design This randomized, double-blind controlled trial was conducted over two years. Ethical approval was obtained from the Medical and Nursing Ethics

Study Design and Setting

This cross-sectional descriptive study was conducted over a two-year period (2020–2022) in the Egypt, an area known for both its rural healthcare challenges and the agricultural cultivation of medicinal and aromatic plants. The study aimed to evaluate pain management strategies among women diagnosed with endometriosis, with a focus on both clinical effectiveness and the socioeconomic relevance of plant-based remedies.

Study Population

A total of 400 women diagnosed with endometriosis were enrolled through outpatient gynecology departments at public hospitals and maternal health centers. Inclusion criteria required participants to be:

1. Aged 18–50 years
2. Diagnosed with endometriosis by laparoscopy or pelvic imaging
3. Experiencing one or more pain-related symptoms (e.g., dysmenorrhea, chronic pelvic pain)
4. Willing to participate voluntarily

Women with known malignancies, autoimmune conditions unrelated to endometriosis, or current pregnancy were excluded from the study.

Data Collection Tools and Procedure

Data were collected using a structured and validated questionnaire administered through face-to-face interviews by trained female health workers. The tool was developed by the research team in consultation with gynecology and agricultural economics experts. It consisted of five sections:

1. **Demographic and Clinical Characteristics:** Age, duration of diagnosis, endometriosis stage, and reproductive health history.
2. **Symptom and Comorbidity Profile:** Symptoms included pain types (dysmenorrhea, dyspareunia, pelvic pain, etc.) and comorbidities such as anxiety, depression, IBS, and migraine.
3. **Pain Management Practices:** Information was collected on conventional treatments (NSAIDs, hormonal therapy, surgery) and alternative practices (herbal use, dietary changes, yoga, CBD, acupuncture). Each method's self-rated effectiveness was scored on a 1–10 scale, and any side effects were recorded.
4. **Use of Medicinal and Aromatic Plants (MAPs):** Participants were asked specifically about their use of locally relevant MAPs—such as geranium, basil, marjoram, and chamomile—for pain relief. Questions also addressed source of access (purchased vs. home-grown), frequency of use, and perceived outcomes.
5. **Satisfaction and Economic Factors:** Included monthly expenditure on treatment, barriers to accessing care, and overall satisfaction with pain management.

The questionnaire was pilot tested on a sample of 20 women to ensure clarity and consistency prior to full deployment.

Ethical Considerations

The study protocol was approved by the Ethical Committee of New Valley university. All participants provided written informed consent. Confidentiality and voluntary participation were assured throughout the study.

Data Analysis

Data were entered and analyzed using SPSS (version 28.0). Descriptive statistics (mean, standard

deviation, frequencies, and percentages) were used to summarize demographic characteristics, symptom profiles, and treatment patterns. Pain relief effectiveness was analyzed across treatment categories. A dual-analysis model integrated clinical effectiveness (pain scores) with published agricultural economic returns (net return per feddan) for selected herbal crops, based on data from Egyptian agricultural sources (6).

Results

Table (1) presents the demographic and clinical characteristics of the study population (n=400). The largest age group was 25–34 years (46.75%), with a notable representation of women aged 35–44 (28.0%). Most participants were diagnosed with Stage II endometriosis (38.0%), followed by Stage I (27.0%) and Stage III (24.0%). Regarding duration since diagnosis, 33.0% had been diagnosed for 1–3 years, and 32.0% for 4–7 years.

Table 1: Respondent Demographics and Clinical Characteristics (n=400)

Characteristic	Category	n (%)
Age Group	18-24	63 (15.75%)
	25-34	187 (46.75%)
	35-44	112 (28.0%)
	45+	38 (9.5%)
Total		**400 (100.0%)**
Endometriosis Stage	Stage I	108 (27.0%)
	Stage II	152 (38.0%)
	Stage III	96 (24.0%)
	Stage IV	44 (11.0%)
Total		**400 (100.0%)**
Duration of Diagnosis	< 1 year	48 (12.0%)
	1-3 years	132 (33.0%)
	4-7 years	128 (32.0%)
	8-10 years	56 (14.0%)
	> 10 years	36 (9.0%)
Total		**400 (100.0%)**

Table (2) details the symptomatology and comorbid conditions reported. Dysmenorrhea was nearly universal (92.0%), with chronic pelvic pain (78.0%) and fatigue (71.0%) also highly prevalent. Dyspareunia (64.0%) and bloating (66.0%) were common secondary complaints. Among comorbidities, anxiety (43.0%) and depression (39.0%) were the most frequently reported, consistent with literature associating endometriosis with psychosocial burden. Other notable conditions included IBS (37.0%) and pelvic floor dysfunction (33.0%).

