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Research Article

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Insomnia and therapeutic alternatives: Survey on the use of phytotherapy by the northern Algerian population

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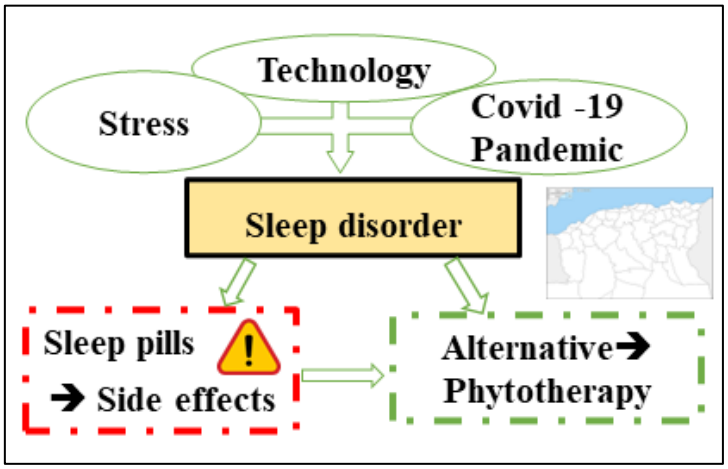
Highlights

- Around 69% of Algerians suffer from insomnia.
- Sleep disorders were associated primarily with symptoms of insomnia, poor sleep quality reduced total sleep time, and frequent awakenings during the night.
- Insomnia can harm daily life.
- Herbal medicine has proven important in regulating sleep disorders by reducing the time it takes to fall asleep, improving sleep quality and reducing tiredness.

Graphical Abstract



Abstract

The number of people suffering from sleep disorders is constantly increasing over the years. To preserve their health and avoid the use of conventional drugs (addiction, undesirable effects, toxicity, etc.), phytotherapy remains a good alternative. This study aims to identify the medicinal plants used by the Algerian population to treat sleep disorders. This was an ethnobotanical survey carried out using an electronic questionnaire concerning the population and their knowledge of the medicinal plants used, followed by bibliographical research on the plants mentioned. 197 people from the north of Algeria took part in this study, which revealed the use of 33 medicinal plants and 7 herbal products to regulate sleep or improve its quality. The use of medicinal plants is widespread in Algeria, prompting researchers to carry out various phytochemical and pharmacological studies to ensure their efficacy and detect any interactions (plants/drugs), adverse effects or toxicity.

Keywords: Insomnia; Medicinal plants; Sleep disorders; Phytotherapy.

1. Introduction

Over the years, with the advance of technology and modernization, many people have lost the sleep habits that consist of going to bed early and in quiet, dark conditions.

As a result, many people find it hard to fall asleep because of the visual (blue light from the screens of smartphones, computers, etc.) and auditory (sound from televisions, telephones, etc.) aggression at late hours when the body is supposed to be resting (Bernard, 2012).

Sleep corresponds to a decrease in the state of consciousness that separates two periods of wakefulness, and is characterized by a loss of vigilance, a reduction in muscle tone and partial retention of sensory perception (Luppi, 2017).

Sleep represents one-third of a human being's life, sleep is extremely important, allowing the body to rest physically and psychologically and contributing to growth and hormone synthesis (Marchand, 1993).

Minor sleep disorders and/or mild anxiety are very frequent reasons for consulting a general practitioner (Allaert, 2009). They manifest themselves as difficulty in falling asleep, waking up during the night with difficulty in getting back to sleep, waking up too early in the morning and/or a feeling of non-recovery sleep, and are always accompanied by consequences during the day: tiredness, difficulty concentrating or paying attention, irritability, impairment of quality of life (Vigilance, 2011).

To remedy the problem, some people use for conventional medicine (hypnotics, benzodiazepines, etc.) (Fonteneau, 2019), others change their bedtime habits by creating rituals (relaxation, calm, darkness, lowering the bedroom temperature, etc.) and others turn to green medicine such as phytotherapy and aromatherapy to avoid the undesirable effects and, above all, the risks of addiction associated with certain modern medicines.(Cassebois, 2023; Rouger & Derbré, 2014)

This study aims to identify the medicinal plants and herbal products used by the Algerian population to treat sleep disorders, particularly insomnia, and to verify the justification for this use.

2. Materials and Methods

2.1. Type of study

This was a descriptive observational cross-sectional study conducted over a 7-month period from 14 June 2020 to 20 January 2021.

2.2.Characteristics of the population

The survey was conducted among the northern Algerian population.
through an electronic questionnaire published online (given the confinement conditions), available in Arabic and French (see appendix).
The questionnaire included 22 questions, the main points of which concerned the respondent (age, sex, place of residence, level of education, duration of the sleep disorder, taking or not taking medication, etc.) and the plants used to treat sleep disorders (vernacular name, methods of obtaining, preparing and administering the plants, duration of treatment, effects of taking the plants and degree of satisfaction).

2.3.Methodology

Participants completed a strictly anonymous self-questionnaire. The data were then processed using Microsoft Excel® software and analysed using simple descriptive statistics methods.
In a second stage, the plants cited by the respondents to the questionnaire were the subject of an in-depth bibliographical search aimed at verifying the relevance of their use in cases of sleep disorders.

