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(RESEARCH ARTICLE)

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Evaluation of the use of phytotherapy in the management of thyroid disease and diabetes among healthcare professionals

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Abstract

Phytotherapy, based on the traditional use of medicinal plants, is attracting growing interest for the management of diabetes and thyroid disorders. This study aims to assess the knowledge and attitudes of Algerian healthcare professionals regarding the use of phytotherapy for these conditions. A survey was conducted via a paper and online questionnaire distributed among pharmacists, doctors, nurses, and other health professionals. Analysis reveals that most have basic training in phytotherapy, but few hold formal qualifications. Pharmacists appear more open to recommending medicinal plants for diabetes, whereas caution predominates regarding thyroid disorders. The most commonly cited plants include ashwagandha, lycopus, atriplex, lemon balm, and ginseng for thyroid health, and garlic, artemisia, chamomile, and fenugreek for diabetes. Nevertheless, medicinal plants are largely seen as complementary rather than substitutive to conventional treatments. Approximately 30% of users report side effects, mainly digestive disturbances and allergic reactions. Main contraindications involve pregnant women, breastfeeding women, and children. Although cross-effects between phytotherapy, diabetes, and thyroid disorders are biologically plausible, they are rarely recognised by professionals, highlighting the need for further research. This study emphasizes the necessity of medical supervision, enhanced education, and increased vigilance to ensure the safe integration of medicinal plants into clinical practice.

Keywords: Phytotherapy; Diabetes; Thyroid Disorders; Healthcare Professionals; Medicinal Plants; Algeria

1. Introduction

Phytotherapy, an integral discipline in the history of pharmacy, is based on the use of medicinal plants to prevent or treat various diseases (1,2). Although advances in chemical synthesis have transformed the therapeutic landscape over the last hundred years, traditional medicine remains the main recourse for a large proportion of the world's population (3). This growing interest in phytotherapy offers new opportunities for the discovery of natural molecules with promising therapeutic properties (4). Many of today's medicines are derived from active substances of plant origin (5).

Healthcare professionals play a key role in promoting plant-based treatments, contributing to prevention, patient education and the integration of phytotherapy into modern medical practice (3). Among the pathologies that can be treated with medicinal plants, diabetes and thyroid disorders feature prominently (6).

Diabetes, a chronic metabolic disease common in Algeria (6), is associated with serious complications (7). Diabetic patients are increasingly turning to medicinal plants with hypoglycaemic properties as a complementary treatment, underlining the important role of phytotherapy in preventing complications associated with this condition (8).

On the other hand, thyroid disorders are among the most common in the world. This is leading a growing number of patients to turn to medicinal plants as an alternative treatment (9). However, the number of plants with thyroid stimulating or regulating activity remains limited, particularly among European species. Examples include Fucus

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vesiculosus (kelp), oats, Lycopus europaeus and elecampane (Inula helenium) (10). In this context, the role of healthcare professionals appears fundamental in the integration of phytotherapy in the treatment of diabetes and thyroid disorders. Their ability to recommend natural approaches in an informed manner, to inform patients and to encourage the safe use of medicinal plants helps to enhance the overall effectiveness of therapeutic care. Their expertise is therefore an essential lever for promoting and supervising the use of plant resources as a complement to conventional treatments.

1.1. Main objective

This study aims to assess healthcare professionals' knowledge of the use of phytotherapy in the treatment of diabetes and thyroid disorders, highlighting their role in promoting these natural approaches to patients.

2. Materials and methods

This study was conducted by means of a survey of healthcare professionals, which followed the following process

2.1. Development of the questionnaire

- Documentary research carried out on search engines: Google scholastic, pub Med, sciences direct, SCI Finder and university libraries and databases of Algerian universities, By introducing the key words: Phytotherapy, Algeria, Diabetes, Thyroid disorders, Hypothyroidism, Hyperthyroidism, Hyperglycaemia, Hypoglycaemia, medicinal plants, Traditional medicine (1,5,10,11,12,13,14,15,16).
- Design of a questionnaire adapted to the target population, followed by validation by the supervisor to guarantee the reliability of the data.
- Distribution of the questionnaire using two different methods:
  - Paper version (hand-delivered in the Algiers region)
  - Digital version by sharing the Google docs link (via QR code):
  - https://docs.google.com/forms/d/e/1FAIpQLSdDzgLFY ncNKZJXfnxM6pZgZGzVq61L0KzJg7LgR- IjcDdOw/viewform?usp=sharing

- The survey data was subjected to a two-stage analysis
  - Initial processing in Microsoft Excel 2019
  - Followed by statistical analysis

2.2. Period

from 20 November 2024 to 20 February 2025 (duration = 3 months)

2.3. Inclusion criteria

healthcare professionals and relatives: any person residing and practising in Algeria and belonging to the healthcare profession: pharmacist, doctor, nurse....

2.4. Non-inclusion criteria

any person who does not meet the above conditions.

2.5. Exclusion criteria

any form that is incorrectly completed or incomplete.

2.6. Study bias

- There is little scientifically validated literature on the same subject.
- There are very few experts in the field who could serve as references.

