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The Effects of Educational, Extension, and Research Factors on the Development of Medicinal Plants in Markazi Province of Iran

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Abstract

The main objective of this study was identifying the effects of educational, extension and research factors on the development of medicinal plants in Markazi Province of Iran. The statistical population included all managers, extension agents and experts involved in medicinal plants in Markazi Province in 2014 (N = 50), who were selected by the census sampling method (n=50). The research instrument was a questionnaire whose face and content validity were confirmed by a panel of experts and specialists of medicinal plants and also its reliability was estimated by Cronbach's alpha to be 0.78. Results showed that some factors such as informing and training the people about medicinal plants via television and training the physicians about medicinal plants benefits prove more effective in the development of this industry. On the other hand, from among five main factors which explained the variance of medicinal plants development factors, the following three factors have priority: training and extension of medicinal plants (Var. =16.54), educational standards of medicinal plants (Var. =13.18), and technical and vocational education (Var. =11.48). Also, the variables of education level, job experience in agriculture section, current attitude towards development of prescribing medicinal plants by physicians, current amount of using medicinal plants capacity in the province, and assessment of current attitudes toward medicinal plants production, have caused more significant difference in the view of statistical sample about the effect of some educational, extension and research factors on the medicinal plants industry development.

Keywords:

education, extension and research, Markazi Province, medicinal plants industry (MPI)

INTRODUCTION

Since the beginning of human creation, human has thought about his/her health as much as about attempts to produce food and clothing. In this respect, how to be healthy, healthy living and physical discomfort have been their concerns. This idea led to the creation of medical science with all its enormous dimensions. These dimensions have an extent and depth as long as the history of human creation and breadth of thousands of research, investigation and experience. In past, nature therapy was done using plants, metals, mineral waters and, empirical methods such as phlebotomy, and orthopedics (Naderi & Madani, 2008). According to historical evidence, there have been some references about various plants specially the plants with medicinal properties in Egyptian (Papyrous & Ebers) works around 26 century BC (Ghahraman, 2003). Herbal medicine information of Chinese and Japanese can be traced back to hundreds centuries BC but, according to available documents, they have dedicated huge gardens and farms to growing medicinal plants since 3000 years BC (Naderi and Madani, 2008). The use of natural plants to preserve health, individual and collective health have been seen in the Islamic traditions for several times. For instance, Holy Prophet of Islam has recommended wood brush for oral hygiene and now it has been found that tannins, calcium and sulfur compounds of this tree are greatly effective in the prevention of tooth decay as well as in the reduction and remedy of oral diseases (Amiri & Chaychi, 2006). Over the past few years, the medicinal plants were regained a wide recognition due to an escalating faith in herbal medicine in view of its fewer side effects as compared to allopathic medicine in addition the necessity of meeting the requirements of medicine for a growing human population (Prakash Kala et al., 2006).

Importance of medicinal plants can be considered from different aspects in sustainable development of Iran. Some aspects such as raw material production, employment, access to global markets, and environment conservation are the opportunities provided by this industry for the economy of Iran (Shahrokhi, 2002). Of

course, these industries play a main role in the alleviation of rural poverty. For example, resource-poor people in India's poorest state Uttaranchal collect plants from the wild in order to complement their incomes (Van de Kop et al., 2006). On this basis, emphasis is put on the low level of integration and collaboration between Medicinal Plants Industry (MPI) service sectors such as extension, academic and research, as well as their isolation from the industry. The majority of small-scale growers use conventional production practices using low-tech inputs supplies which negatively affect the yield and final product quality.

Studies showed that the extent of importance and position of medicinal plants increases day to day in Iran and the world due to its important role in achieving national, regional and universal goals, health development, social happiness, self-medication, job creation, economic development, food security, conservation of plant genetic resources, and active precipitation of the country in global markets (Ebrahimi & Ebrahimi, 2012). Despite having 11 climates of 13 global climates, high temperature variation range (50°C), different ecological and environmental conditions, and 300 sunny days in the year and the fact that 22.6% of 7500 plant species of Iran plateau are medicinal and industrial, but maximum 300 species are used in Iran due to lack of awareness among people and lack of proper quantitative and qualitative studies. 7500 plant species is almost three times as great as Europe's vegetative cover (Shahbazi, 2006). Although having 72 companies active in the production and processing of medicinal plants and presenting 62 items of herbal drugs, 6000 traditional grocery stores which distribute medicinal plants across the country, only 0.3-1% of consumable medicines are produced from medicinal plants in Iran, while some developed countries produce 25-75% of their consumable medicines from these plants (Ebrahimi, 2001). Since three decades ago, the consumption of the medicinal plants has been reduced and even has been eliminated from the people's mind due to the import and production of chemical drugs, the development of new medical science in Iran, and the high