3. Results

A total of 197 people responded to our electronic form.

3.1.Distribution of respondents by sociodemographic and pathophysiological characteristics

Of the respondents, 168 were female (85%) and 29 males (15%) (Figure 1). The average age of the respondents was 32 years.

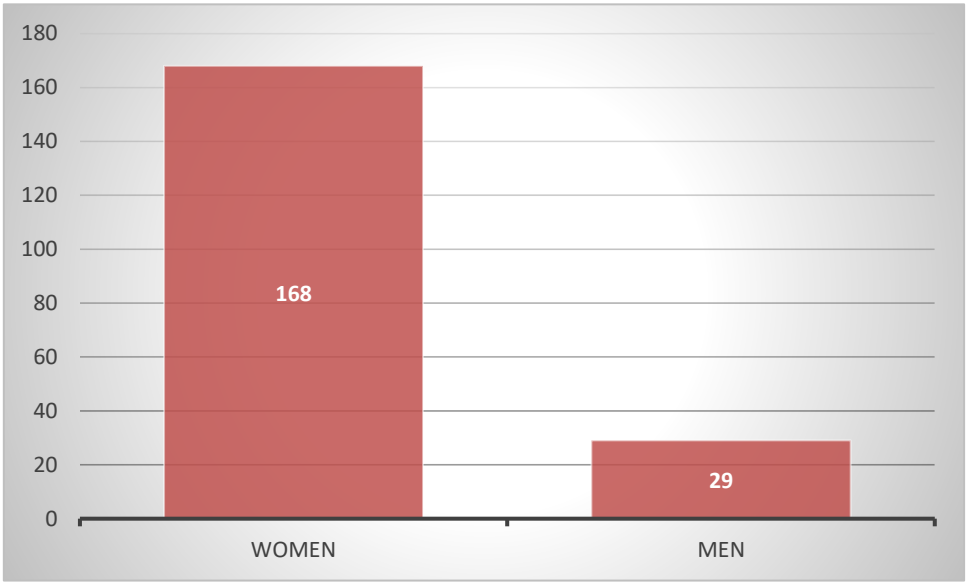


Figure 1. Number of participants by gender.

The majority of participants (93.5%) live in urban areas and have a university education (93%).

According to the responses collected, 80.5% of participants were in good health, 13% had a chronic illness such as diabetes or hypertension and 10% were pregnant or breastfeeding. The notion of taking medication was mentioned by 20% of respondents, and the drugs most frequently cited were: anti-asthmatics (bronchodilators and inhaled steroidal anti-inflammatories), antihistamines, oral antidiabetics, thyroid hormones, β-blockers, iron, vitamins (D3, B12, C), gastric antisecretory, Paracetamol and Aspégic®, antidepressants and anxiolytics. Around 69% of respondents suffer from sleep disorders (Figure 2), which manifest themselves mainly as difficulty in falling asleep, repeated awakenings during the night and waking up early in the morning.

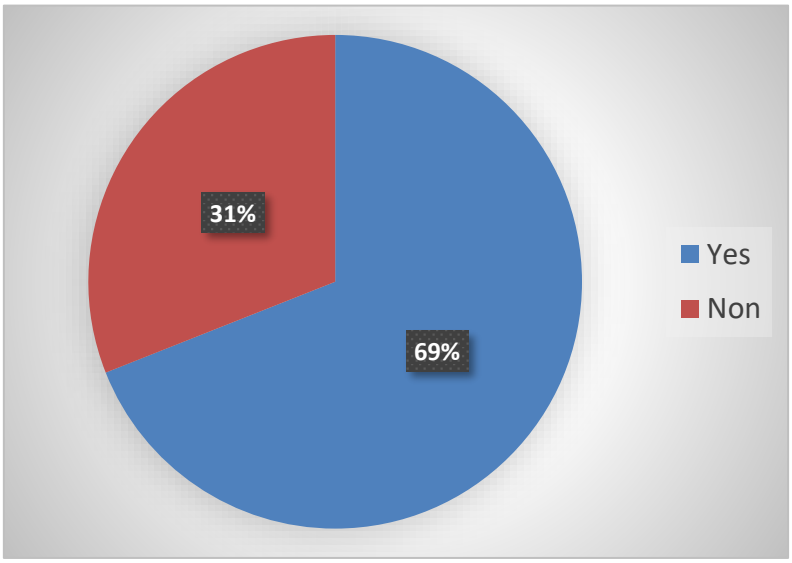


Figure 2. Distribution of participants who suffer from insomnia.

According to 57% of participants, these problems appeared after stress or a particular event (hospitalization, death, travel, etc.) (Figure 3) and date back (depending on the respondent) from several days to several years.