3. Results

The results of the survey are shown in table (I) and in the figures (1.2.3.4.5.6.7.8.9.10.11.12.13.14):

Table 1 Number of rests collected according to the type of (HCP: Health Professional)

Profession (HCP)	Number
Pharmacist	179
Doctor	51
Nurse	20
Other	36
Total	**286**

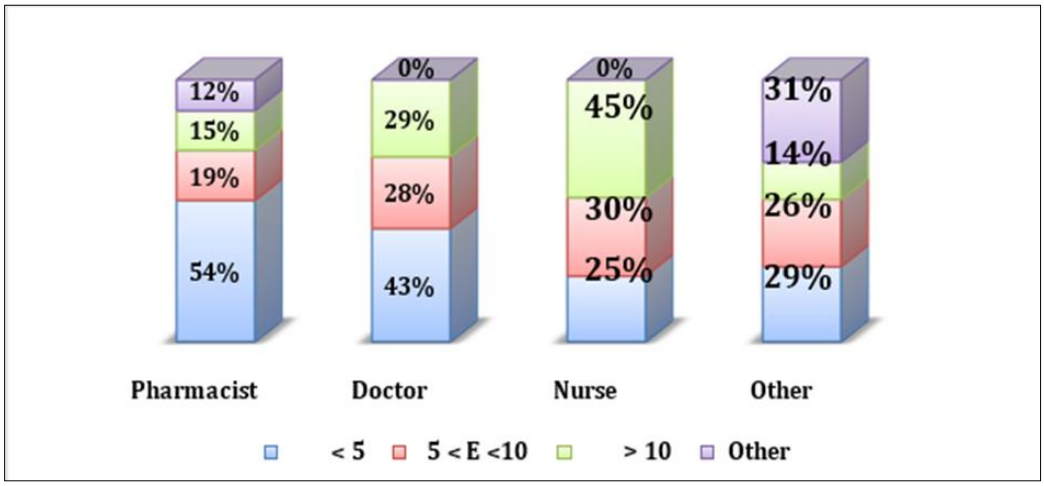

Figure 1 Distribution of participants according to length of professional practice

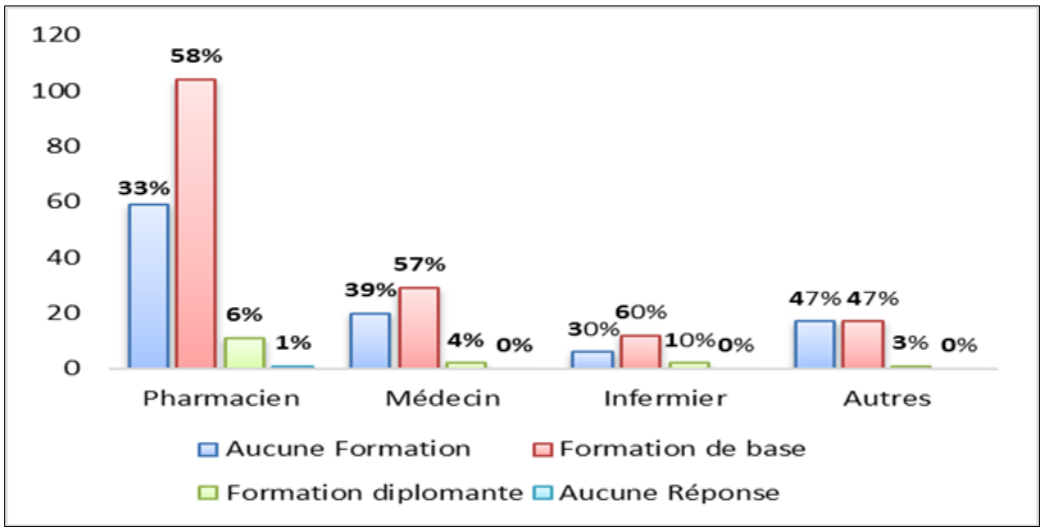

Figure 2 Distribution of healthcare professionals according to their level of training in herbal medicine

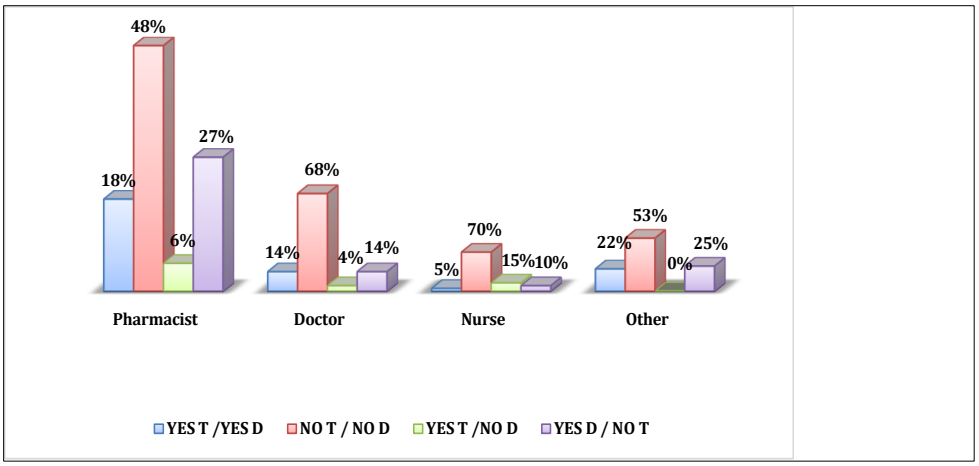

Figure 3 Recommendations for medicinal plants in the treatment of diabetes and thyroid disorders

