







Physician's acceptance and knowledge in herbal medicine: A cross-sectional study in Northwest Algeria

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Abstract

The use of medicinal plants in Algeria is done in an anarchic, uncontrolled, and unregulated way. Serious consequences can affect patients and compromise their good care, especially since this use is often associated with the lack of training and knowledge of a large part of Algerian doctors on the benefits and risks of medicinal plants. This study aims to determine the relationship between the knowledge of Algerian physicians on medicinal plants and their acceptance of herbal medicine practice. A cross-sectional study was conducted in different health institutions in two regions (Tlemcen and Aïn-Témouchent). The main tool that was used to collect the required data was a self-administered questionnaire that was specifically developed and approved by the researchers to meet the study objectives. The data collected was processed by R++. The study revealed that 54.85% of the physicians had below average knowledge about plants, and more than half of them acquired their knowledge through self-training. In addition, the results show that 30% of physicians use herbal medicines, while only 12% prescribe them to their patients. Interestingly, a large majority (81.4%) of the participants expressed a desire to improve their knowledge of herbal medicines and there was a highly significant relationship between physician's knowledge and their acceptance of herbal medicine (Spearman's test: p -value=0.00066). Almost all physicians (87.55%) agreed that knowledge of medicinal plants is important to them and should be included in the general medical curriculum.

Keywords: Physicians, Herbal medicine, Knowledge, Acceptance, Algeria.

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1. Introduction

Over 80% of the population in developing countries rely on traditional medicine, which includes herbal remedies, to manage their health (Zhang & Who, 2002; Mohammed et al., 2021; Pehlivan et al., 2021). There has been an unprecedented explosion in the popularity of herbs in recent decades, particularly in developed countries (Tindle et al., 2005; Kina et al., 2021). This has led to considerable public health concerns among

physicians who are sometimes uncertain about the safety of herbs, especially when used with other allopathic medications (Risberg et al., 1999) (Hyodo et al., 2003). Despite these concerns, the global prevalence of herbal use continues to increase, with patients self-medicating with or without informing their physicians (Zhang & Who, 2002). In this context, physicians's knowledge and acceptance of herbal medicine impact the physician-patient

relationship and the overall quality of health care, particularly about possible adverse effects of herbs and herbal-drug interactions (Sardesai, 2002) (Klepser & Klepser, 1999) (Fugh-Berman, 2000) (Brazier & Levine, 2003) (Izzo & Ernst, 2001). Therefore, the physician needs to have a minimum of data on herbal medicine to better advise and manage the management of his or her patient and avoid potentially serious complications. The use of medicinal plants is important in Algeria (Izzo & Ernst, 2001) (Gardner et al., 2000). Recent studies conducted throughout the national territory, and particularly in the western region, have shown a relatively high prevalence of the use of medicinal plants for the treatment of hypertension (Hassaine et al., 2019), the therapeutic management of thyroid disorders (Taïbi et al., 2021) and the management of diabetes mellitus (Hamza et al., 2019). This high prevalence of use necessitates the implementation of the most appropriate intervention strategies to facilitate improved health care delivery, including physician knowledge of herbal medicines.

Herbal medicine is not well known to Algerian doctors, and no notion of medicinal plants is part of the medical curriculum, unlike in other countries such as Germany, China, or many Arab countries such as Bahrain, Saudi Arabia, and Jordan, where courses on alternative and complementary medicine have been integrated (Silverstein & Spiegel, 2001). Thus, no previous study has focused on the knowledge and perception of Algerian physicians of herbal medicine.

This study was undertaken mainly to assess the level of acceptance and knowledge of herbal medicine by physicians in Tlemcen and Aïn Témouchent hospitals.

2. Material and Methods

2.1. Type, place and period of the study

Descriptive cross-sectional observational study which was conducted mainly at the

University Hospital Center Dr. Tidjani Damerdji - Tlemcen, the Hospital Establishment (EH) Dr. Benzerdjeb - Aïn Témouchent and in a few local public health establishments (EPSP) and a few private medical practices in the two areas. The study was spread over 5 months, from February 2021 to June 2021.

