

Medicinal plants in the treatment of insomnia: an active teaching methodological model for medical training in Primary Health Care

Plantas medicinais no tratamento da insônia: um modelo de metodologia ativa de ensino para formação médica em Atenção Primária à Saúde

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ABSTRACT

Objective: This study aimed to train primary healthcare physicians in the use of medicinal plants for the treatment of insomnia and to evaluate the impact of this intervention on participants' knowledge. **Methodology:** A workshop was conducted in two primary care units in the city of Rio de Janeiro, with the participation of 17 physicians, most of whom were residents in family and community medicine. The intervention included an initial discussion with prompting questions, an evidence-based presentation, and a sensory activity involving medicinal plants. Knowledge assessment was carried out through pre- and post-intervention questionnaires, measuring the frequency of prescriptions and familiarity with medicinal plants. **Results:** Prior to the workshop, only 23.5% of participants occasionally prescribed medicinal plants, increasing to 43.8% after the intervention. Additionally, 76.5% of the physicians were unaware of bibliographic materials on the topic before the workshop, but this number significantly decreased afterward. Participants reported an increasing interest in incorporating the use of medicinal plants into their clinical practice. **Conclusion:** The workshop was effective in enhancing knowledge and clinical application of medicinal plants for insomnia, highlighting the importance of brief interventions in medical training. The experience suggests that this approach can be replicated in other primary care settings, contributing to the clinical and cultural education of healthcare professionals.

KEYWORDS: Medicinal Plants. Phytotherapy. Insomnia Disorders. Primary Health Care. Medical School.

RESUMO

Objetivo: Este estudo teve como objetivo capacitar médicos atuantes na Atenção Primária à Saúde (APS) sobre o uso de plantas medicinais no tratamento da insônia e avaliar o impacto dessa intervenção no conhecimento dos participantes. **Metodologia:** Realizou-se uma oficina em duas unidades da APS no município do Rio de Janeiro, com a participação de 17 médicos, sendo a maioria residentes em medicina de família e comunidade. A intervenção incluiu uma discussão inicial com perguntas disparadoras, uma parte expositiva baseada em evidências científicas e uma dinâmica sensorial com plantas medicinais. A avaliação do conhecimento foi realizada por meio de questionários pré e pós-intervenção, que mensuraram a frequência de prescrição e a familiaridade com as plantas medicinais. **Resultados:** Antes da oficina, apenas 23,5% dos participantes prescreviam plantas medicinais ocasionalmente, aumentando para 43,8% após a intervenção. Além disso, 76,5% dos médicos não conheciam materiais bibliográficos sobre o tema antes da oficina, mas, após a intervenção, esse número caiu significativamente. Os participantes relataram maior interesse crescente em incorporar o uso de plantas medicinais em sua prática clínica. **Conclusão:** A oficina foi eficaz em ampliar o conhecimento e a aplicação clínica das plantas medicinais para insônia, ressaltando a importância de intervenções breves na formação médica. A experiência sugere que essa abordagem pode ser replicada em outros contextos da APS, contribuindo para a formação clínica e cultural dos profissionais de saúde.

PALAVRAS-CHAVE: Plantas Medicinais. Fitoterapia. Insônia. Atenção Primária à Saúde. Formação Médica.

INTRODUCTION

Insomnia, defined as difficulty in initiating or maintaining sleep,¹ including early awakenings, is a common condition in primary health care (PHC).² A recent meta-analysis has revealed sleep disorders account for nearly one-fourth of health problems in Latin America.³ Insomnia is not only a frequent and major complaint among patients but also a challenge for professionals who often consider the available treatment options to be limited.⁴

Medicinal plants often serve as a repository of traditional knowledge and are considered an integral part of self-care within various communities and cultures.⁵ Their use is associated with habits and behaviors that may facilitate sleep and also with their pharmacological properties, promoting sedative and calming effects. Therefore, medicinal plants are regarded as a complementary therapeutic option.⁶ As one of the integrative and complementary practices (PICS), formally established in 2006 by the Brazilian public health system (known as SUS) through the national policy on integrative and complementary practices (PNPIC), medicinal plants may be seen as light technology, grounded in empathetic listening, interpersonal bonding, and integrative care.⁷

Sleep disorders are commonly associated with social determinants of health, such as unemployment and poor socioeconomic background.³ Medicinal plants may represent a readily available and inexpensive therapeutic option.⁶ In general, most of these medicinal plants exhibit lower toxicity and fewer adverse effects when used judiciously, but they are not entirely free of risk.⁶ Other behavioral interventions, such as sleep hygiene — the cornerstone of insomnia management² —, may serve as useful adjuncts in sleep care, particularly for women, older people, and those undergoing critical life changes (e.g., widowhood or divorce).⁸