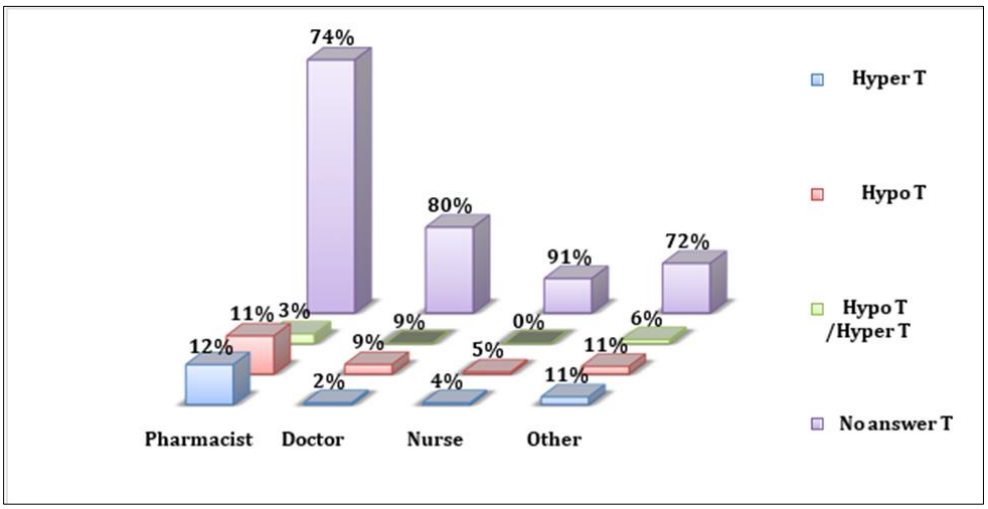

Figure 4 Recommendations of medicinal plants for thyroid disorders

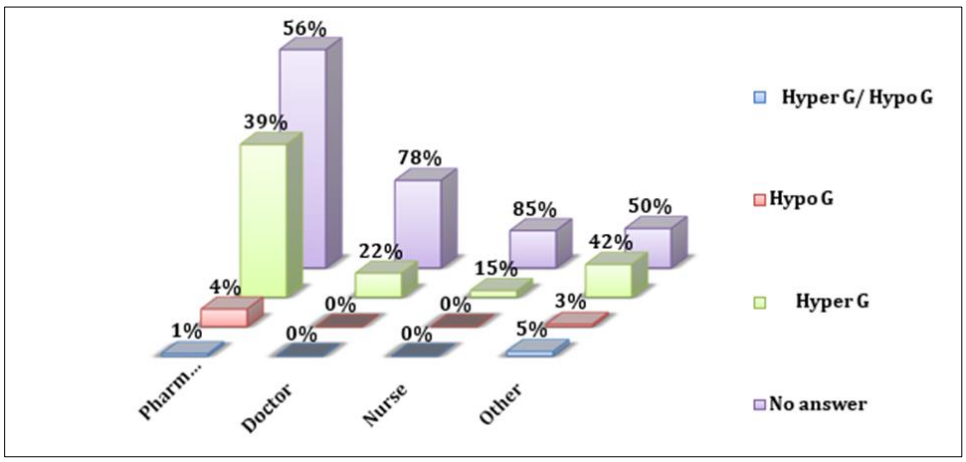

Figure 5 Medicinal plant recommendations for diabetes

Table 2 Medicinal plants for thyroid disorders

French name	Arabic name	*Scientific name*	Family	Number of citations
Ashwagandha	الأشواغاندا	*Withania somnifera*	Solanaceae	11
Lycope	اللوبيليا الأوروبي	*Lycopus europaeus*	Lamiaceae	3
Atriplex	الرمرام	*Atriplex spp*	Amaranthaceae	1
Ginseng	الجنسنغ	*Panax ginseng*	Araliaceae	2
Chia seed	بذور الشيا	*Salvia hispanica*	Lamiaceae	2
Flax seed	بذور الكتان	*Linum usitatissimum*	Linaceae	6
Nettle	القراص	*Urtica dioica*	Urticaceae	2
Lemon balm	المليسة	*Melissa officinalis*	Lamiaceae	8
Common sage	المريمية الطبية	*Salvia officinalis*	Lamiaceae	3
Earth nut	جوز الأرض	*Cyperus esculentus*	Fabaceae	4
Rosemary	إكليل الجبل	*Salvia rosmarinus*	Lamiaceae	6
Bertholletia (Brazil nut)	جوز البرازيل	*Bertholletia excelsa*	Lecythidaceae	1
Red clover	النفل الأحمر	*Trifolium pratense*	Fabaceae	3
Total	**-**	**-**	**-**	**52**

Table 3 Medicinal plants for diabetes

French name	Arabic name	*Scientific name*	Family	Number of citations
Garlic	الثوم	*Allium sativum*	Liliaceae	1
Mugwort	الشيح	*Artemisia vulgaris*	Asteraceae	3
Chamomile	البابونج	*Matricaria chamomilla*	Asteraceae	6
Cinnamon	القرفة	*Cinnamomum verum*	Lauraceae	42
Fenugreek	الحلبة	*Trigonella foenum-graecum*	Fabaceae	18
Common sage	المريمية الطبية	*Salvia officinalis*	Lamiaceae	4
Mint	النعناع	*Mentha spicata*	Lamiaceae	2
Ginger	الزنجبيل	*Zingiber officinale*	Zingiberaceae	18
Olive tree (leaves)	ورقة الزيتون	*Olea europaea*	Oleaceae	25
Morinaga (Leaves)	مورينغا	*Moringa oleifera*	Moringaceae	1
Parsley	البقدونس	*Petroselinum crispum*	Apiaceae	2
Eucalyptus	الكافور	*Eucalyptus globulus*	Myrtaceae	4
Chia seed	بذور الشيا	*Salvia hispanica*	Lamiaceae	2
Chicory	الهندباء	*Cichorium intybus*	Asteraceae	2
Licorice	العرقسوس	*Glycyrrhiza glabra*	Fabaceae	2
Turmeric	الكركم	*Curcuma longa*	Zingiberaceae	3
Fig tree	التين	*Ficus carica*	Moraceae	1