2.2. Study population

For the constitution of the sample of our study, the only inclusion criterion was to be a medical practitioner i.e. holder of a degree "Doctor of Medicine" and practicing as a generalist, resident or specialist either in a public hospital structure or in a private practice.

2.3. Data collection and study process

The collection of data from doctors was done using a questionnaire presented in the APPENDIX which was inspired from several similar surveys (Risberg et al., 1999) (Clement et al., 2005) (Hilal & Hilal, 2017) and subsequently validated by a group comprising three teacher-researchers from the Faculty of Medicine -Tlemcen. The questionnaire contained twenty-nine questions covering three major themes:

The physician's profile: Nine questions concerning the physician's gender, age, field of work, qualification, hospital structure for physicians working in the public domain, department, region, work environment, and number of years of experience.

Physician's acceptance of herbal medicine: this part comprised four questions scored on a scale of 0 to 3 that assessed physician's use of herbal medicine or herbal products in terms of personal use, prescription or recommendation. The item descriptors were never, rarely, often, and always.

Physician's knowledge of herbal medicine: Sixteen questions:

- Two questioning the physician on the level of his knowledge in herbal medicine and how this knowledge was acquired;

- Three YES/NO questions exploring the physician's knowledge of some medicinal plants, some uses of medicinal plants, some adverse effects associated with medicinal plants or possible interactions between medicinal plants and conventional drugs;

- Eight five-choice, single-answer quiz questions assessing the physician's knowledge of herbal medicine. The choice of these questions and of the 31 plants mentioned in the statements or among the proposals was made based on a literature review of ethnobotanical surveys carried out in Algeria, and particularly in the western region, concerning the plants used in traditional medicine and their toxicity. These eight questions were also scored: the value 1 corresponds to a correct answer, while the value 0 corresponds to either a false answer or a blank answer.

- Finally, three questions were asked about the physician's opinion regarding the lack of training in herbal medicine and whether this constitutes a barrier to its use by physicians, whether he/she would like to improve his/her knowledge in this field, and whether he/she would like to see courses and/or lectures on herbal medicine and its risks integrated into the general medicine training curriculum.

Physicians were asked to respond on the spot if they had time and they were encouraged to respond without a literature search to ensure the accuracy of the results.

2.4. Statistical analysis of data:

The analysis was performed in two steps:

- In the first step, the data were entered using LibreOffice Calc (Free Alternative to Microsoft Excel) and exported in CSV format;

- In a second step, the data were imported, visualized, analyzed and interpreted using R++ (statistical tool based on the programming language for statistics R).

Results were expressed as percentages for categorical variables and as mean \pm standard deviation for quantitative variables.

Bivariate analysis was also performed using R++.

The tests used were the following nonparametric statistical tests: Fisher exact, Kruskal-Wallis, Wilcoxon, Spearman and the choice of test depended on the type of variables involved in the bivariate analysis.

The significance levels chosen were 1% and 5%;

- p -value < 0.01 is very highly significant

- $0.01 < p$ -value < 0.05 is highly significant

- p -value > 0.05 is not significant.

2.5. Ethical aspect

The questionnaire was filled out anonymously, without access to the answers and without infringing on the health services intended for the patients. All the physicians were informed of the study's nature and interest.

3. Results and Discussion

240 physicians from both areas agreed to take part in the study and to answer our questionnaire (Table 1).

Table 1. Physician's demographic background.