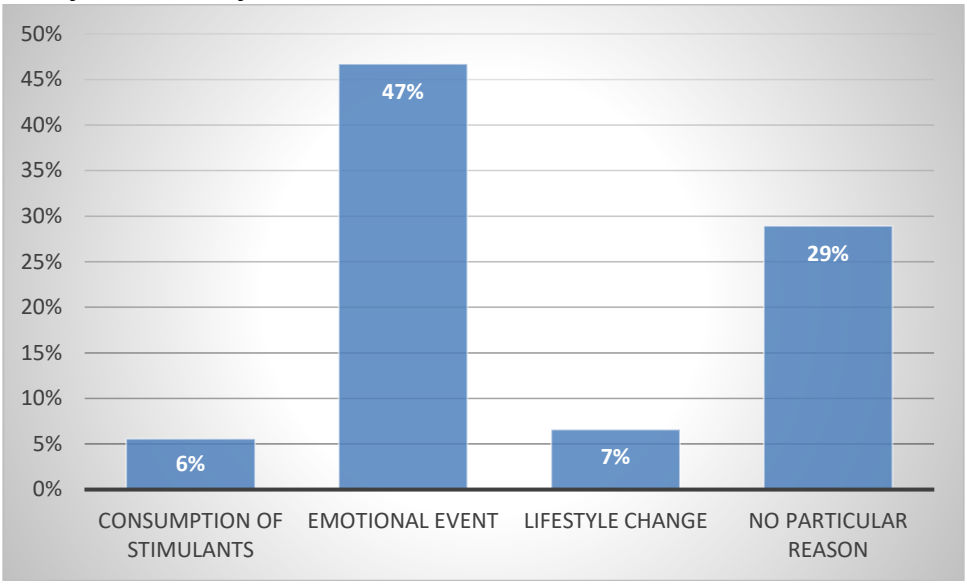


Figure 3. Distribution of participants according to the cause of sleep problems.

3.2 Use of medicinal plants for sleep disorders

Despite suffering from insomnia, only 32% of participants said they had used a treatment to remedy the problem (Figure 4).

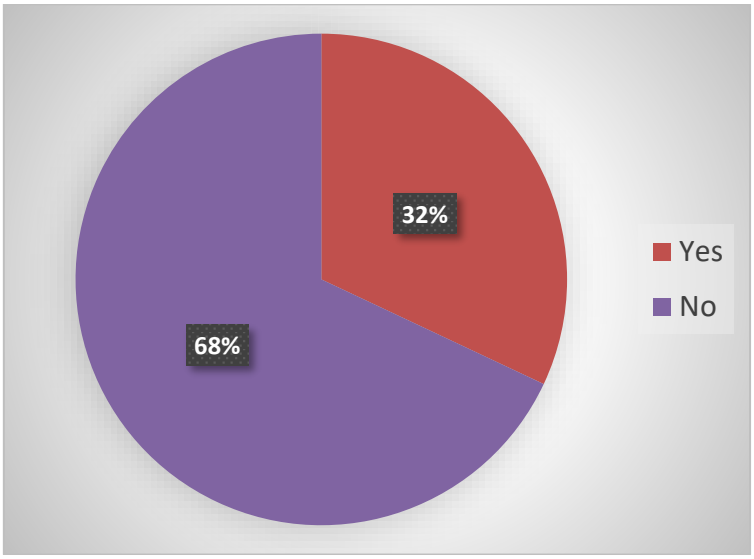


Figure 4. Distribution of participants according to use of therapy.

In 61.4% of cases, this was a natural remedy (plants, herbal tea preparations, essential oils, phytomedicines or plant-based food supplements). This natural treatment was sometimes combined with other practices (sports, meditation, yoga, relaxation, or even synthetic sleeping pills).

3.3 Medicinal plants and herbal products used by the Algerian population to treat insomnia

This survey enabled us to identify 33 medicinal plants (Figure 5) and 9 medicinal plant-based products used in the treatment of sleep disorders. These plants belong to 22 botanical families. The three most frequently cited plants are vervain, spearmint and camomile.