Thyme	الزعتر	*Thymus vulgaris*	Lamiaceae	1
Nettle	القراص	*Urtica dioica*	Urticaceae	3
Lemon	الليمون	*Citrus limon*	Rutaceae	1
Ginseng	الجنسنغ	*Panax ginseng*	Araliaceae	3
Rosemary	إكليل الجبل	*Salvia rosmarinus*	Lamiaceae	2
Green tea	الشاي الأخضر	*Camellia sinensis*	Theaceae	5
Carob tree	الخروب	*Ceratonia siliqua*	Fabaceae	1
Celery	الكرفس	*Apium graveolens*	Apiaceae	1
Total	**-**	**-**	**-**	**153**

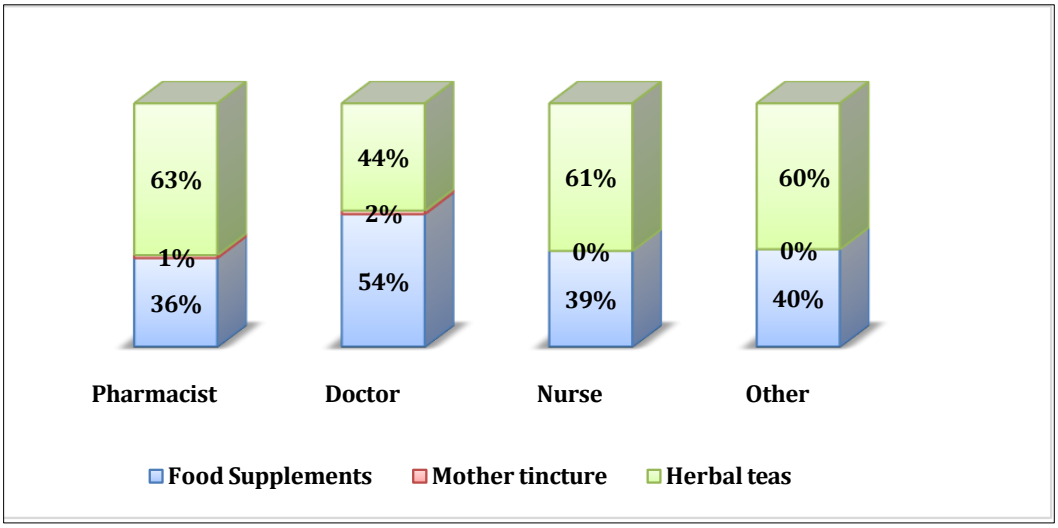

Figure 6 Main form of administration of medicinal plants according to participants

In addition to the traditional forms, other ways of administering medicinal plants were reported: injections, syrups, capsules, ingestion with meals, direct oral administration, or incorporation into gastronomic recipes. These practices reflect the diversity of traditional and modern uses.

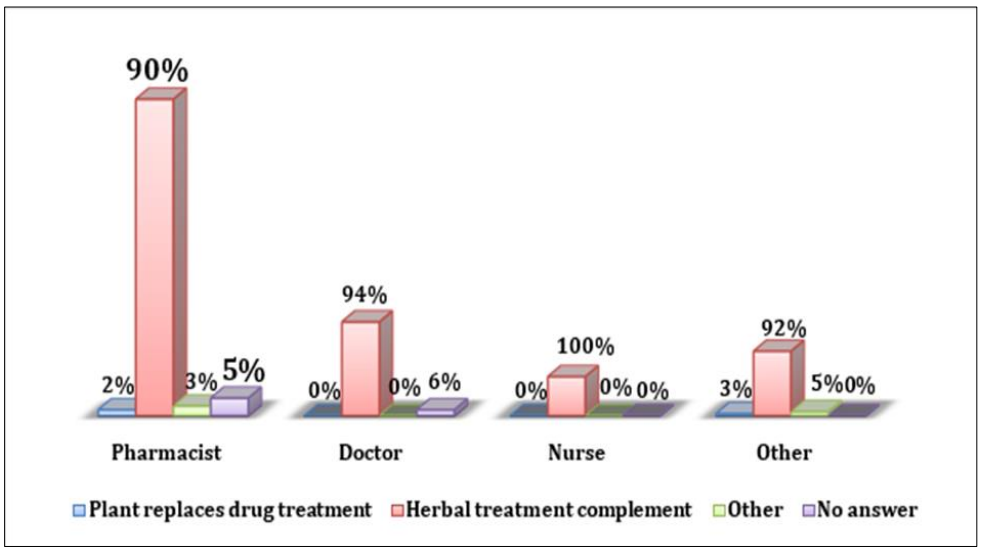

Figure 7 Breakdown of health professionals' statements on the use of plants for thyroid and diabetes

Others stressed the importance of caution: it is essential to be aware of current treatments to avoid interactions. Herbal medicine, which is useful in cases of pre-diabetes or pre-thyroid disorders, does not replace medication, but can complement it. It should be used in moderation, as medical treatment remains essential.