Health professionals acknowledge the importance of the national policy on medicinal plants and phytotherapeutic agents (PNPMF),⁹ however, their level of knowledge in this field remains limited.¹⁰ This limitation can be explained by minimal exposure to the subject during professional training,¹¹ revealing a persistent gap between popular wisdom and scientific knowledge.¹² As a result, reluctance may still exist among health professionals to prescribe, recommend, and utilize medicinal plants,¹² even though phytotherapy stands out as an evidence-based integrative and complementary approach capable of alleviating symptoms of anxiety and insomnia.⁶ A major hurdle is the inadequate awareness among public health administrators and health professionals.^{13,14} Therefore, it is imperative to develop training strategies that expand medical knowledge of this subject, which highlights the importance of the present study.

A method currently under investigation, known as “sensory circuit,” proposes direct physical interaction with the object of study, in line with the principles of active teaching methods.^{15,16} This approach was implemented in a public elementary school in Miguel Pereira, a

town in the state of Rio de Janeiro, Brazil, where students were introduced to acid-base chemical properties using medicinal plants, demonstrating the effectiveness of the teaching method.¹⁶ This method promotes interactive learning, increases students' interest in the subject matter, and employs kinesthetic stimuli to optimize knowledge acquisition and retention.

Therefore, this study sought to train PHC physicians in the use of medicinal plants for the treatment of insomnia and to assess the impact of this intervention on their knowledge, considering its potential to become a reproducible model for bridging the gap between the clinical relevance of phytotherapy in the PHC setting and physicians' limited knowledge of the subject. In accordance with the *Memento Fitoterápico*¹⁷ and the *Formulário de Fitoterápicos*¹⁸ issued by the Brazilian Health Regulatory Agency (ANVISA), numerous plant species are formally recommended for the treatment of sleep disorders, including *Lippia alba* (bushy matgrass), *Cymbopogon citratus* (lemongrass), *Melissa officinalis* (lemon balm), *Matricaria chamomilla* (German chamomile), *Valeriana officinalis* (valerian), *Passiflora incarnata* (passionflower), *Lavandula angustifolia* (lavender), and *Erythrina mulungu* (mulungu). These plants are widely used by the general population for the treatment of sleep disorders, and their traditional use is supported by scientific evidence demonstrating both efficacy and safety in this clinical scenario.^{17,18}

METHODOLOGY

This study employed a quasi-experimental pre-post design to examine the effects of an educational intervention on medical knowledge related to the use of phytotherapy for the treatment of insomnia. This design was selected because it allows comparing level of knowledge and practice before and after the intervention, without requiring a control group, thereby enabling the observation of changes directly attributable to the proposed activity.

In November 2023, two second-year residents from the Family and Community Medicine Residency Program (PRMFC) of the Local Health Department of Rio de Janeiro (SMS-RJ) conducted a training workshop titled "Medicinal Plants and Insomnia," following approval by the Ethics Committee of the Rio de Janeiro Municipal Health Secretariat – SMS/RJ (opinion n.º 6.506.704; CAAE n.º 74812123.8.0000.5279). Immediately before the workshop, participants completed an online questionnaire individually, synchronously, and anonymously, for assessment of their prior knowledge of the topic. The intervention lasted approximately 90 minutes and was conducted at the Medalhista Olímpico Ricardo Lucarelli Souza Family Clinic (CF MORLS) and Estácio de Sá Family Clinic, both located in Programmatic Area 1.0 of the city of Rio de Janeiro, where the researchers carry out their professional activities. The workshop was scheduled in advance with the coordinators to take place in the respective auditoriums during a PRMFC clinical

session. After 28 days, a follow-up questionnaire was sent via email to evaluate participants' impressions and knowledge gained during the workshop. The questions remained available online for 10 days and were answered asynchronously, individually, and anonymously. Responses were analyzed both qualitatively and quantitatively and compared with the pre-intervention questionnaire.

The study population consisted of 17 physicians working in primary health care who were present at the PRMFC clinical session, including residents, preceptors, and staff physicians from the units where the workshop took place — this constituted the inclusion criterion for the study. Participants who did not consent to participate in the research or to sign the informed consent form (ICF) were excluded. Nevertheless, no refusals to participate were recorded.