Table 2: Primary Symptoms and Comorbidities (n=400)

Symptom/Condition	n (%)
Primary Symptoms	
Dysmenorrhea (painful periods)	368 (92.0%)
Chronic pelvic pain	312 (78.0%)
Fatigue	284 (71.0%)
Bloating	264 (66.0%)
Dyspareunia (painful intercourse)	256 (64.0%)
Infertility concerns	196 (49.0%)
Dyschezia (painful bowel movements)	176 (44.0%)
Nausea	152 (38.0%)
Dysuria (painful urination)	104 (26.0%)
Common Comorbidities	
Anxiety	172 (43.0%)
Depression	156 (39.0%)
Irritable bowel syndrome	148 (37.0%)
Pelvic floor dysfunction	132 (33.0%)
Migraine	124 (31.0%)
Fibromyalgia	68 (17.0%)
Interstitial cystitis	56 (14.0%)
Autoimmune diseases	48 (12.0%)

Table (3) summarizes pain management strategies. NSAIDs were the most utilized intervention (92.0%), though their mean effectiveness was moderate (6.5 ± 1.8), and side effects were reported by 42.9%. Heat therapy, the second most used method (87.0%), showed the highest effectiveness among all interventions (7.8 ± 1.2) with minimal adverse effects (2.9%). Hormonal contraceptives (64.0%) and GnRH analogs (26.0%) showed moderate effectiveness (6.3 ± 2.1 and 7.6 ± 2.2, respectively), though side effects were substantial, particularly for GnRH agonists (77.9%). Among alternative methods, herbal remedies were used by 58.0% and rated relatively high in effectiveness (7.2 ± 1.5), with only 11.2% reporting side effects.

Table 3: Pain Management Methods: Usage, Effectiveness, and Side Effects (n=400)

Method	Usage n (%)	Effectiveness (1-10) Mean ± SD	Reported Side Effects n (%)
Conventional Methods			
NSAIDs	368 (92.0%)	6.5 ± 1.8	158 (42.9%)
Heat therapy	348 (87.0%)	7.8 ± 1.2	10 (2.9%)
Hormonal contraceptives	256 (64.0%)	6.3 ± 2.1	174 (68.0%)
GnRH agonists/antagonists	104 (26.0%)	7.6 ± 2.2	81 (77.9%)
Surgery	124 (31.0%)	7.9 ± 2.5	74 (59.7%)
Alternative Methods			
Herbal remedies (overall)	232 (58.0%)	7.2 ± 1.5	26 (11.2%)
Dietary changes	212 (53.0%)	5.9 ± 2.0	17 (8.0%)
Exercise/yoga	196 (49.0%)	6.2 ± 1.7	12 (6.1%)
Acupuncture	96 (24.0%)	6.8 ± 2.3	9 (9.4%)

Figure (1) provides a breakdown of specific herbal remedies. Geranium extract was the most effective (7.9 ± 1.3), followed by basil (7.3 ± 1.5) and turmeric (6.5 ± 1.4). Chamomile, though widely used (45.0%), showed lower mean relief scores (6.1 ± 1.4), suggesting variability in efficacy among botanical treatments. Reported side effects were generally low across all remedies, ranging from 6.7% (chamomile) to 13.6% (basil).