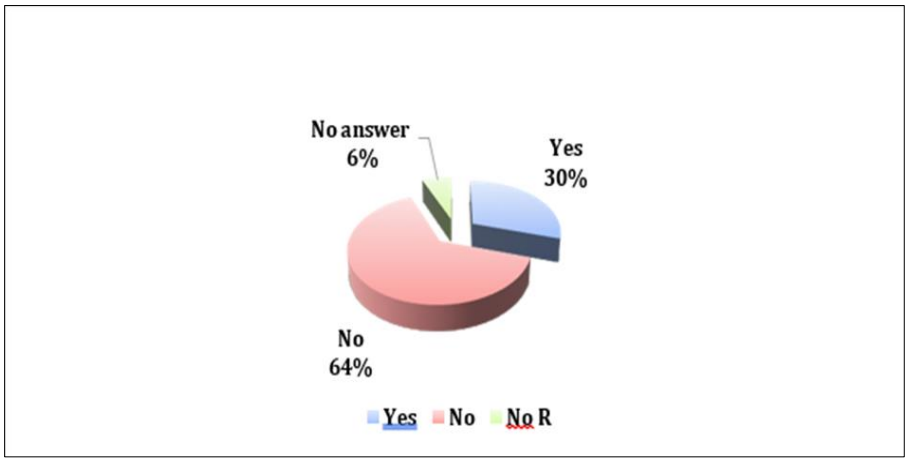

Figure 8 Incidence of side-effects following the use of phytotherapy

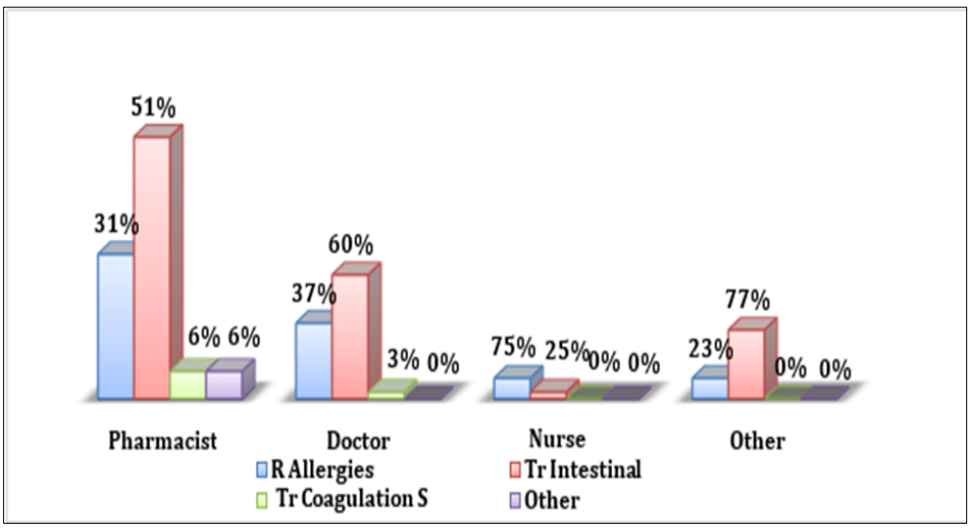

Figure 9 Breakdown of side effects following use of herbal medicine (Q 12)

Other side effects reported by healthcare professionals include irritation, diarrhea, nausea, vomiting, gastro-esophageal reflux, variations in blood pressure and hormonal disorders. These reactions underline the need for supervised use of medicinal plants.

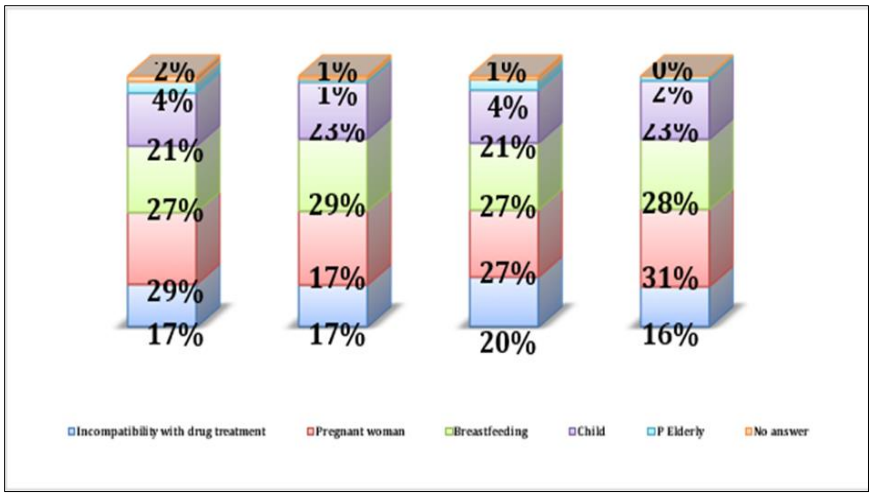

Figure 10 Distribution of contraindications to the use of plants for thyroid and diabetes