Characteristic	%
Age	39 ± 10.5 years
Gender	
Men	41.67%
Women	58.33%
Geographic region	
Urban	95%
Rural	5%
Type of institution	
Public	69.17%
Private	30.83%
Qualification	
Generalist	35.15%
Resident	19.66%
Specialist	45.19%
Experience	
Less than 5 years	32%
Between 5 and 10 years	19%
Over 10 years	49%

3.1. Physician's acceptance of herbal medicine

The mean acceptance score was equal to 3.11 ± 1.86 (Maximum score = 12). Half of the physicians did not exceed a score equal to 3 (median) and 75% had a score equal to or less than 4 points, whereas the best score obtained by the respondents was equal to 10 and 13 physicians had a score equal to 0 (Figure 1).

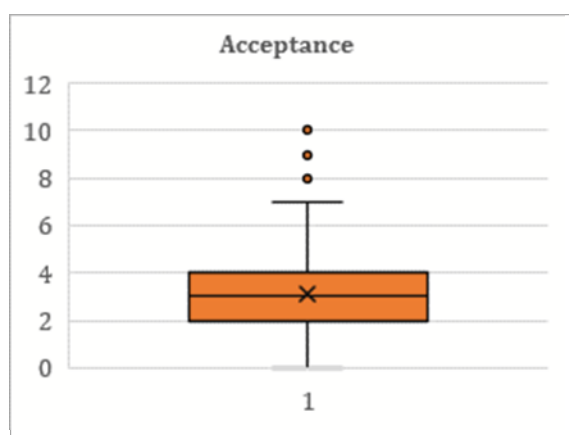


Figure 1: Distribution of physicians by total acceptance score.

Socio-demographic factors did not influence the acceptance scores (Table 2).

Approximately 15% of physicians reported almost never having used herbal medicine for personal use. 73.53% never asked their patients about herbal use and 87.45% almost never recommended a plant or herbal product, let alone an herbalist. This result diverges from the study of Clement et al. (2005) in Trinidad and Tobago where most physicians (55.7%) reported having asked their patients about their use of herbal medicines as part of the history taking and 27.1% of the respondents had already recommended the use of herbal medicines to their patients mainly for the management of diseases such as gastric ulcers, prostate enlargement and hepatitis, which supported their acceptance of this modality. And, on the contrary, agrees with that of Hilal et al. (2017) study where the use of herbs by Bahraini physicians was found to be limited. Specifically, approximately 18.8% of the taking part physicians never used herbs, while most of the participants rated their herbal use as rare (Hilal & Hilal, 2017) (Clement et al., 2005). Furthermore, the results presented suggest that physicians tend to use herbal medicines rather than prescribe them to their patients.

However, approximately 13% of our respondents had ever advised their patients about herbal medicines, which is in full agreement with the results of the previously cited study (Clement et al.) and those of another Norwegian study, where only 12% of the physicians supported the idea that herbs could improve symptoms or speed up healing (Clement et al., 2005) (Risberg & Kolstad, 2003). According to the same study, the main reason for rejecting the use of herbs was the lack of scientific information from clinical trials to support the safety and efficacy of herbs in health care management. Physicians even indicated that they did not believe that herbs were safe or beneficial and that their efficacy is not scientifically proven and may give false hope to patients (Clement et al., 2005). To a lesser extent,

another reason for rejecting herbs was the lack of transmission of this knowledge during their medical training. Indeed, physicians rarely question their patients about herbal medicine. This may be because asking a patient about his or her consumption of plants is not necessarily a habit. The problem is not that the physician is uninterested in the subject, nor that he or she deliberately does not want to talk about it, but because it is not his or her habit. Over the years, each doctor has created a standard questioning scheme to be systematic in questioning his patients. This line of questioning was often taught during medical school and became instinctive, and the question "Do you use plants or plant-based products?" was not necessarily the question that doctors learned to ask. However, given the reality that, with or without the help of the attending physician, patients are turning to plants, it would be interesting to be able to accompany them in the best possible way, to be alerted in the event of a change in the state of health or the biological balance of a patient taking plants, more particularly elderly patients, multi-pathological patients, patients with multiple medications, pregnant women and children.