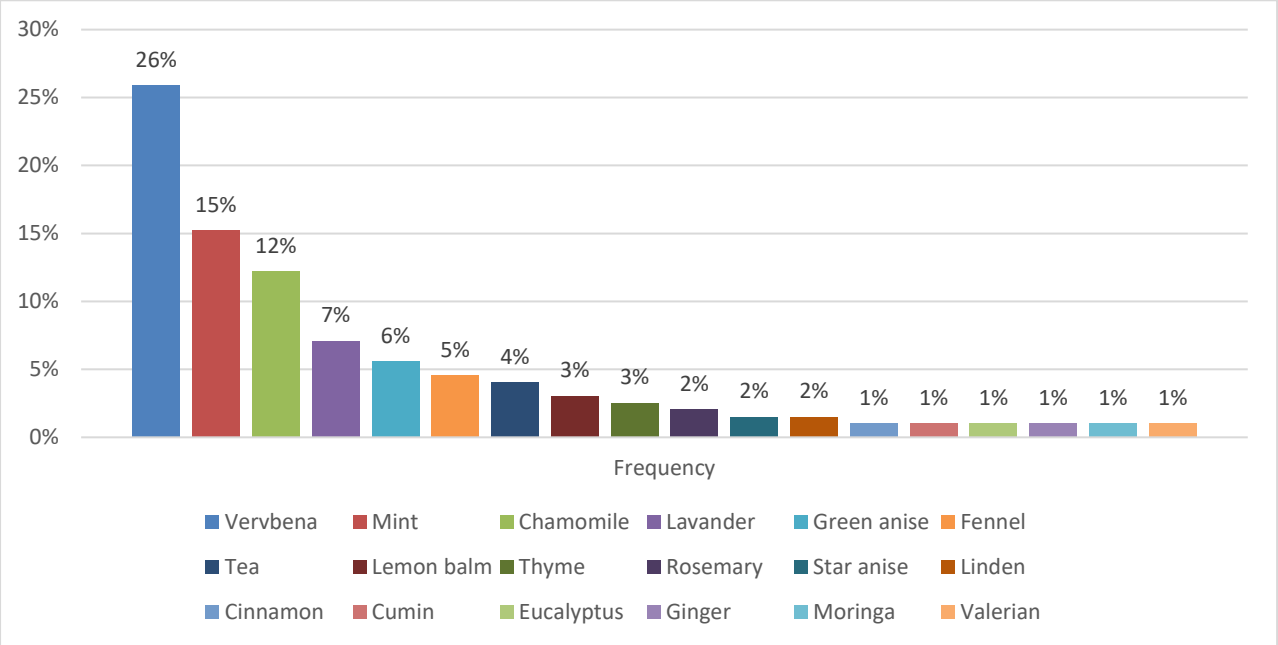


Figure 5. Frequency of use of medicinal plants.

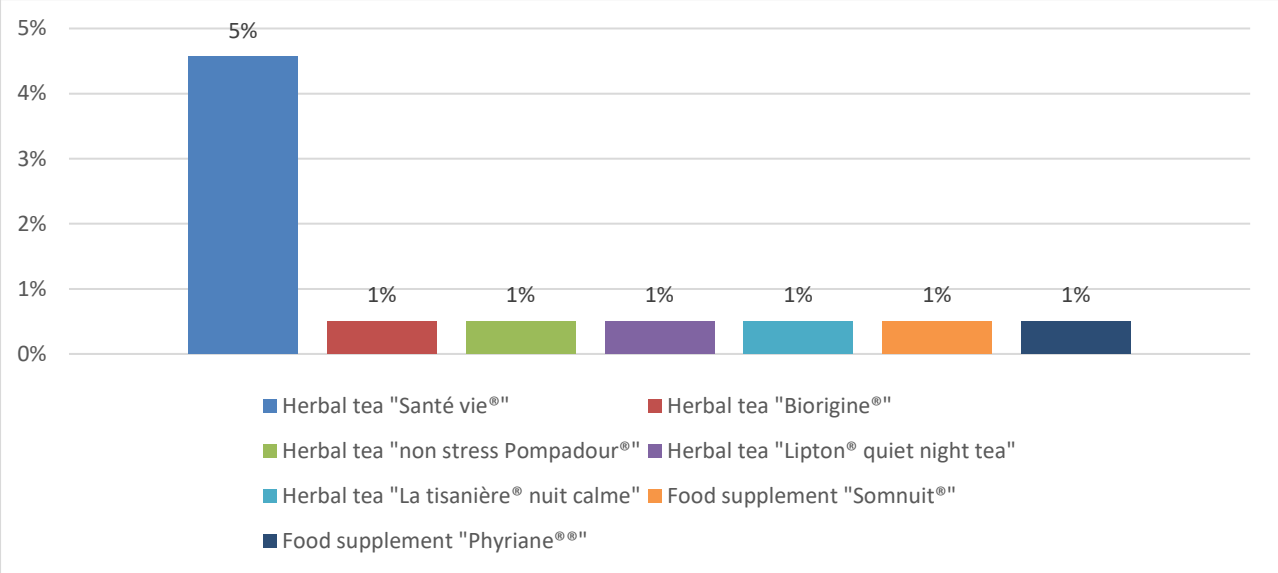


Figure 6. Frequency of use of herbal products.

Tables 1 and 2 show the medicinal plants and herbal products cited by the participants, together with the botanical family of the plant (APG III), their vernacular names (Arabic and French), their scientific names, the parts used and the composition (for herbal products).

Table 1. Medicinal plants used in the treatment of insomnia.

