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Designing and determining psychometric properties of the knowledge, attitude, and practice questionnaire for the use of medicinal plants among older adults

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Abstract:

BACKGROUND: Due to the occurrence of chronic diseases, older adults demonstrate more inclination to use various drugs. In fact, they constitute the major proportion to consume medicines for the many age-related diseases and often use medicinal plants along with synthetic medicine. Therefore, due to the tendency of the elderly to use medicinal plants and the lack of sufficient documentation on their consumption of medicinal plants, the present study was conducted to design and determine psychometric properties of a questionnaire of knowledge, attitude, and practice of the elderly regarding the use of medicinal plants.

MATERIALS AND METHODS: This study was conducted in two phases: designing the questionnaire and estimating its validity and reliability in 2020. In this study, which was performed in 2020, the instrument was a questionnaire to measure knowledge, attitude, and practice, designed using scientific sources, studies, and expert opinions. To calculate content validity, the ratio coefficient and index were consulted by asking the opinions of 12 experts. Also, a test–retest method was used to assess the reliability of the questionnaire.

RESULTS: The 43-item questionnaire addressed the three aspects of knowledge, attitude, and practice of the elderly with 11, 8, and 11 items to evaluate knowledge, attitude, and practice, respectively. In the present study, the content ratio and content index were 0.79 and 0.8, respectively. The correlation coefficient calculations demonstrated the favorable status of the questionnaire based on the test–retest method.

CONCLUSION: The present researcher-made questionnaire has met validity and reliability requirements and can be used by other researchers as an appropriate questionnaire.

Keywords:

Attitude, knowledge, practice, psychometric properties, questionnaire

Introduction

With an increase in life expectancy and the improvement of health care, there has been a constant increase in the elderly population that makes 21st-century social, economic, and health challenges.[1] According to the reports of the World Health Organization, by 2025, the population of people aged 65 and above will reach more than 800 million. Developing countries have a 70% share in the rise of the elderly population. Other evidence has predicted that by 2030, the ratio of the elderly population in developing countries will be 9 times the current situation.[2] In

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Iran, according to the 2015 census, about 9.3% of Iran's population consists of people over 60 years old, which indicates the rapid growth of the elderly population.[3] Generally, aging as a serious health concern is regarded as a natural, physiological process rather than a disease.[4]

As people age, the probability of chronic diseases also increases. In this regard, Barry's study showed that 8% of the elderly suffer from at least one chronic disease such as arthritis, high blood pressure, respiratory diseases, heart diseases, or sensory disorders.[5] In the study by Woo and his colleagues in South Korea, 46% of the elderly had more than two diseases at the same time.[6] Therefore, the elderly constitute the largest population with many chronic diseases who use herbal and synthetic drugs. This population tends to use significantly higher amounts of medicinal plants for treatment purposes[7], mainly due to the fact that the medical industry has failed to cure or stop the advancement of many age-related diseases.

For centuries, people have been using plants as food or medicine to improve their health,[8] and medicinal plants have been believed to cure diseases safely. They have gained considerable global attention in recent years due partly to adverse side effects of synthetic medicines.[9] Because of availability, low cost, and minimal side effects of medicinal plants, they have been increasingly used,[10] making them an integral part of alternative health care. Complementary medicine, which is also called alternative or informal medicine, is a method in the treatment of many diseases commonly through herbal therapy or herbal medicine, which has been used in different societies for many years. According to the World Health Organization, herbal medicine is the use of plants, plant materials, plant compounds, and plant products whose active ingredient is a part of the plant or plant material that is used to treat many diseases.[11] Research has proven the effectiveness and safety of some complementary medicine methods, including medicinal plants, in the treatment of some diseases.[10]

Iran enjoys a remarkable diversity in the type and number of plant species with about 7000 plant species so far. According to a study in Iran, until 2006, more than 5000 Attari units were active and about 100 to 200 plant species in Iran were recognized as outstanding herbal medicine and by the Ministry of Health, Medicine and Medical Education for the preparation and production of medicinal plants has been introduced.[12]

Based on the items mentioned above, such as considering the wide use of medicinal plants and the acceptance of the elderly in using these plants together with medicinal treatments or replacing the use of these plants for many diseases and also considering that so far there are limited studies based on, this study has been done to determine the level of knowledge, attitude, and practice of the elderly regarding the consumption of medicinal plants in Iran. The present study was conducted with the aim of introducing a reliable tool to investigate the knowledge and attitude of the elderly as well as their practice in using medicinal plants in order to plan for the proper use of medicinal plants by the Iranian elderly population.