The medicinal plants for the treatment of insomnia were selected by researchers based on the *Memento Fitoterápico*¹⁷ and on the *Formulário de Fitoterápicos*,¹⁸ published by ANVISA. Seven plants indicated for sleep disorders were chosen, namely: *Lippia alba* (bushy matgrass), *Cymbopogon citratus* (lemongrass), *Melissa officinalis* (lemon balm), *Matricaria chamomilla* (German chamomile), *Valeriana officinalis* (valerian), *Passiflora incarnata* (passionflower), *Lavandula angustifolia* (lavender), and *Erythrina mulungu* (mulungu).

Workshop organization and structure

Both auditoriums were arranged with chairs set in a semicircle, and the tables were organized as stations for the medicinal plants (Fig. 1). The workshop was organized as follows: (1) introduction to the researchers and to the subject matter; (2) careful reading and signature of the ICF by participants; (3) application of the pre-intervention questionnaire (answered anonymously); (4) open debate based on two guiding questions, encouraging participants to share clinical cases: “Has anyone ever had any experience using or recommending medicinal plants for insomnia? How have you been addressing insomnia in your clinical practice?”; (5) brief presentation of the concepts of insomnia, epidemiological data, relevance of the subject matter, popular and scientific use of medicinal plants, public policies, supplemental material, and an overview on phytotherapy; (6) dynamic activity conducted at medicinal plant stations; (7) closure, with distribution of free samples of medicinal plants for interaction after the workshop; (8) final remarks of participants and acknowledgments; and (9) application of the post-intervention questionnaire. Slides were prepared by the researchers as supporting material to enhance the quality of the workshop.

Figure 1 – Spatial organization of auditoriums

Source: Authors' personal archive.

The interactive component of the workshop, conceived as its central element, was organized into stations, each focused on a specific medicinal plant. Specimens of each plant, obtained in advance by the researchers through online vendors and natural product stores, were sequentially arranged in glass jars on the tables (Fig. 2). Additional materials supplemented the stations, including plant identification signs, thermal bottles with extemporaneous preparations, pots containing whole plants or plant parts, essential oils, foot baths, and cushions. To illustrate extraction methods, cups, strainers, infusers, and spoons were provided, and wide containers were used to facilitate the distribution of dried plant parts among participants.

Figure 2 – Materials used at medicinal plant stations

Source: Authors' personal archive.

The activity was guided by projected images of the plants, alongside examples of prescriptions and references from scientific studies, following the sequence of each station. A simplified printed booklet (see [Appendix A](#)) prepared by the researchers was handed out to participants. The theoretical framework was based on a literature review and established reference materials, such as the *Memento Fitoterápico*¹⁷ and the *Formulário de Fitoterápicos*.¹⁸ The booklet also included a conversion table for conversion of weight in grams to household spoon equivalents, facilitating the preparation of extemporaneous formulations at home. Upon completion of the session, participants were provided with samples of the medicinal plants and could share their impressions. The session ended with acknowledgments from the researchers.

Immediately before the session, participants completed an anonymous pre-intervention questionnaire through Google Forms on their own cell phones. The questionnaire was designed to assess their previous knowledge and professional experience in prescribing and advising on the use of medicinal plants as complementary therapy for insomnia. Participants had to answer the following questions: (1) *How often do you prescribe or advise on the use of medicinal plants as a complementary treatment for insomnia?* (never, rarely, occasionally, frequently, or very frequently); (2) On a scale from 1 to 5, where 1 indicates feeling very insecure and 5 indicates feeling completely confident, how confident do you feel in advising and prescribing medicinal plants for insomnia?; (3) *Based on your knowledge, which medicinal plants or phytotherapeutic agents do you consider appropriate for the complementary treatment of insomnia?* (open-ended question, descriptive answer); and (4) *Do you know of any reference materials that can serve as a reliable source of information to support the prescription or counseling on the use of medicinal plants in the complementary treatment of insomnia?* (open-ended question, descriptive answer).

Between 28 and 38 days following the workshop, participants received a post-intervention questionnaire through a Google Forms link, with all responses collected anonymously. This questionnaire included the same four questions as in the pre-intervention questionnaire, supplemented by two additional questions designed to compare the findings and assess the impact of the intervention on participants' knowledge and professional practice concerning the use of medicinal plants for insomnia. The two additional questions were: (5) On a scale from 1 to 5, with 1 meaning "no contribution" and 5 meaning "very significant contribution," to what extent do you consider that the workshop contributed to your understanding of the use of medicinal plants in the complementary treatment of insomnia?; and (6) On a scale from 1 to 5, where 1 indicates "did not integrate" and 5 indicates "fully integrated," to what extent do you believe that, after the workshop, you integrated the prescription or counseling on the use of medicinal plants into your complementary treatment for insomnia?.