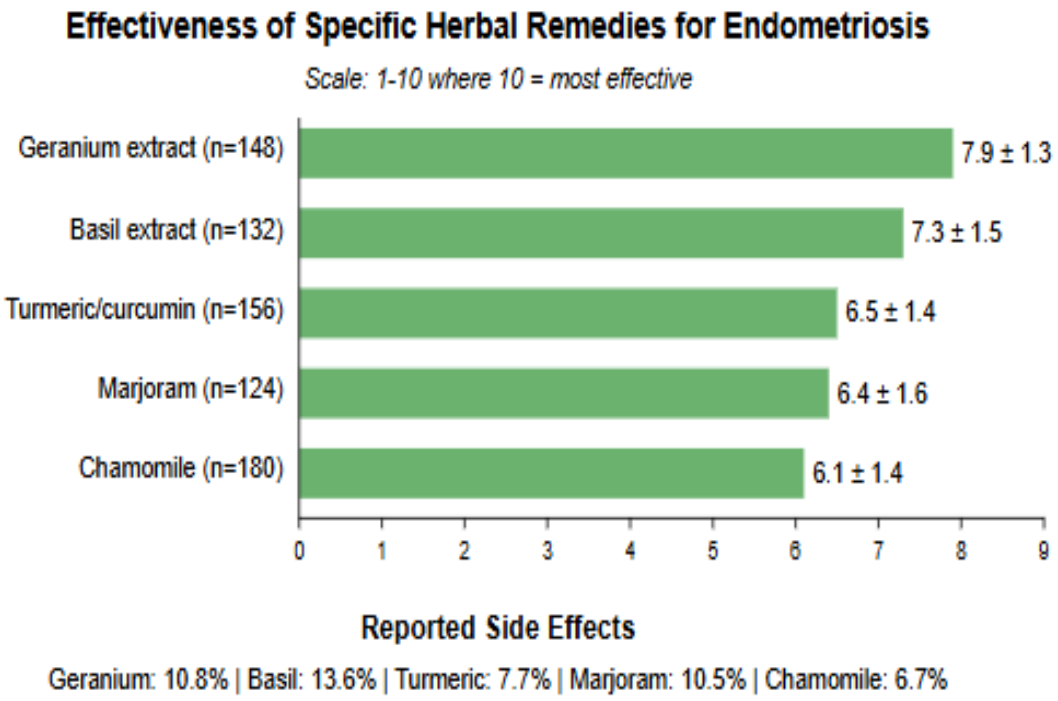

Figure 1. Detailed Analysis of Herbal Remedy Effectiveness

Figure 2 illustrates a dual-impact evaluation of four aromatic plants by integrating clinical effectiveness—measured as mean pain relief scores reported by women with endometriosis—and agricultural profitability, quantified as average net return per feddan based on data from Egyptian cultivation. The figure reveals a distinct correlation between therapeutic utility and economic value in certain crops. Geranium demonstrates the highest dual potential, combining the highest pain relief rating (7.9/10) with the highest net return (48,148 EGP/feddan). Basil also performs well, showing a strong therapeutic rating (7.3/10) and a moderate economic return (14,911 EGP/feddan). In contrast, Chamomile—despite being widely used—exhibits both low clinical efficacy (6.1/10) and minimal profitability (1,074 EGP/feddan). These findings highlight geranium and basil as strategic crops offering value in both public health and agricultural development sectors, reinforcing the importance of cross-sectoral planning in promoting medicinal plant cultivation with clinically validated applications.

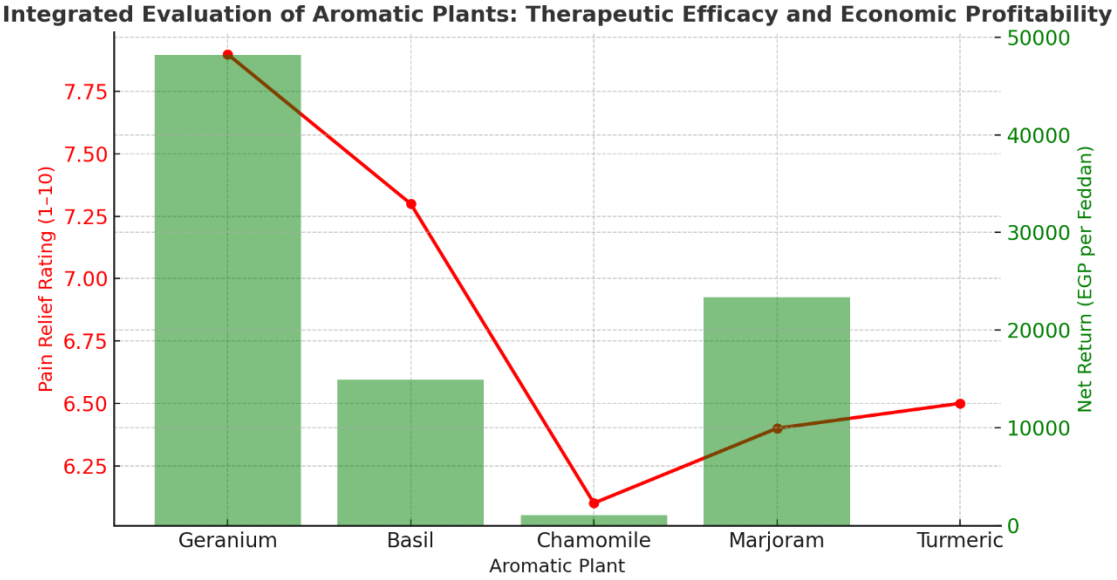

Figure 2. Comparative Analysis of Medicinal Plant Use in Endometriosis and Their Agricultural Returns

Figure (3) reveals that only 12.0% of participants reported being very satisfied with their pain management regimen, while 25.0% expressed dissatisfaction and 24.0% remained neutral, indicating room for significant improvement in treatment approaches.