Materials and Methods

This study was conducted in the two phases of designing and examining the validity and reliability of a questionnaire on the knowledge, attitude, and practice of the elderly regarding the use of medicinal plants. In order to design and compile the questionnaire, questions were first extracted by reviewing the literature and using expert opinion regarding the knowledge, attitude, and practice of the elderly regarding the consumption of medicinal plants. Content validity was examined quantitatively and qualitatively. In qualitative content validity, 50 designed items were given to six gerontology experts and six medicinal plant experts to provide their comments on grammar, use of appropriate words, and placement of phrases in the appropriate place. Then the tool was modified based on the suggestions provided. In terms of quantitative content validity, two indicators, CVR[1] (content validity ratio) and CVI[2] (content validity index) were used. To calculate CVR, all the aforementioned experts were asked to examine the necessity of each item in the tool base and a Likert scale: 1. it is necessary, 2. it is not necessary but it is useful, and 3. it is not necessary.

$$CVR = \frac{\text{The number of experts who have selected the necessary option}}{\frac{\text{Total number of specialists}}{2}}$$

There were 12 experts, and according to the Lawshe table, the values of 0.56 and above were considered essential. At the same time, as the content validity ratio was determined, the experts were asked to check the CVI using the Waltz and Basel method. Experts rated relevance, clarity, and simplicity of each item based on a 4-point Likert scale. The value of CVI was calculated by dividing the number of experts who gave each item a score of 3 and 4 in terms of relevance by the total number of panel experts (relationship below). Therefore, according to the number of experts in this study, a score of 0.79 and above is considered acceptable.

1. Content Validity Ratio
2. Content Validity Index

$$\text{CVI} = \frac{\textit{The number of experts who rated the item 3 and 4}}{\textit{Total number of specialists}}$$

Therefore, the items that obtained sufficient scores for CVI and CVR values remained in the tool. The items that did not have sufficient scores for CVI and CVR values were removed from the tool. In order to determine the formal validity, experts were asked to assign importance to the items. The following formula was used to evaluate each of the items of the tool in a 5-point Likert scale as well as the impact scores of each item.

Impact score = (percentage) frequency * importance

To accept the formal narrative of each item, the impact score should not be less than 1.5.

In order to determine the qualitative formal validity, experts were asked to comment on the difficulty, vagueness, and inadequacy of the sentences. After collecting the comments, the impact score of the items was calculated and the items that did not obtain the minimum score were removed. According to the opinions of the evaluators, some items were modified and the final items of the tool were obtained.

To evaluate the reliability of the questionnaire, the test–retest method was used in such a way that the final instrument was presented to 30 elderly people for completion, and then they were asked to complete the questionnaire again after 2 weeks and the answers were examined under the correlation test.

Results

In terms of qualitative content validity, 50 items designed in the three spectrums of knowledge, attitude, and practice were given to six gerontology experts and six herbalists. To investigate the validity ratio of quantitative content based on the opinion of 12 experts according to the Lawshe table, values of 0.56 and greater were considered in the questions which indicated the necessity of each item. Accordingly, the following items were confirmed: 12 of the 19 items related to the knowledge of the elderly about the use of medicinal plants, 7 of the 18 items related to the attitude of the elderly, and 12 of the 13 items related to the practice of the elderly regarding the use of medicinal plants. Regarding the CVI, the Waltz and Basel method was employed, and each item was determined based on a 4-point Likert scale. The minimum acceptable value for the CVI index was equal to 0.79, and if the CVI index was lower than this value, an item was removed from the questions. Therefore, 14 of the 19 items related to the elderly's knowledge about the use of medicinal plants, 12 of the 18 items related to the elderly's attitude, and 12 of the 13 items related to the elderly's practice were confirmed. The CVI for all items of knowledge and practice was higher than 0.8, and the CVI of attitude was below 0.79 in two cases. In fact, the items that obtained sufficient quorum for CVI and CVR values remained in the tool, and the items that did not obtain sufficient quorum for CVI and CVR values were removed [Table 1].