Analysis of the results

A mixed-methods design was used to analyze the intervention, combining qualitative and quantitative approaches. The open-ended responses from the pre- and post-intervention questionnaires underwent qualitative content analysis, with all responses fully reviewed to identify recurring themes and insights drawn from participants' experiences. Moreover, the frequency of mention of each medicinal plant species cited by participants in the open-ended questions was quantified, and the results were expressed as percentages. The qualitative analysis also incorporated the researchers' notes and observations recorded during the workshop, which included photographic and video documentation of the intervention.

Data from the closed-ended quantitative questions were tabulated and described using absolute and percentage frequencies. Owing to the small sample size and the exploratory and non-confirmatory character of the study, no comparative statistical analyses or hypothesis testing were undertaken.

RESULTS

A total of 17 physicians participated in the workshops — six from the Estácio de Sá Family Clinic and 11 from the MORLS Family Clinic. Only one participant was not affiliated with the PRMFC of the Local Health Department of Rio de Janeiro (SMS-RJ). Most of the participating physicians were first- or second-year residents, while two served as preceptors. One of the preceptors was unable to attend the full session.

The results and discussion are presented according to the three components of the workshop, the participants' final remarks, and the analysis of the pre- and post-intervention questionnaires.

Open debate prompted by guiding questions

Following the guiding questions ("Has anyone ever had any experience using or recommending medicinal plants for insomnia? How have you been addressing insomnia in your clinical practice?"), most of the physicians at both clinics actively participated in the discussion, which lasted approximately 10 minutes. Participants' key reflections and shared experiences were organized into the following thematic categories: (a) both successful and unsuccessful attempts to discontinue benzodiazepines through the use of herbal medicines, particularly *Passiflora incarnata* and *Valeriana officinalis*; (b) professional frustration in response to patients' expectation for rapid relief of insomnia symptoms through allopathic drugs; (c) the importance of plant origin and dosage in achieving the desired therapeutic effects; (d) the impact of social determinants of

health on insomnia and the limitations of pharmacological approaches, including phytotherapeutic agents; and (e) the relevance of physicians recognizing and valuing the use of medicinal plants as a means to strengthen the physician-patient relationship, promote patient self-care, and support sleep hygiene practices. The following excerpts illustrate participants' statements shared during the workshop:

"I've used *passiflora*, *mulungu*, and *valerian* myself, and they really helped. I didn't have insomnia, I just wanted to improve my sleep quality. It was actually a nice experience — instead of taking medication, I realized that making the tea and drinking it by the window became part of my sleep hygiene routine and helped me relax."

"Chamomile is one that I often mention, but what happens more often is that the patient brings it up first. They often come looking for some sort of validation, saying things like: 'Oh, I couldn't sleep and had some tea... that's not good, right? You're going to tell me to take a medicine, right?' There's this expectation that we won't value these practices. I've noticed that this initiative usually comes from the patients themselves. Usually, I suggest chamomile or *Passiflora* as a herbal option for anxiety."

"The main request I get is for clonazepam, but many patients are dissatisfied when the only recommendation is sleep hygiene."

"Valerian has saved me several times from having to prescribe a benzodiazepine. I often make an agreement with the patient to try valerian first and come back later, and it really helps me avoid prescribing a benzodiazepine."

"I've prescribed chamomile and valerian, and sometimes I prescribe passionflower. I think it's important to work with what's feasible for each patient — if they can manage to have some tea in the morning and get through the day, that's already something. But what I find hardest to deal with, beyond the herbal treatments themselves, are the family issues, social vulnerability, and safety concerns."

Expository section

The expository section was guided by slides and lasted approximately 15 to 20 minutes. During this session, the researchers emphasized that the *Memento Fitoterápico*¹⁷ and the *Formulário de Fitoterápicos*,¹⁸ which served as theoretical references for the presentation, are reliable reference materials that can be used in daily clinical practice to clarify questions regarding the use of various medicinal plants. Accordingly, the researchers aimed to foster the integration of these reference materials into routine medical practice.

Station-based activity

Participants were invited to actively engage in the practical session involving medicinal plants, moving through the series of preestablished stations in sequential order. The researchers outlined the inclusion and exclusion criteria applied in selecting the eight medicinal plants, without naming them, and invited participants to undertake a sensory exploration exercise. Participants were tasked with identifying the plants by consulting the printed simplified booklet and the measurement conversion table, both designed to support them throughout the activity. The

identification signs were initially turned backwards and then revealed after a short period, allowing participants to try to recognize the plant being displayed. Each researcher conducted the activity with four species.