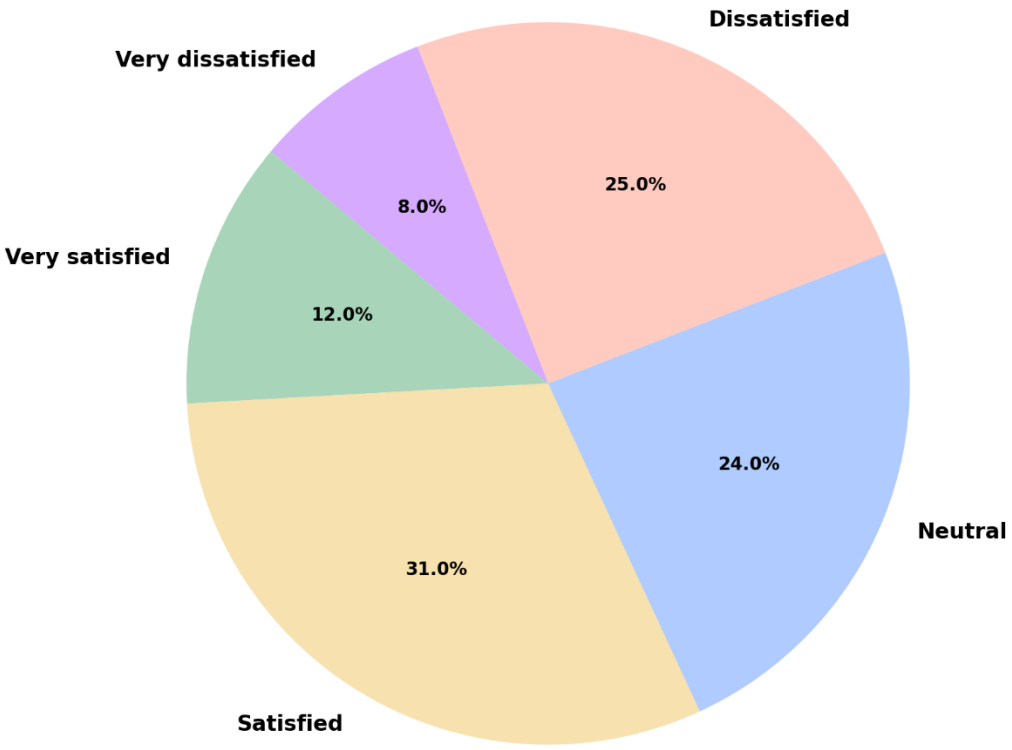

Figure 3: Overall Satisfaction with Pain Management (n=400)

Table (4) identifies key barriers to effective management. Cost was the most reported barrier (72.0%), followed by limited access to specialized care (64.0%) and insurance restrictions (59.0%). Side effects of medications (56.0%) and inadequate provider communication (48.0%) were also prominent concerns.

Table 4: Barriers to Optimal Pain Management (n=400)

Barrier	n (%)
Cost	288 (72.0%)
Difficulty accessing specialized care	256 (64.0%)
Insurance limitations	236 (59.0%)
Side effects of medications	224 (56.0%)
Limited knowledge about options	204 (51.0%)
Healthcare provider doesn't listen	192 (48.0%)
Time constraints for self-care	168 (42.0%)

Discussion

Currently, the management of endometriosis-associated pain focuses on pharmacologic treatment options like non-steroidal anti-inflammatory drugs (NSAIDs), combined oral contraceptives (COCs), as well as GnRH agonists. The primary goal of these strategies is to relieve the excruciating pain caused by these conditions, which most approaches tend to fall short of. NSAIDs are among the most commonly prescribed medications due to their anti-inflammatory properties and the ability to provide prompt relief of acute pain. They are typically administered as the first line of treatment for dysmenorrhea (painful periods) and chronic pelvic pain. Although these medications do provide symptom relief, studies indicate that their effectiveness is discretionary in these scenarios, as the side effects are considerable. These include gastrointestinal distress and long-term issues with renal function for many users (9).