Plant	Part used	Common names		Scientific name	Family
		French	Arabic		
Orange	Leaves	Orange	برتقال	*Citrus sinensis*	Rutaceae
Mint	Leaves	Menthe verte	النعناع	*Mentha spicata* L.	Lamiaceae
Lavender	Aerial parts	Lavande officinale	الخزامى	*Lavandula angustifolia* Mill.	Lamiaceae
Verbena	Leaves	Verveine odorante	لويزة	*Aloysia citrodora* Palàu	Verbenaceae
Tea	Leaves	Thé vert	شاي أخضر	*Camellia sinensis* L. Kuntze	Theaceae
Chamomile	Flowering tops	Camomille	البابونج	*Matricaria chamomilla* L.	Asteraceae
Green anise	Fruits	Anis vert	حبات حلاوة	*Pimpinella anisum* L.	Apiaceae
Ginger	Rhizome	Gingembre	زنجبيل	*Zingiber officinale* Roscoe	Zingiberaceae
Lemon balm	Flowering tops	Mélisse/ Citronnelle	بلسم الليمون	*Melissa officinalis* L.	Lamiaceae
Fennel	Fruits	Fenouil	البسباس	*Foeniculum vulgare*	Apiaceae
Eucalyptus	Leaves	Eucalyptus	كاليتوس	*Eucalyptus globulus* Labill.	Myrtaceae
Thyme	Leaves and flowering tops	Thym	زعيترة	*Thymus vulgaris*	Lamiaceae
Rosemary	Leaves and flowering tops	Romarin	إكليل الجبل	*Rosmarinus officinalis* L.	Lamiaceae
Cherry	Stalk (Tail)	Cerise	كرز	*Prunus cerasus*	Rosaceae
Cinnamon	Bark	Cannelle de Ceylan	قرفة سيلان	*Cinnamomum zeylanicum*	Lauraceae
Sage	Leaves	Sauge officinale	المرامية	*Salvia officinalis*	Lamiaceae
Hibiscus	Flowers	Hibiscus/karkadé/ Oseille de Guinée	كركديه	*Hibiscus sabdariffa*	Malvaceae
St John's Wort	Flowering tops	Millepertuis/ Herbe de la Saint-Jean	نبتة سانت جون	*Hypericum perforatum* L.	Hypericaceae
Passionflower	Flowers	Fleur de la passion	زهرة العاطفة	*Passiflora incarnata*	Passifloraceae

Nettle	Leaves	Ortie	نبات القراص	*Urtica dioica* L.	Urticaceae
Olive	Leaves/ Oil	Olive	زيتون	*Olea europaea*	Oleaceae
Cumin	Fruits	Cumin	كمون	*Cuminum cyminum* L.	Apiaceae
Linden	Flowers & bracts	Tilleul	الزيزفون	*Tilia cordata* Mill.	Tiliaceae
Clove	Flower buds	Girofle	القرنفل	*Eugenia caryophyllata* Thunb.	Myrtaceae
Oregano	Leaves	Origan	زعتر	*Origanum vulgare*	Lamiaceae
Star anise	Fruit	Badiane de Chine	الينسون	*Illicium verum*	Illicaceae
Laurel	Leaves	Laurier commun	رند	*Laurus nobilis*	Lauraceae
Moringa	Leaves	Moringa	المورينجا	*Moringa oleifera*	Moringaceae
Valerian	Root	Valériane	فاليريان	*Valeriana officinalis*	Caprifoliaceae
White artemisia	Leaves	Armoise blanche	الشيح	*Artemisia herba alba*	Asteraceae
Soja	Seeds	Soja	الصويا	*Glycine max* L. Merr	Fabaceae
Peppermint	Leaves	Menthe poivrée	نعناع فلفلي	*Mentha piperita*	Lamiaceae
Henna	Leaves	Henné	حناء	*Lawsonia inermis*	Lythraceae

Table 2. Herbal products used in the treatment of insomnia.

Herbal product	Composition	Parts of plant used	Common names		Scientific name	Family
			French	Arabic		
Pompadour® Non stress (Herbal tea)	Linden	Flowers and bracts	Tilleul	الزيزفون	*Tilia cordata*	Tiliaceae
	Lemon verbena	Leaves	Verveine citronnée	لويزة	*Aloysia citrodora*	Verbenaceae
	Lavender	Aerial parts	Lavande	الخزامى	*Lavandula angustifolia*	Lamiaceae
	Chamomile	Flowering tops	Camomille	البابونج	*Matricaria chamomilla*	Asteraceae
	Lemon balm	Leaves	Mélisse	بلسم الليمون	*Melissa officinalis*	Lamiaceae
	Mint	Leaves & flowers	Menthe	النعناع	*Mentha spicata*	Lamiaceae
	Sage	Leaves	Sauge	المريمية	*Salvia officinalis*	Lamiaceae
Biorigine® (Herbal tea)	Verbena	Leaves	Verveine odorante	لويزة	*Aloysia citrodora*	Verbenaceae
	Lemon balm	Leaves and flowering tops	Mélisse	بلسم الليمون	*Melissa officinalis*	Fabaceae
	Licorice	Rhizome	Réglisse	عرق السوس	*Glycyrrhiza glabra*	Lamiaceae
	Fennel	Fruits	Fenouil	البسباس	*Foeniculum vulgare*	Apiaceae
Lipton ® quiet night tea (Herbal tea)	Linden	Flowers & bracts	Tilleul	الزيزفون	*Tilia cordata*	Tiliaceae
	Chamomile	Flowering tops	Camomille	البابونج	*Matricaria chamomilla*	Asteraceae
	Lavender	Aerial parts	Lavande	خزامى	*Lavandula angustifolia*	Lamiaceae
	Orange	Flowers & leaves	Orange	البرتقال	*Citrus sinensis*	Rutaceae