After determining the CVI and CVR values and removing the items that did not score a minimum value, qualitative and quantitative formal validity was calculated. For quantitative formal validity, 12 experts in gerontology and medicinal plants were asked to assign importance to each of the instrument's items in a 5-point Likert scale. To confirm the face validity of each item, its impact score should not be less than 1.5. In fact, questions with a score higher than 1.5 are acceptable in terms of face validity. At this stage, the following items were confirmed: 11 out of 14 knowledge items, 8 out of 12 attitude items, and 11 out of 12 practice items were confirmed.

For qualitative formal validity, evaluators were also asked to comment on their difficulty, vagueness, and inadequacy. Therefore, while expressing their opinion about the importance of the items, they were asked their opinion about the clarity of the questions and write their suggestions if any. After collecting the opinions, the impact score of the items was calculated and the items without the minimum score were removed. Also, according to the opinions of the evaluators, some items were modified. Furthermore, 15 elderly people[13] were interviewed face-to-face, and the level of difficulty and simplicity and the ambiguity and clarity of the questions were examined. Following that, necessary changes were made using expert opinion.[14] To examine the reliability of the questionnaire, the test–retest method was employed. To do so, the final instrument was presented to 30 elderly people for completion, and then they were asked to complete the questionnaire again after 2 weeks. Afterward, the correlation coefficient between the two tests was calculated [Table 2].

The way of judging the percentage of agreement values is as follows: less than 20%, strongly disagree; 21% to 40%, fair agreement; 41% to 60%, average agreement; 61% to 80%, good agreement; 81% to 100%, strongly agreement [Table 3].

Discussion

A major finding of the current research was determining the validity and reliability of the designed tool. In this regard, there has been no study on the validity and reliability of a similar questionnaire. However, in this research, the validity and reliability of the instrument used to measure the variables of knowledge, attitude, and practice of the elderly regarding the consumption of medicinal plants were examined, and according to the

Table 1: The CVR and CVI of each item of the knowledge, attitude, and practice questionnaire regarding the use of medicinal plants in the elderly

Row	Subject of the question	Answer options	CVI	CVR	Approval or disapproval
		Knowledge			
1	Do you know medicinal plants?	Yes No	1	0.86	approval
2	If yes, what diseases is it used to treat?		0.8	0.33	disapproval
3	Do you know the side effects of medicinal plants?	Yes No	0.8	0.73	approval
4	If yes, name these complications.	Yes No	0.93	0.46	disapproval
5	Do you know how to use medicinal plants?		0.8	0.33	approval
6	If yes, name the usual ways of using it.	Yes No Sometimes effective and sometimes ineffective	0.86	0.46	disapproval
7	Are medicinal plants more effective than chemical drugs in treating diseases?	Yes No	0.93	0.6	approval
8	Is access to medicinal plants easier than chemical drugs?	Yes No	1	0.6	approval
9	Is the simultaneous use of medicinal plants with chemical drugs appropriate?	Yes No It is Not prohibited by doctor's prescription	0.93	0.6	approval
10	Should medicinal plants be taken under the supervision of a doctor?	Yes No	1	0.86	approval
11	Is it harmful to take several herbs at the same time?prescription	Yes No It is Not prohibited by doctor's	1	0.73	approval
12	Do medicinal plants work faster than chemical drugs in treating diseases?	Yes No	0.8	0.33	approval
13	Can medicinal plants be used in large quantities and often?	Yes No	1	0.6	approval
14	Are medicinal plants safe?	Yes No Sometimes they are dangerous and sometimes they are harmless	1	0.73	approval
15	Should you consult your doctor regarding the use of medicinal plants?	Yes No	0.93	0.3	approval
16	Is the use of medicinal plants a traditional method?	Yes No No idea	0.86	0.3	disapproval
17	Is the cost of medicinal plants more appropriate than chemical drugs?	Yes No	1	0.3	disapproval
18	Which of the following are your reasons for using medicinal plants?	Yes No cold respiratory heart other	1	0.73	approval
19	Which of the following are the reasons for people not using medicinal plants?	Yes No	1	0.33	approval

Contd...