Therapies such as COCs and progestins effectively manage pain related to endometriosis by suppression of ovarian activity and menstrual flow as the primary mechanism of action. In their works, Ferrero and his team report that COCs and progestins have been shown to improve pain symptoms in the majority of patients with endometriosis, which makes these treatment alternatives well-tolerated, and cost-effective (10). Still, these treatments lack curative potential, as symptoms of endometriosis usually return after cessation of therapy. They are also associated with undesirable effects including weight gain, headaches, and shifts in mood, which limits their long-term application. On the contrary, use of GnRH agonists as secondary line of treatment is more prevalent; these therapies employ hypoestrogenic states to remove endometriotic tissue and are often used for patients nonresponsive to COCs or progestins. Literature demonstrates the efficacy of GnRH agonists in pain management, and in limiting recurrence rates after surgical interventions. However, the presence of estradiol and other peripheral hormones has been shown to hinder efficacy through adverse effects, bone density loss, and hot flashes, depressed mood and reduced concentration. Sultana et al. (2021) (11) discuss some of the remaining difficulties associated with GnRH analogs, noting that while these therapies are effective, the side effects and the need to implement mitigation therapies to manage bone loss greatly restrict their application in clinical practice.

An additional primary concern with traditional methods of pain treatment is that there tends to be a high rate of recurrence following the cessation of treatment. A study by Rice (12), the use of GnRH agonists and danazol does allow for symptom alleviation; however, those treatment options incur consequences, such as chronic long-term side effects, including ineffectiveness at preventing recurrence post-treatment. This limitation has led many healthcare providers to attempt to improve results by integrating both medical and surgical interventions, thus creating a gap where more high-quality randomized clinical trials could be needed to support some treatment formulations and enable complete informed choices.

Due to such gaps, some researchers started investigating the non-hormonal and alternative therapies, such as aromatase inhibitors and GnRH antagonists, seeking to achieve the same level of pain relief with lower side effects. Al Hussaini et al. (2024) (13) reviewed the existing therapies and stressed the need for tailored interventions to treat the different components of endometriosis pain. These potential new agents may offer solutions to the contextual treatment of patients by minimizing the commonly found side effects related to hormonal treatment by using more non-invasive therapies.

While NSAIDs, COCs, and GnRH agonist therapies remain cornerstone strategies for the management of endometriosis-related pain, the necessity for sustained solutions persists. Mikuš et al. (2023) (14) underline how available options, while effective, come with intense repercussions and complications in holistic management of the condition. It is critical to redirect the investigative focus towards new pharmacological compounds, multitarget therapies aimed at the pathophysiology of endometriosis, and tailoring strategies for optimizing outcomes.

A particular notable result is herbal medicine usage which is rated at 58.0% and effectiveness at 7.2 out of ten with a relatively low side effect profile of 11.2%. Within specific botanicals geranium (7.9 ± 1.3) and basil (7.3 ± 1.5) were perceived as the most effective. These findings support a recent meta-analysis by Lin et al (2023) (15), which reported significant improvements in dysmenorrhea and

pelvic pain from Chinese herbal medicine after 3 to 4 months of use, with less side effects than hormonal treatments. Also, interestingly, a large cohort study in Germany reported that 62.5% of women with endometriosis have used complementary therapies and the highest usage was among those who reported fatigue and dissatisfaction with conventional care ($p = 0.006$ and $p = 0.013$ respectively), supporting the role of CAM in coping strategies (16).

The integration of clinical pain relief and agricultural profitability, in terms of net returns per feddan and clinical efficacy, is a unique contribution of this study. The findings indicate that not only did geranium and basil provide the highest clinical effectiveness, but they also had considerable economic returns for the growers in Egypt. For instance, geranium had a net return of 48,148 EGP/feddan, which aligns with Komal et al.'s (2021) (17) discourse on the economic value of cultivating medicinal plants with known therapeutic effects, supporting public health and local economies. This dual-impact perspective, combining health and economic benefits, underscores the attention received toward sustainable agricultural practices in developing countries.

Citing the Egyptian Ministry of Agriculture, data from 2017-2021 place the economic yield of geranium and basil cultivation at 8.4 and 5.1 pounds respectively. Their favorable cost-to-price ratios (12% for geranium, 15% for basil) illustrate the economic viability for developing affordable treatments for endometriosis. Principally, these factors and their therapeutic impact bolster the argument for the development of affordable botanical therapies for endometriosis while concurrently supporting agricultural economic growth in Egypt (6,18).

Conclusions

In conclusion, the emerging dependence on complementary therapies amid the intricate challenges associated with managing pain in endometriosis. Even though supplement herbal therapies such as geranium and basil are economically beneficial and relieve pain, conventional treatments are still largely unsatisfactory. The results advocate for health policies aimed at promoting the growing of medicinal plants—especially in Egypt where MAPs have remarkable economic value. More research with sufficient follow-up periods and randomized controlled trials is required to understand the enduring effectiveness of CAM therapies and satisfaction among patients.

Data availability statement

The datasets that were assessed in the present study are available from the corresponding author upon request.

Declaration of Competing Interest

The authors declare that they have no conflict of interest.

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