3.2. Physician's knowledge of medicinal plants

64.13% of the physicians surveyed reported having good or moderately good knowledge of herbal medicine and that this knowledge was acquired, generally, through self-study or with experience (55.35% and 40.93% respectively) versus only 3.72% via qualifying training. This diverges and agrees with both the study by Hilal et al. (2017) where half of the participants, with basic knowledge of medicinal plants, indicated that experience was the main source of this knowledge, followed by academic studies (28.1%) and other resources such as the Internet (21.9%) (Hilal & Hilal, 2017). Percentages of 27.5% and 22.92% of the physicians were able to answer correctly to

both 2 questions regarding medicinal plants and their traditional uses. Only 17.08% could answer the question on interactions and a higher proportion could answer the questions on toxicity and adverse effects. This result coincides slightly with that found in the study by Clement et al. (2005) in Trinidad and Tobago where 50% of respondents were able to identify at least two Caribbean medicinal plants and their traditional uses, most respondents were unable to identify at least one contraindication and only 15.1% were able to correctly identify a known interaction between a plant and a drug (Clement et al., 2005).

Overall, physicians who reported having a better knowledge of medicinal plants, their traditional uses, drug-plant interactions and adverse or toxic effects had better answers to the different questions of the quiz. This finding is in complete contrast to the results of Jeffrey R et al. (2004) and Clement et al. (2005) where only 12.4% of the 54.7% of physicians who reported knowledge of the Caribbean Pharmacopoeia and medicinal plants were able to identify at least one (Clement et al., 2005) (Suchard et al., 2004). On a scale of 8, the average knowledge score (obtained by answering the quiz questions) was equal to or less than 2.50 ± 1.93 (Maximum score = 8). Half of the physicians did not exceed a score equal to 2 (median) and 75% had a score equal to 4. The highest score obtained by the respondents was equal to 7 and 53 physicians did not answer any question correctly (Figure 2).

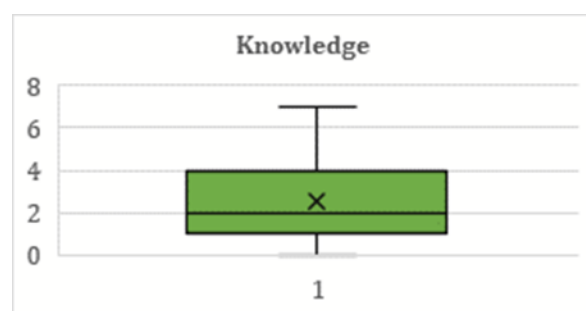


Figure 2: Distribution of physicians by total knowledge score.

Jeffrey R et al. (2004) found similar results in their study in Orange and Los Angeles counties in California with a mean score of 4.63 (on a scale of 16) significantly different from that obtained with a random sample. The same result was also observed in another study conducted in Trinidad and Tobago by Clement et al. (2005), which used open-ended questions as an approach to assess physician's knowledge, where the average score did not exceed 15% (Clement et al., 2005) (Suchard et al., 2004).

between demographic factors and knowledge (Table 2). This result is consistent with those of Clement et al. (2005) regarding gender, hospital site and specialty, and with Jeffrey R et al. (2004) regarding experience. But diverges from Hilal et al. (2017) and Clement et al. (2005) regarding years of experience. Indeed, in both studies, a trend toward a moderate increase in knowledge with years of medical experience was observed, but it was not statistically significant (Hilal & Hilal, 2017) (Clement et al., 2005) (Suchard et al., 2004).

There was no significant relationship

Table 2. Association between demographic factors and knowledge and acceptance of herbal medicine.