Table 1: Contd...

Row	Subject of the question	Answer options	CVI	CVR	Approval or disapproval
		Knowledge			
		1. The price of herbal medicines compared to chemical medicines 2. Lack of experts in the field of medicinal plants 3. People's lack of confidence in the medicinal properties of medicinal plants due to their impurity 4. Lack of proper processing and packaging of medicinal plants compared to chemical medicines 5. Improper introduction Medicinal plants from official and scientific authorities 6. People's lack of familiarity with the properties of medicinal plants 7. Late effects of medicinal plants compared to chemical drugs in the treatment of diseases			
		Attitude			
1	Do you think it is possible to recommend the use of medicinal plants to someone?	Yes No	0.93	0.46	disapproval
2	Do you think medicinal plants are harmful?	Yes No Sometimes useful and sometimes harmful No idea	0.93	0.73	approval
3	In your opinion, how is the simultaneous use of medicinal plants and chemical?	Beneficial, harmful, uncomplicated It is Not prohibited with the doctor's prescription drugs?	0.8	0.33	approval
4	Do you think it is harmful to take several herbs at the same time?	useful harmful It is Not prohibited with the doctor's prescription	0.93	0.6	approval
5	What diseases do you think medicinal plants are most effective on?	Nervous, digestive, diabetes, blood pressure, other	0.86	0.46	disapproval
6	What do you think about the therapeutic efficacy of medicinal plants?	High efficiency, efficiency that does Not work	0.8	0.46	approval
7	Do you think medicinal plants can replace chemical drugs?	Yes No	0.93	0.86	approval
8	If your answer to the above question is positive, why?	Less complications, easier access, cheaper price, more information	0.73	0.2	disapproval
9	What do you think is the best place to get medicinal herbs?	Pharmacies, pharmacies, supermarkets	0.93	0.6	approval
10	Do you think medicinal plants should be taken under the supervision of a doctor?	Yes No	1	0.86	approval
11	Do you think medicinal plants have fewer side effects than chemical drugs?	Yes No There is No difference	1	1	approval
12	Do you think the use of medicinal plants for the treatment of diseases needs scientific investigation?	Yes No	0.66	0.2	disapproval
13	Do you think medicinal plants work faster than chemical drugs in response to diseases?	Yes No	0.8	0.46	approval
14	Do you think medicinal plants are more available than chemical drugs?	Yes No Sometimes they are dangerous and sometimes they are harmless	0.93	0.2	disapproval
15	Do you think the cost of medicinal plants is more appropriate than chemical drugs?	Yes No	0.93	0.33	approval

Contd...

Table 1: Contd...

Row	Subject of the question	Answer options	CVI	CVR	Approval or disapproval
		Attitude			
16	Do you think that using medicinal plants is preferable to chemical drugs?	Yes No No idea	0.86	0.6	approval
17	What factors affect your use of medicinal plants?		0.86	0.33	disapproval
18	In your opinion, how is the use of medicinal plants compared to chemical drugs?	Better the same Worse Has no effect	0.66	0.2	disapproval
		Practice			
1	Have you ever advised someone to use medicinal plants?	Yes No	0.93	0.73	approval
2	If yes, what herbs have you recommended to others?		0.93	0.73	approval
3	Do you use medicinal plants for your illness if prescribed by your doctor?	Yes No No idea	1	1	approval
4	If you are sick, do you use medicinal plants to treat your illness?	Yes No	0.93	0.73	approval
5	If yes, which herbs do you use?		0.86	0.46	disapproval
6	How often do you use medicinal herbs?	Daily consumption.....times Weekly consumption.....times Monthly consumption.....times Annual consumption.....times	0.93	0.73	approval
7	Which of the following is your method of using medicinal plants the most?	Boiled Herbal Tincture Powder Edible Topical infusion	0.93	0.6	approval
8	How do you use medicinal plants?	Only medicinal plants Several medicinal plants at the same time, the simultaneous use of medicinal and chemical plants	0.86	0.73	approval
9	How do you prepare medicinal plants?	Collected by the individual Buy from Attari Buy from supermarkets, buy from pharmacy	0.86	0.6	approval
10	Do you inform your doctor about the use of medicinal plants?	Always Mostly Never Sometimes	1	1	approval
11	Do you use medicinal plants as a therapeutic supplement at the same time as taking chemical drugs?	Yes No	0.93	0.73	approval
12	Have you ever used several herbs at the same time?	Yes No	1	0.86	approval
13	Which of the following is the reason for not using medicinal plants?	1. The price of herbal medicines in comparison with chemical medicines 2. Lack of experts in the field of medicinal plants 3. People's lack of confidence in the healing properties of medicinal plants due to their impurity 4. Lack of proper processing and packaging of medicinal plants compared to chemical agents 5. Improper introduction of medicinal plants by official and scientific authorities 6. People's lack of familiarity with the properties of medicinal plants 7. Late effects of medicinal plants compared to chemical drugs in the treatment of diseases	0.93	0.6	approval