Tisanière® nuit calme (Herbal tea)	Chamomile	Flowering tops	Camomille	البابونج	*Matricaria chamomilla*	Asteraceae
	Linden	Flowers & bracts	Tilleul	الزيزفون	*Tilia cordata*	Tiliaceae
Santé vie® Sommeil (Herbal tea)	Silver lime	Flowers & bracts	Tilleul	الزيزفون	*Tilia cordata*	Tiliaceae
	Orange	Flowers & leaves	Orange	البرتقال	*Citrus sinensis*	Rutaceae
	Bitter orange	Leaf	Oranger amer/ Bigaradier	برتقال المر	*Citrus aurantium*	Rutaceae
	Apple	Pulp	Pomme	التفاح	*Malus domestica*	Rosaceae
Phyriane® sommeil (Food supplement)	Valerian	Root	Valériane	فاليريان	*Valeriana officinalis*	Caprifoliaceae
	Passionflower	Flowers	Fleur de la passion	زهرة العاطفة	*Passiflora incarnata*	Passifloraceae
	Hawthorn	Flowering tops	Aubépine	الزعرور	*Crataegus oxyacantha*	Rosaceae
	Hop	Inflorescence cone	Houblon	نبات القفزة	*Humulus lupulus*	
Somnuit ® (Food supplement)	Valerian	Root	Valériane	فاليريان.	*Valeriana officinalis*	Caprifoliaceae
	Passionflower	Flowers	Fleur de la passion	زهرة العاطفة	*Passiflora incarnata*	Passifloraceae
	Lemon balm	Flowering tops	Mélisse	بلسم الليمون	*Melissa officinalis*	Fabaceae

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The recipes were mainly prepared by infusion (91.9%). The daily dosage and duration of treatment varied and depended, in the majority of cases, on need. 33% of respondents used natural remedies following advice from a specialist (doctor and/or pharmacist), 10% were advised by an herbalist, while the rest relied on knowledge acquired from family, television, the Internet or books. 90% of our informants observed an improvement in their general condition after taking a natural treatment, with positive effects such as deeper sleep, reduced alertness and aggressiveness, and a feeling of well-being, relaxation and zenitude (Figure 7).

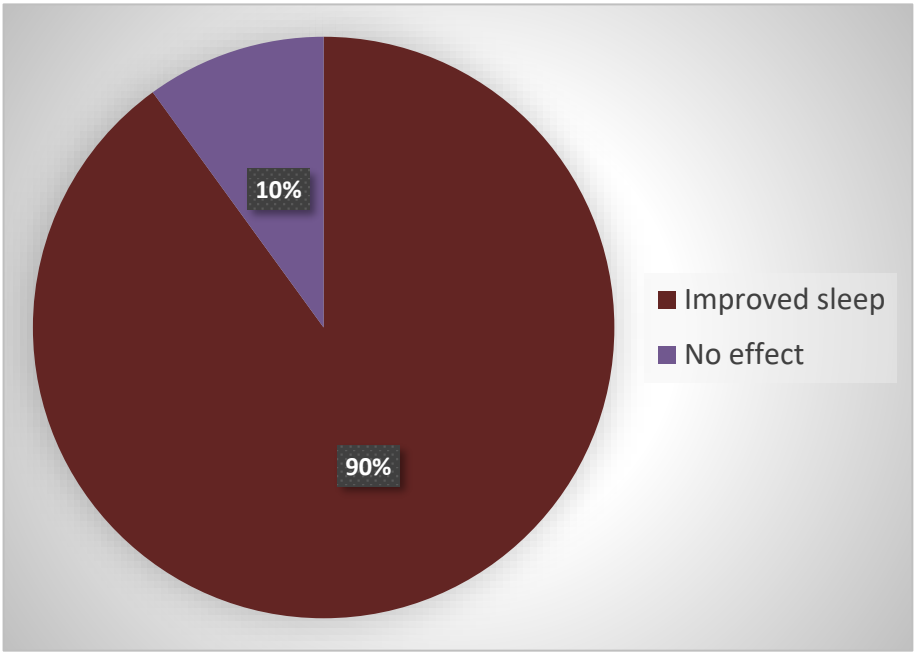

Figure 7. Distribution of participants according to their feelings after using a natural treatment.

4. Discussion

This ethnobotanical survey revealed that 69% of our respondents suffer from insomnia, whereas 15 to 20% of the French population is affected according to the National Institute of Health and Medical Research (Inserm) (Adrien, 2017). This difference can be explained on the one hand by the nature of the survey that was conducted online only and therefore only accessible to part of the population that uses connected electronic devices (smartphone, computer, tablet, etc.), and on the other hand by the exceptional health crisis caused by the CoronaVirus 2019 (Covid-19) that the whole world was going through, upsetting everyone's habits (confinement, stress, fear (of illness, death, loss of a loved one, etc.). A study revealed that 56% of participants suffered from poor-quality sleep during the lockdown period compared to the period before the confinement. (Bertrand et al., 2022)

This pathology is triggered by a multitude of causes, including the occurrence of a particular event (tension/stress/emotional shock following a death, hospitalization, etc.), which corresponds to 57% of respondents, 33% of whom say that it occurred for no apparent reason.

This may be due to age (sleep quality decreases with age), genetic variations (short sleepers get 6 hours of sleep or long sleepers get 9 hours of sleep), pathological disorders (neurological or psychiatric conditions (Alzheimer's, Parkinson's, etc.), vascular or metabolic disorders (heavy meals before bedtime, hyperthyroidism, diabetes, menopause, etc.). Or physiological disorders: lack of cooling of the body, vegetative disorders, alteration of the nychthemeral rhythm (travel, staggered working hours, etc.), which affects 10% of our respondents (Glomot, 2017; Goetz, 2011; Marchand, 1993).