Profile	Number (%)	Knowledge mean score (Maximum = 8)	<i>p</i> -value knowledge	Acceptance mean score (Maximum = 12)	<i>p</i> -value Acceptance
Doctors combined	240 (100)	2.50 ± 1.93		3.11 ± 1.86	
Women	140 (58.33)	2.52 ± 1.83	0.792601	3.28 ± 1.87	0.104202
Men	100 (41.67)	2.48 ± 2.08		2.88 ± 1.84	
Age	222 (92.5)		0.560416		0.258613
Public	166 (69.17)	2.51 ± 1.91	0.974757	3.11 ± 1.75	0.600454
Private	74 (30.83)	2.50 ± 1.99		3.10 ± 2.12	
Generalist	84 (35.15)	2.61 ± 1.98		3.33 ± 2.17	
Specialist	108 (45.19)	2.57 ± 2.02	0.547628	3.04 ± 1.65	0.578465
Resident	47 (19.67)	2.21 ± 1.60		2.83 ± 1.69	
Urban	228 (95.80)	2.49 ± 1.94	0.775219	3.09 ± 1.84	0.46805
Rural	10 (4.20)	2.60 ± 1.84		3.80 ± 2.53	
Less than 5 years	77 (32.35)	2.49 ± 1.92		3.03 ± 1.57	
Between 5 and 10	46 (19.33)	2.59 ± 1.80	0.892474	3.13 ± 1.76	0.977285
Over 10 years	115 (48.32)	2.50 ± 2.01		3.18 ± 2.09	

3.3. Knowledge and acceptance of herbal medicine: what relationship?

The correlation between knowledge and acceptance was significant. The more

physicians had knowledge of herbal medicine, the more they accepted its practice (p -value = 0.00066 highly significant with Spearman's test) (Figure 3).

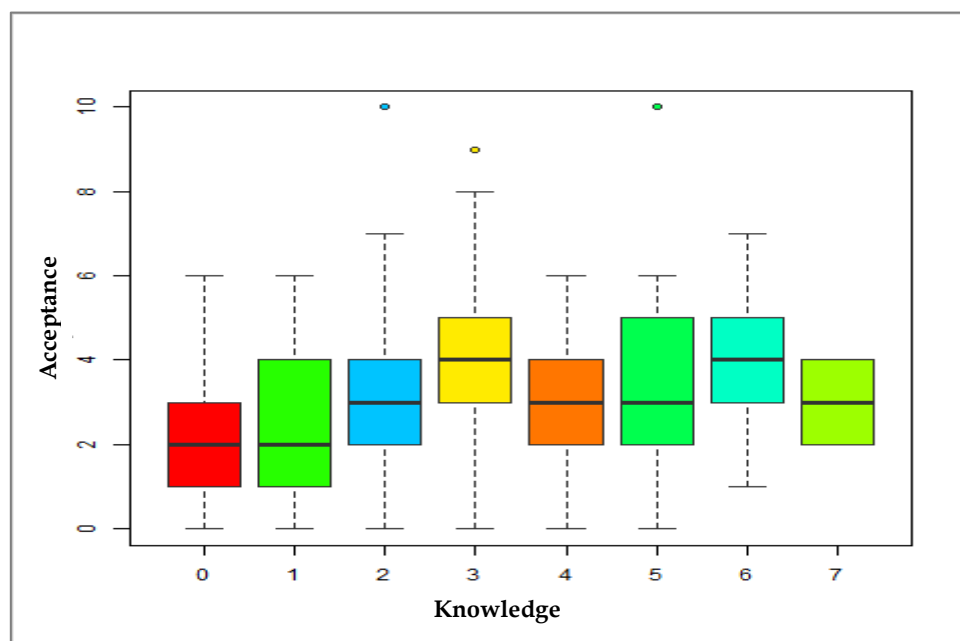


Figure 3: Distribution of physicians according to their knowledge and acceptance scores.

This result is very different compared to the study of Clement et al. (2005) where a marked disparity was shown between acceptance and knowledge of herbs by physicians who had relatively high levels of acceptance with poor knowledge. It is totally in agreement with the results of Hilal et al. (2017) where participants believe that having the knowledge is the main factor that would encourage physicians to use plants (Hilal & Hilal, 2017) (Clement et al., 2005).