Most participants showed enthusiasm, curiosity, and receptiveness when engaging with the sensory experience and the plant identification task. Active participation was evidenced through the observation of the plants' morphological features, tactile exploration, olfactory perception, and tasting of extemporaneous preparations. This multisensory engagement fostered an exchange of perceptual experiences and prior knowledge. Throughout the stations, the researchers provided complementary explanations aligned with the instructional content of the booklet and slides.

At the first station, *Lippia alba*, *Cymbopogon citratus*, and *Melissa officinalis* were displayed together, as they share a similar popular name and certain pharmacological properties. Most participants were unable to correctly distinguish among these three medicinal plants, with *Lippia alba* being the least recognized species. Interestingly, despite being the species most frequently mentioned by community members and largely grown in the gardens of the participating clinics, this fact was largely unknown to the participants. During the workshop, only a few participants were able to identify the plants on display, and many of their attempts were far from the correct names, even when referring to popular denominations. This finding underscores how distant the medical community remains from traditional knowledge, as highlighted in previous studies,¹⁹ thus hindering the accurate identification of medicinal plants — an essential step for appropriate prescription, safe guidance, and rational use of medicinal plants.

Among all specimens, *Matricaria chamomilla* was the most readily recognized by participants, whose appreciation for its infusion was particularly evident. Its traditional use in pediatric care was underscored, and a handmade pillow produced by a patient was presented as an example of its practical, non-pharmacological application. *Valeriana officinalis* was notably remarked upon for its pungent scent, the diversity of standardized industrial preparations, the number of available clinical trials substantiating its efficacy, and its relatively elevated cost, which may hinder both patient access and routine prescription. A number of participants were already acquainted with this phytotherapeutic agent, whether from personal use or from prescribing it as tablets or tinctures. *Lavandula officinalis* was broadly recognized, largely owing to its frequent use in the cosmetic industry. Conversely, the distinctive beauty of *Erythrina mulungu* captured considerable attention; however, few participants were aware of its potential indication for insomnia or of its commercial availability in stores specializing in natural health products.

The workshop highlighted the remarkable potential of Brazil's native flora and the relative paucity of scientific research dedicated to medicinal plants of Latin American origin, especially when contrasted with the extensive literature on European species.

A considerable number of participants lacked familiarity with the differential principles underlying the extraction methods of infusion and decoction, which were practically demonstrated using the available plant materials. Inquiries were made concerning the evaluation of dried plant quality and the identification of the plant part utilized — key determinants for ensuring therapeutic safety and achieving the intended pharmacological efficacy.

Participants' final remarks

The workshop, with particular regard to its practical component, was widely commended across both clinical settings. At the Estácio de Sá Family Clinic, participants proposed extending the time devoted to the practical section — structured as an exhibition — and increasing the number of live potted specimens to optimize plant identification and consolidation of knowledge. At the MORLS Family Clinic, participants recommended the use of an olfactory neutralizing agent, such as ground coffee, between sensory trials to counteract the persistence of essential oils. Participants also proposed offering more comprehensive pre-activity instructions regarding safety measures and endorsed the presentation of the workshop at conferences related to PHC.

Participants underscored the importance of the booklet prepared by the researchers as a practical reference for clinical use and requested that the material be shared at both clinics. They also suggested the development of an additional resource containing examples of prescriptions. Of particular note, several employees at the Estácio de Sá Family Clinic observed the activity in the study center and, upon its conclusion, approached the researchers with interest in the subject. A nurse extended an invitation for the workshop to be offered to the clinic's nursing team.

Pre- and post-intervention questionnaires

All 17 participants completed the pre-intervention questionnaire after signing the informed consent form. The post-intervention questionnaire, sent 28 to 38 days after the workshop and available for 10 days, was completed by 16 participants. With respect to the frequency with which participants prescribed or provided guidance on the use of medicinal plants for the complementary management of insomnia, there was an observed increase in the number of participants reporting that they did so occasionally or more frequently. Prior to the intervention, nearly half of the participants reported that they had never engaged in this practice, whereas after the intervention, no participant indicated “never” (Table 1).