Analysis of the survey results showed that almost 61% of respondents use a natural remedy.

Almost 61% of people undergoing treatment use a natural remedy and that nearly 31.8% of the population who responded to the questionnaire use a treatment for insomnia and only 61% use a natural remedy (Plants, phytomedicines, EO, etc.). A few years ago, people suffering from insomnia were treated exclusively with conventional drugs such as hypnotics, anxiolytics, benzodiazepines, etc., which have several undesirable effects such as addiction, daytime sleepiness, dependence and the risk of withdrawal syndrome when treatment is stopped (Hennebelle et al., 2007)

Herbal medicine is an interesting alternative (Cassebois, 2023) to the use of hypnotic drugs because of the relative safety (few reports of serious adverse effects) guaranteed by the use of plants that have been consumed for a long time (De Sousa, 2013; Hennebelle et al., 2007). However, the use of these plants is not completely harmless, the pharmacist must remind patients of certain precautions and recommendations. (Fonteneau, 2019; Létard et al., 2015)

Over the last decade, many herbal medicines have been used to treat anxiety disorders. Statistics show that more and more people in Europe, North America and Australia are consulting phytotherapy professionals, herbalists, naturopaths and other healers, in addition to doctors, and using medicinal plants. According to one study, 44% of psychiatric patients suffering from anxiety disorders had used medicinal plants (De Sousa, 2013; Kumar, 2006).

According to respondents, the plants most frequently cited and used for sleep disorders, particularly insomnia, were verbena, mint and camomile. The results of one study showed that verbena has a rich chemical composition, with active ingredients with sedative potential (citral, limonene, a sedative monoterpene, and linalool, a terpene alcohol with sedative properties), suggesting that it can be used to treat anxiety, stress and insomnia and that it is safe to use in therapeutic doses (Bertrand, 2017; Makram et al., 2015). Another study by Colombian researchers, based on a battery of tests, concluded that spearmint leaf has anxiolytic and hypnotic effects, demonstrating the benefits of using this plant for insomnia. (Caro et al., 2018).

Several studies have been carried out on German chamomile and the results have demonstrated its sedative effect (Petitet, 2016). Another study carried out on 80 post-partum women to assess the impact of a chamomile infusion showed a significant improvement in sleep quality and depressive symptoms (Chang & Chen, 2016). It should be noted that not all the plants mentioned have a proven sedative effect, but can improve sleep quality. Fennel, for example, has an antispasmodic effect (Létard et al., 2015), particularly on pain associated with digestive disorders, which calms these spasms and gives the patient a restful sleep. Cinnamon, for its part, is not known for its sedative effects, but is mainly used in combination with other plants such as hops to mask its strong, bitter taste (Gony & Petitet, 2016).

Green tea leaves contain caffeine (2 to 4% of the dry weight of the drug), as well as other purine bases: theophylline and theobromine. Caffeine acts on the nervous system, increasing alertness

and reducing fatigue, but can also increase pre-existing anxiety and alter sleep quality, particularly when consumed in excess or by sensitive individuals (Bertrand, 2017). Green tea is often wrongly cited as a remedy for insomnia, and this is often due to name confusion, as some people regard tea infusion as mint infusion, which is known to be sedative. These plants are overflowing with active ingredients, and to extract them and benefit from all their effects, an aqueous solution is prepared from previously dried plant material by immersing it in a hot or cold aqueous solution, most often as an infusion (fragile "leaf/flower" material), as was the case for 91.9% of our respondents, but also as a decoction ("root, stem, bark or fruit" material) (Bertrand, 2017; Fonteneau, 2019).

Undesirable/toxic effects and interactions associated with the use of the plants mentioned. Although most of the plants cited by respondents to the questionnaire were found to be justified for use in cases of sleep disorders, a large number of them have undesirable/toxic effects ranging from a simple headache to life-threatening effects (Fattinger & MeierAbt, 2003). What's more, these plants, considered by most users to be harmful, are generally taken in combination with synthetic medicines, which could in some cases be the cause of plant/drug interactions. Consumers are generally unaware of this interaction, which can lead to considerable changes in the pharmacokinetics or pharmacological effect of the drug.

5. Conclusions

Insomnia is a public health problem because it is a pathology that has a significant impact on the mental and physical health of patients.

Pharmacists but also herbalists are called upon for the management of insomnia. Our survey highlighted around thirty plants used to relieve sleep disorders. The pharmacist must ensure the proper use of these plants to warn patients of possible side effects interactions with medications and the risks of overdose because not everything that is natural is necessarily safe.

6. Patents

The authors declare that they have no links of interest.