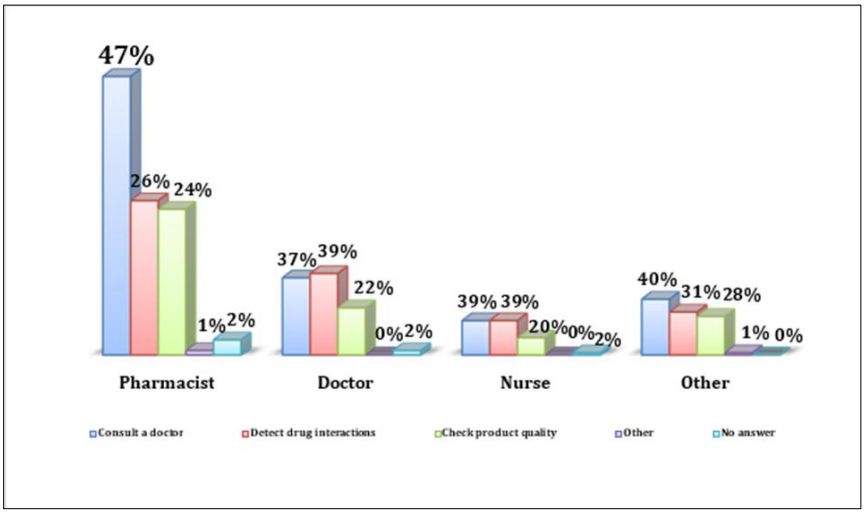

Figure 11 Distribution of some precautions when using herbal medicine

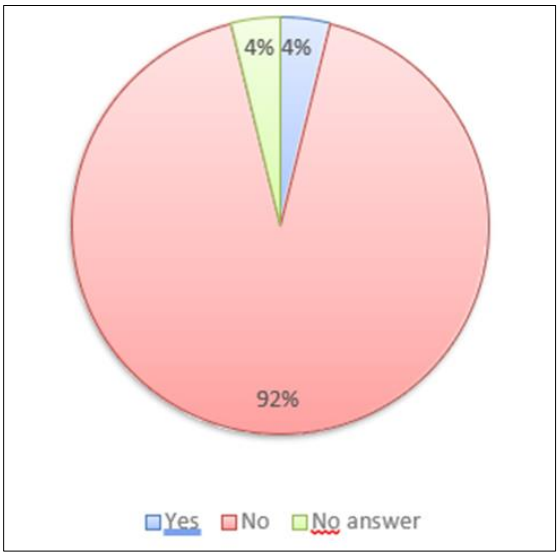

Figure 12 Plants with a cross-over impact on diabetes and thyroid function

Among the plants cited for their effects on metabolism or the endocrine system are lemon balm, soya, fenugreek (which improves insulin sensitivity but can inhibit thyroid hormones), berberine and watercress seeds.

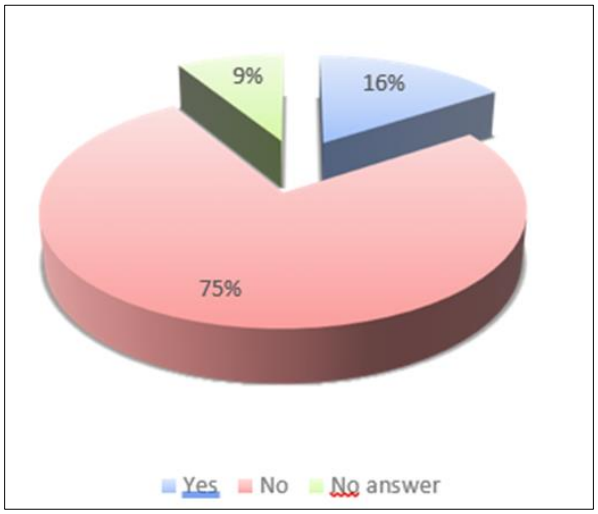

Figure 13 Percentages of healthcare professionals offering suggestions for improving the use of herbal medicine

Few healthcare professionals responded, but their recommendations converged: strengthen the regulation and monitoring of herbal medicine, improve the continuing training and education of professionals, encourage interdisciplinary collaboration, develop research, improve the supervision of herbalist shops, and integrate herbal medicine specialists into pharmacies and clinics to ensure safer and more effective management.

4. Discussion

Analysis of the results on the use of phytotherapy reveals a clear caution on the part of healthcare professionals. The majority of the sample studied was made up of pharmacists (62%), which underlines their involvement in the field. Doctors accounted for 18%, nurses for 7% and other healthcare professionals for 13%. In terms of professional experience, the pharmacists surveyed are mainly at the beginning of their careers, with 54% having practised for less than 5 years. In comparison, doctors show a more balanced distribution, and nurses appear

to be the most experienced, with 45% having practised for more than 10 years. The other healthcare professionals show a scattered distribution between the different seniority brackets, with 29% having less than five years' experience, 26% between five and ten years, and 14% more than ten years, while 31% (Other seniority levels).

Overall, training in herbal medicine remains limited. The majority of pharmacists (58%) and doctors (57%) have received basic training, but very few have taken a diploma course (6% and 4% respectively). Nurses have made a notable effort, with 60% having received basic training and 10% holding a certificate. Among other professionals, the picture is very mixed, with almost half having received no training at all. This finding highlights the need to strengthen the range of structured training courses in herbal medicine.

When it comes to recommending medicinal plants for diabetes and thyroid disorders, the majority of professionals adopt a reserved stance. Pharmacists are the most open-minded, with 48% not recommending any plants, but 27% doing so for diabetes and 18% for both conditions. Doctors are more reticent, with 68% recommending nothing, and only 5% recommending them for diabetes. Nurses are the most cautious, with 70% making no recommendation. Other healthcare professionals were more open about diabetes, although they had reservations about thyroid treatment. Pharmacists are more open because they have a better knowledge of medicinal plants thanks to their studies (pharmacognosy, botany).

Doctors are more cautious, preferring to rely on therapeutic management.

Nurses are even more reserved, as they mainly follow medical prescriptions and do not take risks. Other healthcare professionals are more open about diabetes, but remain very cautious about thyroid disease, because it is a condition that requires more careful management.

Analysis by type of thyroid disorder confirms this caution. Recommendations remain weak, with a majority of professionals (over 70% in all categories) making none. Where they do exist, they relate more to hypothyroidism than hyperthyroidism, particularly among pharmacists. This may be explained by the higher prevalence of hypothyroidism in Algeria compared with hyperthyroidism.