Concerning medicinal plants that can be utilized as complementary treatment of insomnia, nearly 25% of participants failed to cite any species in the pre-intervention questionnaire; nevertheless, most participants identified at least one plant utilized for this therapeutic purpose. After the intervention, all participants who completed the questionnaire mentioned at least one

medicinal plant, which were cited more frequently compared with the pre-intervention questionnaire (Table 1). The species were reported only by their common names, and a single common name may correspond to multiple species. Notably, “valerian” exhibited the greatest increase in citations. The frequency with which each plant was mentioned rose following the workshop, indicating the positive effect of the intervention on clinical practice. Of particular interest was the mention of “fennel” by participants. Although this species is seldom addressed in the scientific literature and therefore was not included in the workshop, it is commonly used in popular practice. Furthermore, “St. John’s wort” was mentioned after the workshop, although it was not included among the species addressed during the intervention.

Concerning familiarity with bibliographic resources, most participants in the pre-intervention questionnaire indicated that they did not know of any reliable sources to guide the prescription or counseling regarding the use of medicinal plants for the complementary treatment of insomnia. Only two participants mentioned relevant references, namely the *Memento Fitoterápico*¹⁷ and the *Formulário de Fitoterápicos*.¹⁸ After the intervention, only one participant reported lacking such knowledge, while the remaining participants cited an increased number of reference sources, including the *Fitoterapia Brasil* website, “*Formulários de Fitoterápicos*,” *quick guides*, “*Manual de Fitoterapia*,” “*Medicinal Plants and Phytotherapeutics Materials*” from the Ministry of Health, “*Brazilian Pharmacopoeia*,” and “*Memento*,” contrasting with the scarcity of responses prior to the intervention.

Table 1 – Assessment conducted pre-intervention (immediately before) and post-intervention (28 to 38 days later)

Question and response options	Pre-intervention (n=17) n (%)	Post-intervention (n=16) n (%)
<i>How often do you prescribe or advise on the use of medicinal plants as a complementary treatment for insomnia?</i>		
Never	8 (47.1)	0 (0)
Rarely	3 (17.6)	3 (18.8)
Occasionally	4 (23.5)	7 (43.8)
Frequently	2 (11.8)	6 (37.5)
Very frequently	0 (0)	0 (0)
<i>On a scale from 1 to 5, where 1 indicates feeling very insecure and 5 indicates feeling completely confident, how confident do you feel in advising and prescribing medicinal plants for insomnia?</i>		
1 (Very insecure)	7 (41.2)	1 (6.3)
2	6 (35.3)	1 (6.3)
3	2 (11.8)	9 (56.3)
4	1 (5.9)	5 (31.3)
5 (Completely confident)	1 (5.9)	0 (0)

Question and response options	(Conclusion)	
	Pre-intervention (n=17)	Post-intervention (n=16)
	n (%)	n (%)
<i>Based on your knowledge, which medicinal plants or phytotherapeutic agents do you consider appropriate for the complementary treatment of insomnia?*</i> #		
Passionflower	6 (35.3)	12 (75)
Valerian	2 (11.8)	11 (68.8)
German chamomile	8 (47.1)	11 (68.8)
Bushy matgrass	3 (17.6)	8 (50)
Mulungu	3 (17.6)	4 (25)
Lavender	1 (5.9)	4 (25)
Lemon balm	1 (5.9)	3 (18.8)
Lemongrass	1 (5.9)	3 (18.8)
Fennel	2 (11.8)	1 (6.3)
St. John's wort	0 (0)	1 (6.3)
Do not know	4 (23.5)	0 (0)

* Descriptive, open-ended question: Participants were allowed to list any number of plants, resulting in a total number of citations greater than the number of participants (n = 33). Percentages represent the number of participants citing each plant in relation to the total respondents.

The species were reported only by their common names, and a single common name may correspond to multiple species.

Source: Prepared by the authors.

Concerning the perceived impact of the workshop on participants' knowledge, 75% indicated the maximum score of "5" on a 1-to-5 scale, reflecting a very high contribution. The remaining 25% selected "4," demonstrating that all participants regarded the intervention as meaningful for their learning (Table 2).

Table 2 – Post-intervention (28 to 38 days after the workshop) assessment

	After the workshop n (%)
<i>On a scale from 1 to 5, with 1 meaning "no contribution" and 5 meaning "very significant contribution," to what extent do you consider that the workshop contributed to your understanding of the use of medicinal plants in the complementary treatment of insomnia?</i>	
1 (No contribution)	0 (0)
2	0 (0)
3	0 (0)
4	4 (25)
5 (Very significant contribution)	12 (75)

(Conclusion)	
After the workshop	
n (%)	
<i>On a scale from 1 to 5, where 1 indicates “did not integrate” and 5 indicates “fully integrated,” to what extent do you believe that, after the workshop, you integrated the prescription or counseling on the use of medicinal plants into your complementary treatment for insomnia?</i>	
1 (Did not integrate)	0 (0)
2	2 (12.5)
3	2 (12.5)
4	10 (62.5)
5 (Fully integrated)	2 (12.5)

Source: Prepared by the authors.