Table 2: The standard questionnaire of knowledge, attitude, and practice of the elderly regarding how to use medicinal plants

Demographic information questionnaire

1- Age: 60-65□ 66-70□ 71-75□ 76 and older□
2- Sex: Female□ Male□
3- Level of education: Illiterate□ High school□ diploma□ Higher than diploma□
4- marital status: Single□ Married□ Divorced□ Widowed□
5- Living arrangement: Alone□ With wife□ With other family members□
6- Number of children:
7- Job status: Retired□ Farmer□ Employee□ manual worker□ housewife□ Self-governed job□ Unemployed□ other□
8- History of disease: Yes□ No□
9- Name of commonly used drugs:
10- Name of medicinal plants used:
11- How familiar are you with medicinal plants? Good □ Average □ Poor □
12- Which of the following is the most important source of your information on the properties of medicinal plants? My own studies □ Friends, family and relatives □ Media and press □ Health staff □ Books □
13- Who are the providers of information about medicinal plants? Health and treatment staff □ Non-health staff □ Health staff □ Press and media (radio and television) □ Internet □ Books □ I don't know □

Knowledge assessment questionnaire

14) Do you know medicinal plants? Yes □ No □
15) Do you know the side effects of medicinal plants? Yes □ No □
16) Do you know the methods of using medicinal plants? Yes □ No □
17) Are medicinal plants more effective than chemical drugs in the treatment of diseases? Yes □ No □ Sometimes effective and sometimes ineffective□
18) Is access to medicinal plants easier than chemical drugs? Yes □ No □
19) Is the simultaneous use of medicinal plants with chemical drugs appropriate? Yes □ No □ Not prohibited with doctor's prescription□
20) Should medicinal plants be taken under the supervision of a doctor? Yes□ No□
21) Do medicinal plants work faster than chemical drugs in the treatment of diseases? Yes □ No □
22) Can medicinal plants be used in large quantities and often? Yes □ No □
23) Are medicinal plants safe? Yes □ No □ Sometimes they are dangerous, sometimes they are harmless□
24) Which of the following are your reasons for using medicinal plants? Cold□ Respiratory problems□ Digestive problems□ Heart problems□ Other diseases□ All cases□

Attitude measurement questionnaire

25) Do you think medicinal plants are harmful? Yes □ No □ Sometimes they are useful and sometimes they are harmful □ I have no opinion□
26) In your opinion, how is the simultaneous use of medicinal herbs and chemical drugs? Useful □ Harmful □ Uncomplicated □ It is not prohibited with a doctor's prescription □
27) Do you think it is harmful to take several herbs at the same time? Yes□ No□ It is not prohibited with doctor's prescription □
28) What is your opinion about the therapeutic efficacy of medicinal plants? High efficacy □ Low efficacy □ No efficacy □ Sometimes weak efficacy and sometimes strong efficacy □
29) Do you think medicinal plants can replace chemical drugs? Yes □ No □
30) Do you think medicinal plants have less side effects than chemical drugs? Yes □ No □ There is no difference□
31) Do you think the cost of medicinal plants is better than chemical drugs? Yes □ No □
32) Do you think the use of medicinal plants is better than chemical drugs? Yes□ No□

Practice measurement questionnaire

33) Have you ever advised someone to use medicinal plants? Yes□ No□

If yes, which medicinal plants have you recommended to others?