Of the 16 plants cited for the treatment of thyroid disorders, only five have been shown to be effective: Ashwagandha, Lycope (Lycopus europaeus), Atriplex, Ginseng and Lemon balm. Studies have shown that Ashwagandha is effective, particularly in the case of hypothyroidism, helping to rebalance thyroid hormone levels according to Ashok k. Sharma; 2018 (17) and compagnie des sens (18). Similarly, Lycope has shown beneficial effects in patients suffering from hyperthyroidism according to Andreas M. Beer 2008(19). An ethnopharmacological study conducted in Algeria documents the traditional use of Atriplex in the treatment of hyperthyroidism, hypothyroidism and thyroid cysts, according to Taibi et al 2021 (20). Lemon balm, also known as lemon balm, has been studied for its potential effects on thyroid disorders, particularly in cases of hyperthyroidism according to Mannaa et al; 2021 (21). Ginseng is also a therapeutic agent for metabolic disorders linked to hypothyroidism according to Zhang xy et al; 2024 (22).

Other plants or foods such as chia seeds, flax seeds, nettles and Brazil nuts are not direct treatments for thyroid disorders. However, their nutritional profile, rich in essential fatty acids, antioxidants and trace elements (such as selenium), can support thyroid health. Rosemary, thanks to its antioxidant effect, may also be indirectly effective in protecting thyroid tissue. On the other hand, although red clover is often used to alleviate menopausal symptoms thanks to its phytoestrogenic properties, its specific effectiveness on the thyroid has not been scientifically confirmed. Finally, although earthnuts are not used directly to treat thyroid disorders, they do help to improve the absorption of iodine, an essential element in the production of thyroid hormones.

When treating diabetes, a distinction is made between hypoglycaemia and hyperglycaemia. On the whole, recommendations remain modest and are mainly aimed at hyperglycaemia. Among pharmacists, 39% recommend treatment for hyperglycaemia, 4% for hypoglycaemia, 1% for both, and 56% recommend nothing. Doctors are even more cautious: 22% recommend for hyperglycaemia only, and 78% do not recommend at all.

Nurses show the same trend, with only 15% recommending hyperglycaemia. On the other hand, other healthcare professionals are relatively open, with 42% recommending treatment for hyperglycaemia and a total of 50% recommending nothing. The lack of information on hypoglycaemia could explain why many healthcare professionals recommend nothing on this subject.

Most of the plants listed in the questionnaire are recognised for their effectiveness in treating diabetes, and are therefore considered to be natural anti-diabetic agents. Several rigorous clinical and experimental studies have demonstrated the beneficial effects of garlic on carbohydrate metabolism, particularly in reducing fasting blood sugar levels, according to Delgado et al; 2025 (23). Similarly, research has confirmed the hypoglycaemic properties of mugwort according to Liza et al; 2024 (24), while chamomile has been shown to be effective in reducing glycated haemoglobin according to Rafraf et al; 2015 (25). In addition, other medicinal plants such as fenugreek, cinnamon, green tea, lime according to Faezeh T. Sazever; 2016 (26), olive leaves, ginseng, ginger according to Pouyat; 2017 (27) and nettle have also been the subject of scientific investigations confirming their potential in regulating glycaemia according to Marie-Rose Bonjean; 2022 (28). Taken together, these results support the growing interest in phytotherapeutic solutions for the treatment of type 2 diabetes.

The general view of the use of medicinal plants shows overall agreement. They are seen as a complement to, rather than a substitute for, drug treatment. This position is shared by 90% of pharmacists, 94% of doctors, 100% of nurses and 92% of other professionals, reflecting a great deal of caution on the part of professionals and a desire to remain within a therapeutic framework.

Analysis of the data shows that 30% of herbal medicine users report having experienced side-effects, compared with 64% who say they have not, while 6% did not respond. According to healthcare professionals, the most frequently reported side-effects were intestinal problems, particularly in the 'Other' category (77%), followed by doctors (60%) and pharmacists (51%). Nurses, on the other hand, were more likely to report allergic reactions (75%). Coagulation disorders appear to be very rare, with rates ranging from 0% to 6%. The "Other" category also mentions effects such as irritation, nausea and vomiting. These results reveal a discrepancy between the perception of users and that of healthcare professionals. It is likely that some side effects are misinterpreted or simply overlooked by patients.

This underlines the importance of rigorous medical supervision when using medicinal plants, as well as the need to raise awareness of the potential risks associated with their use. As far as contraindications are concerned, pregnant

women are the population most frequently mentioned, with percentages ranging from 17% among doctors to 31% in the 'Other' category. This trend reflects professionals' mistrust of the hormonal or metabolic effects that certain plants could induce during pregnancy. Breastfeeding is also a regularly cited contraindication: 29% of doctors, 28% of other professionals and 27% of pharmacists and nurses stress the potential risks to infants, particularly through breast milk. Children are also identified as a sensitive group, with percentages ranging from 21% to 23%, confirming their vulnerability to the active ingredients in medicinal plants. Incompatibility with medicinal treatments was mentioned by 16% to 20% of respondents, revealing a degree of caution regarding possible interactions between phytotherapy and medicines. On the other hand, the elderly were rarely mentioned (1% to 4%), as were cases with no response (0% to 2%), which may reflect a lack of specific data.

Taken together, these data show that the main contraindications concern so-called physiologically fragile populations, such as pregnant and breastfeeding women and children. This underlines the need for an individual assessment and appropriate medical follow-up before any use of medicinal plants. The study also reveals that the most frequently cited precaution is prior consultation with a doctor, with a particularly high rate among pharmacists (47%), followed by the 'Other' category (40%), nurses (39%) and doctors (37%). This trend confirms the importance of medical advice in preventing complications, particularly in patients with chronic diseases. Taking account of drug interactions is also an essential precaution, cited by 39% of doctors and nurses. This shows a growing awareness of the risks associated with interference between medicinal plants and

conventional treatments. Checking the quality of the product is another preventive measure reported, albeit to a lesser extent, by pharmacists (24%) and the 'Other' category (28%). This reflects the attention paid to the reliability and traceability of phytotherapeutic products, particularly in a marketing context that is sometimes poorly regulated.