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Appendix:

Survey:

Questionnaire

1. **Vous êtes : 1. Vous êtes أنتم**
    - Homme
    - Femme
2. **Quel âge avez-vous ? السن**

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3. **Vous habitez en milieu : هل تعيش في منطقة**
    - Urbain حضرية
    - Rural ريفية
4. **Quel est votre niveau d'instruction? ما هو مستواك التعليمي**
    - Universitaire جامعي
    - Secondaire ثانوي
    - Moyen متوسطة
5. **Vous êtes أنتم**
    - En bonne santé في صحة جيدة
    - Souffrant d'une maladie chronique (Hypertension artérielle, diabète) تعاني من مرض مزمن (ارتفاع ضغط الدم والسكري)
    - Femme enceinte ou allaitante المرأة الحامل أو المرضعة

6. **Prenez-vous un(des) médicament(s) particulier(s) ? هل تتناول أي دواء (أدوية) معين؟**
    - Oui نعم
    - Non لا

7. **Si oui, le(s)quel(s) ? إذا كانت الإجابة بنعم، أي منها؟**

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8. **Avez-vous une insomnie ? تعاني من الأرق؟**

- Oui نعم
- Non لا

9. **Si oui, s'agit-il de: إذا كانت الإجابة السابقة نعم ، فهل هي**
    - Difficulté d'endormissement صعوبة النوم
    - Réveils au cours de la nuit الاستيقاظ أثناء الليل
    - Réveil matinal précoce الاستيقاظ في الصباح الباكر

10. Vous souffrez de trouble du sommeil : كنت تعاني من اضطراب النوم

- من حين اخر De façon occasionnelle
- De façon constante بثبات

11. Vous souffrez de trouble du sommeil : Depuis quand? pendant combien de temps (jours /semaines /mois)? أنت تعاني من اضطراب النوم: منذ متى؟ ما هي المدة (أيام / أسابيع / شهور)؟

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12. Ces troubles sont apparus : ظهرت هذه الاضطرابات:

- Sans raison apparente دون سبب واضح
- Suite à un stress/ événement particulier : hospitalisation, décès d'un proche, problèmes personnels ou professionnels بعد ضغط / حدث معين: الاستشفاء ، وفاة شخص عزيز ، مشاكل شخصية أو مهنية
- Suite à un changement d'environnement (déménagement, un voyage (décalage horaire) (... بعد تغير البيئة (تتحرك، رحلة (اضطراب الرحلات الجوية الطويلة)
- Suite à la consommation d'excitants (café, thé, boissons énergisantes, vitamines, tabac, alcool, autres

متابعة استهلاك المنشطات (القهوة والشاي ومشروبات الطاقة والفيتامينات والتبغ والكحول وغيرها ...)

13. Avez-vous déjà été anxieux(se) ou dépressif(ve) ?

- Oui نعم
- Non لا

14. Utilisez-vous un remède contre l'anxiété et le manque de sommeil ? هل تستعمل دواء ضد الأرق و قلة النوم؟

- Oui نعم
- Non لا

15. Si oui, il s'agit de إذا كانت الإجابة بنعم ، أيهم؟

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16. Si vous avez utilisé des plantes pour tisane, des huiles essentielles ou des phytomédicaments, c'était en suivant le conseil إذا كنت تستخدم نباتات الشاي العشبية أو الزيوت الطيارة أو الأدوية النباتية ، فقد كان ذلك باتباع النصيحة

- من أخصائي (طبيب / صيدلي) (D'un spécialiste (médecin/ pharmacien
- شوهد على التلفزيون / الإنترنت Vu à la télévision / internet
- من شخص عزيز / صديق (علاج الجدة) (D'un proche/ ami (remède de grand-mère
- اقرأ على كتاب Lu sur un livre

17. D'où vous vous procurez ces remèdes naturels ؟ من أين تحصل على هذه العلاجات الطبيعية؟

- Chez un herboriste العشاب

- Chez un pharmacien عند الصيدلي
- Récolté dans votre jardin يحصد في حديقتك
- Sur internet على شبكة الانترنت
- Récolté dans la forêt/ un champ/ les montagnes تحصد في الغابة / الحقل / الجبال

18. Quels sont ces remèdes (Nom de la plante, tisanes ou nom commercial du phytomédicament) (اسم النبات ، شاي الأعشاب أو الاسم التجاري لطب الأعشاب)ما هذه العلاجات

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19. S'il s'agit de plantes, vous les préparez comment ? إذا كانت نباتات ، كيف تحضرها؟

- Infusion (plonger la plante dans de l'eau bouillante 5-10min puis filtrer, (يغمر النبات في الماء المغلي 5-10 دقائق ثم يصفى
- Décoction (faire bouillir la plante à feu doux 2-15 min selon la partie utilisée « feuilles/ racine/ tige » puis filtrer (غلي النبات على حرارة منخفضة 2-15 دقيقة حسب الجزء (المستخدم "أوراق / جذر / ساق" ثم مرشح

20. A quelle fréquence prenez-vous ces plantes ? et pendant combien de jours ? كم مرة تأخذ هذه النباتات؟ وكم يوما؟

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21. Quels effets sont apparus suite à la consommation de ces plantes ? ما هي الآثار التي ظهرت من استهلاك هذه النباتات؟

- Pas d'effets.
- Un meilleur sommeil نوم أفضل
- Diminution de l'agressivité انخفاض العدوانية
- Diminution de la fatigue انخفاض التعب

22. Que pensez-vous de l'efficacité des remèdes naturels ? ما رأيك في فعالية العلاجات الطبيعية؟

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