3.4. Doctors and plants: a training to develop in Algeria

A large proportion of the respondents to our questionnaire agreed that the lack of training in herbal medicine is a barrier to its use by physicians. Similarly, the majority (95.95%) expressed their desire to improve their knowledge of herbal medicine and

were in favor of integrating some courses/lectures on medicinal plants and their risks into the general medicine training curriculum (Table 3).

Our results are consistent with those reported by other studies such as Awodele et al. (2012) for resident physicians in Nigeria, Ghia and Jha (2012) for health professionals in India, Clement et al. (2005) for physicians in Trinidad and Tobago and Hilal et al. (2017) for physicians in Bahrain where most of the physicians surveyed (81.3% and 91.7% respectively for the latter 2 studies) felt that continuing education in herbal medicine is important in facilitating greater physician-patient interaction in this growing area of health care management (Hilal & Hilal, 2017) (Clement et al., 2005) (Afolabi et al., 2012) (Amin & Fattouh, 2017).

Table 3. Distribution of doctors according to their responses on questions 27,28 and 29.

Question	%
Question 27: In your opinion, the lack of training in herbal medicine is a hindrance to its use by Algerian doctors?	
Strongly disagree	3.98
Somewhat disagree	3.10
Neither agree nor disagree	11.50
Somewhat agree	31.42
Strongly agree	50.00
Question 28: Do you want to improve your knowledge of herbal medicine?	
Yes	95.95
No	4.05
Question 29: Do you think that adding some courses/lectures about herbal medicine and its risks in the medical curriculum is necessary to improve this knowledge?	
Strongly disagree	2.15
Somewhat disagree	3.43
Neither agree nor disagree	6.87
Somewhat agree	31.76
Strongly agree	55.79

From the above, it seems clear that a lack of knowledge of herbal medicine may make the physician more reluctant to accept its use. Indeed, while pharmacists receive basic training in herbal medicine during their studies, this is not the case for medical students. Therefore, offering herbal medicine and pharmacognosy education during medical school could interest physicians. Studies have shown that educational interventions on herbal medicine, taught as structured programs through different media, significantly improve physician's knowledge, confidence and interactions with patients. The goal in this case is not to achieve comprehensive training in herbal medicine or to know how to recommend herbs or prescribe herbal products, but to be aware of the major risks associated with herbs and herbal products and therefore be able to consider possible self-medication and assess the risk of drug-herb interactions. Continuing education programs are also recommended so that practicing physicians enhance their knowledge in this rapidly expanding field, which is an important public health issue. In the meantime, physicians should be

equipped with books of reputable herbs in their regions, consult trusted journals and electronic websites to further their knowledge of herbs and answer questions that arise during clinical practice.

4. Conclusion

As far as we know, this study is the first one carried out in Algeria on physicians' knowledge of medicinal plants and their acceptance of the practice of herbal medicine. Our results showed that the physicians interviewed had basic knowledge of herbal medicine, knowledge that was not influenced by socio-demographic factors, and that there was a significant relationship between this knowledge and the physician's acceptance of herbal medicine. Almost physicians showed a desire to improve their knowledge of herbal medicine and supported the idea of integrating courses/lectures on this discipline into the curriculum of graduate medical studies. This is not surprising, as they fully agreed that the lack of information about herbal medicine is a barrier to its use in medicine. This creates an interesting scenario where the lack of knowledge, and

the desire to improve, provides an ideal opportunity to facilitate the introduction of educational programs and policies that would increase the knowledge base of health care professionals. Well-informed physicians would be more confident in their interactions with patients, which would improve the quality of health care delivery, as more meaningful communication about important issues such as adverse effects and herbal-drug interactions would be facilitated. The trend toward increased use of herbs is expected to continue for the foreseeable future, and the improved knowledge of physicians will benefit patients who will appreciate being able to discuss their health needs in a judgment-free environment.