In short, these observations confirm the importance of rigorous medical supervision, vigilance with regard to drug interactions and high-quality standards in the products used to ensure safe and effective use of herbal medicine.

With regard to the cross-effect of medicinal plants on diabetes and thyroid disorders, the perceptions gathered reveal that 92% of participants reject this possibility, against only 4% who approve, while 4% did not respond. This predominantly negative trend could be explained by a lack of scientific data, the absence of specific research, or a lack of knowledge of the pharmacological mechanisms of the plants concerned. Although the existence of a cross-effect is biologically plausible, particularly via certain active compounds capable of acting on several physiological systems, no definitive conclusion can be drawn without precise identification of the plant in question or additional experimental data. This highlights the urgent need for in-depth research into the potential interactions between phytotherapy, carbohydrate metabolism and thyroid function.

Finally, only 16% of healthcare professionals surveyed offered suggestions for improving the use of herbal medicine in clinical practice, compared with 75% who did not, and 9% who did not respond. This low rate of suggestions may reflect limited interest, lack of training, or scepticism about integrating herbal medicine into conventional medical practice. This highlights the need to promote research, increase knowledge and formalize protocols for use in order to ensure reliable and safe therapeutic support.

4.1. Study limitations

4.1.1. Access to healthcare professionals

Availability and time

Healthcare professionals, whether doctors (general practitioners, endocrinologists, diabetologists), pharmacists or nurses, are often very busy. Obtaining their consent to participate in our study (via the questionnaire) was difficult and time-consuming.

4.1.2. Sensitivity of the subject

Some professionals were reluctant to discuss the use of herbal medicine, either because of a lack of knowledge, scepticism or fear of appearing unconventional.

4.1.3. Heterogeneity of Practices and Knowledge

Variability of opinions

Healthcare professionals had very different levels of knowledge about herbal medicine, ranging from total ignorance to some familiarity or even personal use or occasional recommendation

Diversity of training

Their initial and continuing training in herbal medicine probably varied, which influenced their perceptions and practices.

5. Conclusion

Analysis of the results reveals a marked caution among healthcare professionals regarding the use of herbal medicine, particularly in the treatment of diabetes and thyroid disorders. Although pharmacists are the most open to its use, doctors and nurses take a more cautious approach, stressing the lack of robust scientific data and the potential risks associated with self-medication.

Training in herbal medicine remains inadequate, with the majority of professionals having received only basic training, which justifies stepping up degree programs to guarantee solid expertise. Furthermore, most people see medicinal plants as a complement to, rather than a substitute for, conventional treatments, confirming the need for strict medical supervision.

Side-effects and contraindications, while varying according to profile, mainly concern vulnerable populations (pregnant women, children, patients on medication), reinforcing the importance of individual assessment. Finally, the lack of in-depth research into the interaction between plants, diabetes and the thyroid gland, and the lack of commitment on the part of professionals to making proposals for improvement, underline the need to develop rigorous clinical studies and to integrate herbal medicine into a validated therapeutic approach.

In conclusion, while herbal medicine has therapeutic potential, it must be used within a secure, scientifically-supported framework, supervised by trained professionals, in order to optimize the benefits while minimizing the risks.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no links of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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Appendix: The questionnaire

Assessment and Current Trends in the Use of Phytotherapy for Thyroid and Diabetes Management Among Healthcare Professionals

- **What is your profession?**
  - Pharmacist
  - Doctor
  - Nurse
  - Other
- **How long have you been practising your profession?**
  - Less than 5 years
  - Between 5 and 10 years
  - More than 10 years
  - Other
- **How much training do you have in herbal medicine?**
  - No training
  - Basic training
  - Diploma course
  - Other
- **Have you ever recommended medicinal plants to treat diabetes and thyroid?**
  - Yes, for thyroid
  - Yes, for diabetes
  - No for thyroid
  - No for diabetes
- **If yes in the case of thyroid disorders, for which pathology?**
  - Hypothyroidism
  - Hyperthyroidism
  - If yes for diabetes, which biological sign is the reason for this recommendation?
  - Hypoglycaemia.
  - Hypoglycaemia
- **For thyroid disorders, which plants?**

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- **For diabetes, which plants?**

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- **What are the most recommended ways of administering plants?**
  - Herbal teas (infusion, decoction, maceration)
  - Mother tinctures
  - Food supplements
  - Other (please specify):

.....

- **Which statement is true about the use of plants to treat thyroid disease and diabetes?**
  - Plants are a substitute for medication.
  - Plants are used as a complement to treatment.
  - Other (please specify): .....
- **Have you ever experienced any side effects from using herbal medicine?**
  - Yes
  - No
- **If so, which ones?**
  - Allergic reactions
  - Intestinal problems
  - Blood coagulation disorders
  - Other (please specify): .....
- **What are the contraindications to the use of plants (thyroid, diabetes)?**
  - Incompatibility with medication
  - Pregnant women
  - Breast-feeding

  - Children (under 6)
  - Elderly people
- **What precautions should be taken before recommending a plant?**
  - Consult a doctor
  - Check for possible drug interactions
  - Check the quality of the product
  - Other
- **Do you know of any plants that treat diabetes and disrupt thyroid function, or vice versa?**
  - Yes
  - No
- **If yes, which ones?**

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- **Do you have any suggestions for improving the use of phytotherapy in clinical practice?**
  - Yes
  - No
- **If so, which ones (briefly)?**

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