DISCUSSION

This study comprised an intervention implemented within primary health care, through a workshop aimed at physicians operating at this level of care in the city of Rio de Janeiro. The objective was to provide training on the use of medicinal plants in the treatment of insomnia and to evaluate its effect on participants' knowledge of the subject. Quantitative and qualitative measurements were conducted before and after the intervention. The results indicated that physicians' prior knowledge regarding the use of medicinal plants for insomnia was limited and that the intervention enhanced participants' understanding of the topic. A further finding was the increased clinical use of medicinal plants by these professionals as a complementary therapeutic approach. These findings indicate that educational interventions employing active learning strategies, such as the sensory circuit utilized in this study, can effectively foster medical learning in domains that are underrepresented in conventional medical training.

Notably, the participating physicians showed considerable engagement with the topic and successfully integrated the concepts presented in the workshop, thereby broadening their therapeutic options in clinical practice for addressing sleep disorders. The observed limitations in prior knowledge, as documented in the literature,^{10,11} can be largely explained by the divergence between undergraduate medical education and the National Curriculum Guidelines for Undergraduate Medical Education,²⁰ established by the Brazilian Ministry of Education and Culture. These guidelines are intended to align medical training with the directives of the Brazilian Public Health System (SUS), which include the PNPMF²¹ and the PNPIC.⁷

In turn, the lack of knowledge — reported and observed during the workshop — regarding

the proper indication and guidance for the use of medicinal plants directly compromises treatment efficacy. While the pre-intervention questionnaires indicated physicians' uncertainty, significant engagement with the subject was noted, mirroring the interest of the general public. Approximately 60% of the Brazilian population is estimated to use medicinal plants for symptom relief or disease treatment,¹⁹ which prompts many patients to disclose their use and seek professional validation during medical appointments, as reported by the physicians involved in this study.

The success of the workshop was attributed to the sharing of reliable, evidence-based information, much of it drawn from documents consolidated by organizations such as the Brazilian Ministry of Health and ANVISA, in accordance with the standards outlined in traditional medical curriculum guidelines. In addition, participants were provided with appropriate prescription strategies grounded in pharmaceutical guidelines, facilitating their comprehension of how to utilize this resource in routine care, while considering correct dosing and treatment duration.

Also noteworthy was the opportunity for participants to interact with the organoleptic properties of the plants discussed in the theoretical sessions, using a sensory circuit format.^{15,16} It is known that the learning process involves the processing of sensory stimuli that generate affective memory. During the workshop, participants were able to perceive the terpenes responsible for the aromas of the infusions and visually identify the characteristics of high-quality raw material for extemporaneous preparations.

Notwithstanding the significant relevance and the rising interest in the subject, public resources allocated to the development and consolidation of the PNPIC and PNPMF remain insufficient.⁶ In this context, replicating experiences such as the workshop conducted in this study — with engaged professionals and proper guidance — may encourage the implementation of policies supporting the use of medicinal plants, especially because such activities entail minimal financial investment.

In this scenario, socioeconomic factors influence both the prevalence and management of sleep disorders.³ Therefore, the family physician, whose training provides a psychosocial perspective, benefits from activities such as the one described in this study. PHC physicians manage complaints concerning difficulties with sleep initiation or maintenance across the diverse care networks of the SUS, often constituting the only available resource for socioeconomically vulnerable populations.²² Furthermore, the subject holds significance as a strategy for quaternary prevention, as interventions by PHC physicians may mitigate unnecessary allopathic prescriptions of benzodiazepines — given the risk of falls in older adults, as well as long-term tolerance and dependence²² — for complaints that could be temporary or effectively managed through self-care practices.

Concerning the limitations of this study, the constrained timeframe of approximately 90 minutes warrants mention, as a longer session could offer greater scope for responding to participants' questions and uncertainties. Note that the second workshop was conducted in the afternoon, after the participants' regular working hours, which may have limited content retention. The post-intervention questionnaire was available for 30 days, during a break from work, and multiple requests for completion were necessary, potentially affecting the response rate. The inclusion of an open-ended question for participants' suggestions or subjective impressions could have provided greater depth to the qualitative findings. The limited number of participants reflected the reliance on a scheduled clinical session within the Family and Community Medicine residency program.