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Author Contribution

Concept and design: A.H., K.B. Data Collection and processing: M.T., S.A.Y. Data analysis and interpretation: A.H., K.B., M.T. Literature Search: A.H., K.B. Writing: A.H.

Conflicts of Interest

The authors declared no conflict of interest.

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APPENDIX . Questionnaire.**Acceptance and knowledge of Algerian doctors in phytotherapy****Profile:**

- 1- **Gender:** Woman -Man
- 2- **Age:**
- 3- **Domain:** -Public -Private
- 4- **Structure:**
-EHU -CHU -ESH -EPH -EPSP
- 5- **Qualification:** -Generalist -Specialist -Resident
- 6- **Service:**
- 7- **Wilaya:** -Tlemcen -Aïn-Témouchent
- 8- **Working environment:** -Urban -Rural
- 9- **Experience:** -Less than 5 years -Between 5 and 10 years -Over 10 years

Acceptance of herbal medicine:

- 10- **Do you use herbal medicine on your own?**
-Never -Rarely -Often -Always
- 11- **During a consultation, do you ask your patients if they use medicinal plants before prescribing a treatment?**
-Never -Rarely -Often -Always
- 12- **Have you ever recommended or prescribed a herbal medicine or product to your patients?**
-Never -Rarely -Often -Always
- 13- **Have you ever recommended to your patients to go to an herbalist?**
-Never -Rarely -Often -Always

Knowledge in herbal medicine:

- 14- **How would you describe your knowledge of herbal medicine?**
-Not at all good -Moderately good
-Fairly good -Excellent
- 15- **How did you acquire this knowledge?**
Self-training - Qualifying training
-Experience
- 16- **Do you know some medicinal plants and their uses?** -Yes -No
- 17- **Are you aware of any interactions between certain medicinal plants and conventional drugs?** -Yes -No
- 18- **Are you aware of any undesirable and/or toxic effects related to the use of certain plants?** -Yes -No
- 19- **Milk thistle is a plant known for its activity:**
-Hypoglycemic -Antiviral
-Hepatoprotective
-Antimicrobial -Antispasmodic
- 20- **One of the following plants decreases the absorption of certain substances: iron, zinc, calcium, magnesium, vitamin B12, drugs... which one?**
-Black cumin -White horehound
-Basil -Flaxseeds -Ricin
- 21- **One of the following plants is used to treat diabetes and is known to be toxic:**

- Thyme -Coloquint -Poulliot mint
-Verbena -Spearmint
- 22- **The root of a common plant in the Mediterranean region is the cause of serious life-threatening poisoning:**
-Ginger -Poppy Mint -Glue Thistle
-Verbena -Spearmint
 - 23- **One of these plants stimulates the release of LH, which one?**
-Atlas cypress -Sage
-Celery -Fenugreek -Verbena
 - 24- **Orally, one of these plants is contraindicated in people with bile duct obstruction:**
-Turmeric -Caraway -Laurel
-Thyme -Licorice
 - 25- **A plant with expectorant and antispasmodic action can induce high blood pressure if consumed for a long time and in high doses:**
-Sesame -Carob -Wormwood
-Cinnamon -Licorice
 - 26- **Prolonged use of any of the following plants may cause hypokalemia and disruption of heart function:**
-Celery -Senna -Arbutus
-Flaxseed -Cinnamon
 - 27- **In your opinion, the lack of training on herbal medicine is a hindrance to its use by Algerian doctors?**
-Strongly disagree -Somewhat disagree
-Neither agree nor disagree
-Somewhat agree -Strongly agree
 - 28- **Do you want to improve your knowledge of herbal medicine?** -Yes -No
 - 29- **Do you think that adding some courses/lectures about herbal medicine and its risks in the medical curriculum is necessary to improve this knowledge?**
-Strongly disagree -Somewhat disagree
-Neither agree nor disagree -Somewhat agree -Strongly agree