34) Do you use medicinal plants for your illness if prescribed by your doctor? Yes □No□ I have no opinion□
35) If you are sick, do you use medicinal plants to treat your illness? Yes□ No□
36) How often do you use medicinal plants? Daily consumption..... times □ Weekly consumption..... times □ Monthly consumption..... times □ Yearly consumption..... times□
37) Which of the following is your method of using medicinal plants? Decoction □ Sweat □ Powder □ Oral □ Topical □ Tea
38) How do you use medicinal plants? Medicinal plants only □ Multiple medicinal plants at the same time □ Combined use of medicinal plants and chemical drugs □
39) How do you prepare medicinal plants? Collection by the person himself □ Purchase from an apothecary □ Purchase from a pharmacy □ Purchase from supermarkets □
40) Do you inform your doctor about the use of medicinal plants? Always □ Often □ Never □ Sometimes □
41) Do you use medicinal plants as a therapeutic supplement at the same time as taking chemical drugs? Yes□ No□
42) Have you ever used several herbs at the same time? Yes□ No□
43) Which of the following is the reason for not using medicinal plants?

Contd...

Table 2: Contd...

The price of herbal medicines in comparison with chemical medicines□
Lack of expert staff in the field of medicinal plants□
People's lack of confidence in the healing properties of medicinal plants due to impurity
Lack of proper processing and packaging of medicinal plants compared to chemical agents□
Improper introduction of medicinal plants by official and scientific authorities□
Lack of familiarity of people with the properties of medicinal plants□
The long-term effect of medicinal plants compared to chemical drugs in the treatment of diseases □

Table 3: The percentage of agreement between two assessment procedures in the elderly on the knowledge, attitude, and practice regarding the use of medicinal plants

Percentage of agreement	Question number	Percentage of agreement	Question number
0.73	16	Knowledge	
1	17	1	1
0.59	18	0.63	2
0.58	19	0.92	3
Practice		0.63	4
0.93	20	0.54	5
0.45	21	0.81	6
0.82	22	0.75	7
0.72	23	0.87	8
1	24	0.48	9
0.95	25	0.4	10
0.54	26	0.97	11
0.61	27	Attitude	
0.8	28	0.52	12
0.8	29	0.62	13
0.81	30	0.74	14
		0.87	15

results, a valid and reliable instrument was confirmed after performing the psychometric procedures.

In general, the average percentage of agreement in the questionnaire was 0.73%. According to the findings, bad agreement was not observed in the results and 12 cases of very good agreement, 10 cases of good agreement, 7 cases of average agreement, and 1 case of fair agreement were obtained. In Heydari Far's study, the reliability of the questionnaire was 0.86,[9] and in Gheydari's study, it was 0.88.[15] In terms of the method adopted to determine the internal and external reliability, this study is consistent with many previous studies, including the study of Husseini *et al*.[16] and Mirzamani *et al*.[17]

Limitation

One of the biggest limitations of this research was the simultaneous implementation of the research and data collection with the peak of the COVID-19 epidemic.

Recommendation

1. Wider investigations regarding the level of knowledge, attitude, and practice of the elderly.
2. Investigating the interactions of herbal medicines with chemical medicines used in the elderly.
3. Investigating the effectiveness of medicinal plants in the elderly.

Conclusion

The present study, which included the design of a questionnaire on the knowledge, attitude, and practice of the older adults regarding how to use medicinal plants, mostly consisted of 43 questions in the areas of knowledge, attitude, and appropriate practice regarding how to use medicinal plants; after determining the content validity and reliability of the questionnaire and determining the correlation coefficient between the questions that were calculated during re-testing, the study revealed that this questionnaire is able to measure these three areas and can be used by other researchers in future studies; therefore, due to the lack of an appropriate questionnaire for collecting information in conducting research, especially in the field of medicinal plants, this questionnaire can provide comprehensive and accurate information to researchers in this field, which can be used as a suitable tool that has acceptable validity and reliability.

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Conflicts of interest

There are no conflicts of interest.

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