CONCLUSION

From the experience gained by the researchers during the intervention described in this study, a gap was observed between medical knowledge and practice regarding both scientific and popular understanding of medicinal plant use for complementary treatment of insomnia in the PHC setting in Rio de Janeiro. This finding aligns with previous publications indicating the need for enhanced technical training on the topic and underscores the necessity for stronger public policy support in this area. Concurrently, the workshops elicited substantial interest, acknowledgment, and critical engagement from the physicians. The intervention effectively met its objective of familiarizing participants with this domain of knowledge and practice through a highly regarded workshop format, promoting an exchange of experiences among participants and the researchers themselves. It was evident that participants expanded their repertoire for the treatment of patients with sleep disorders. Accordingly, the workshop model proved to be both effective and efficient, given its low implementation cost and high acceptability. It can be replicated in medical residency programs as well as in other settings, not only for complementary treatment of insomnia but also for addressing other common complaints in PHC, leveraging the extensive array of phytotherapeutic resources available across the various levels of care.

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Go to top

APPENDIX A

Educational booklet prepared by the researchers and provided in print to participants.

	Matricaria chamomilla (German chamomile)	Lippia alba (Bushy lemon balm)	Cymbopogon citratus (Lemongrass)	Melissa officinalis (Lemon balm)	Valeriana officinalis (Valerian)	Passiflora incarnata (Passionflower)	Lavandula angustifolia (Lavender)	Erythrina mulungu (Mulungu)
Highlights	Internal use in children; important external use	Widely used locally, accessible	Caution with citronella; essential oil relevant	True species; widely studied	Prescription-only; sleep induction	Widely studied, mainly anxiety	Different from dentata; essential oil	Brazilian native; decoction
Origin	Europe	South America	India and South Asia	Europe and Asia	Europe and Asia	South America	Europe	Southeastern Brazil
Part used	Inflorescences	Leaves and flowers	Leaves	Leaves	Root	Leaves	Flowers	Stem bark
Phytochemicals	Farnesene, limonene, chamazulene, apigenin	Citral, myrcene, limonene, carvone	Citral, myrcene, linalool, geraniol	Citral, limonene, linalool, geraniol	Valerenic acid, valepotriates, alkaloids	Flavones, vitexin, apigenin, coumarins	Luteolin, apigenin, linalool, camphor	Alkaloids, flavonoids, terpenes
Indications	Mild anxiolytic and sedative; mild GI complaints	Mild anxiety, dysmenorrhea, mild cramps	Mild anxiety and insomnia	Mild anxiety and insomnia	Sleep induction, anxiety-related insomnia	Mild anxiolytic and sedative	Mild anxiety and insomnia	Mild anxiety and insomnia; muscle relaxant
Contraindications	Pregnancy, breastfeeding, infants <6 months	Pregnancy, breastfeeding, <18 years	Pregnancy, breastfeeding, <18 years	Pregnancy, breastfeeding, <12 years	Pregnancy, breastfeeding, <12 years	Pregnancy, breastfeeding, <12 years	Pregnancy, breastfeeding, <12 years	Pregnancy, breastfeeding, <18 years
Drug interactions	Warfarin, statins, oral contraceptives	CNS depressants, paracetamol	CNS depressants	CNS depressants	CNS depressants	CNS depressants	CNS depressants	CNS depressants
Dosage (150 mL)	0.5–4 g, 4x/day	0.4–0.6 g, 3x/day	1–3 g, 3–4x/day	1.5–4.5 g, 3x/day	200–600 mg/day	0.5–2 g/day, 4x/day	1–2 g, 3x/day	0.5 g, 3x/day

Measurement equivalents for extemporaneous pharmaceutical preparations

Measures	Dose for solids	Dose for liquids
Coffee spoon	0.5 g	2 mL
Teaspoon	1 g	5 mL
Dessert spoon	2 g	10 mL
Tablespoon	3 g	15 mL
Teacup	—	150 mL
Coffee cup	—	50 mL

Source: https://portal-adm.campinas.sp.gov.br/sites/default/files/secretarias/arquivos-avulsos/125/2023/04/13-100034/Cartilha_Plantas_Medicinais_Campinas.pdf

Notes

Note 1: Sources used:

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Note 2: Tea shops = bulk herbal and natural product stores.

Note 3: Specialized stores = specialized herbal and natural product stores and online stores.

Note 4: Prices based on the researchers' own survey in 2023.

Note 5: Except for highlighted exceptions, teas are generally used for 3 months with a 7-day break.

Note 6: Measurement equivalents for extemporaneous pharmaceutical preparations.