tendency of physicians for prescribing chemical drugs and being less aware or unaware about the benefits and methods of medicinal plants consumption. Physicians' recommendations about not using these plants by people and lack of their correct use promotion caused medicinal plants to be eliminated from the cycle of physical and mental health of people. This led to the replacement with chemical drugs use so that several medicinal packages and tablets can be found in almost all homes (Pouyan, 2008).

The importance and necessity of medicinal plants are increasing with studies developing on their side effects (Rad et al., 2013; Sharifi Rad et al., 2013). In developed countries, tendency is increasing towards medicinal plants consumption by revealing the harms of chemical drugs and various studies is being carried out to show the influence of herbal medicine. For instance, herbal medicine is effective in simplifying the remedy of chronic diseases (Rad et al., 2014; Sharifi-Rad et al., 2014), while no significant advance is seen in their production and consumption in Iran. Although it is estimated that the amount of world trade of medicinal plants and their products is about 100 billion dollars per year, the share of Iran is only 0.07% (60 million dollars). Such situation is not acceptable for a country with 2300 plant species and high plant potential capacity in which 800 species are medicinal and 100 species play an important role in producing medicines, cosmetics, etc. (Ebrahimi Varkiani, 2008). On the other hand, lack of some prerequisites prevents production and consumption of medicinal plants in Iran. In this regard, available data show that Iran does not have a comprehensive gene bank of medicinal plants. It is necessary for officials to support and define economical tools given the economical and sanitary importance of medicinal plants and their export development in non-oil commodities basket (Sadat, 2011). Zahedi (1990) noted the necessity of identifying and introducing the therapeutic effects of medicinal plants as a solution to develop medicinal plants industry. In addition, he noted the importance of proper packaging, establishment of main scientific-research centers to distinguish effective materials,

procedures for proving therapeutic effects of medicinal plants, legislation of rules for the presence of competent people in different stages of this industry and to prevent excessive harvesting. Omidbeigi (2010) reported that medicinal plants production is traditional in Iran and that practical procedures are needed for their scientific production. The most important activity of successful countries in this industry is to standardize medicinal plants from stage of planting the seeds to extraction of essential oil and processing stage. Therefore, this industry should be affordable in order to improve medicines produced from medicinal plants. Also, it is necessary to study the effect of various climatic conditions on their fertility, operations of the mechanization of production, packaging, processing, storage, marketing, and export.

Although currently, people's tendency to use medicinal plants has increased over the past and there is a significant potential to entrepreneurship and the creation of job opportunities in this field, it is not considered yet as a field for the occupation of agricultural graduates due to the problems of medicinal plants industry (Sadat, 2011). Little attention to the development of medicinal plants results in high costs for the country. For instance, half a billion dollars and 3000 billion IRR (Iran currency) per year is spent from general budget for imported drugs while medicinal plants sold in the country is less than 3% of medicinal plants (Rashidi et al., 2011). In 1997 in the U.S. from 27 billion dollars of traditional treatments costs, 3.24 billion dollars was for herbal remedies. 80% of the offered medicines in some countries have an herbal origin and 90% of people in developed countries use herbal medicines. But there is no documented and reliable statistics of medicinal plants consumption or even the amount of their production. Also, no comprehensive, regular, and consistent development plan is followed to develop medicinal plants (Rashidi et al., 2011). Gousheh (2008) showed that in Kerman Province, mean familiarity of doctors with medicinal plants and their prescription was as low as about 30%, and age and type of their expertise did not have significant effect. On the other hand, 63% of

studied patients were familiar with medicinal plants, 96% of them believed in medicinal plants, and 76% believe that the using medicinal plants should not be under medical supervisions. Also, 77% were ready to take medicinal plant instead of chemical drugs. It should be considered that people of Shiraz have higher awareness about these plants as compared with people of other regions of Iran (Beheshtipour et al., 2010). Bakhtiary (2010) indicated that only 37% of patients believed that medicinal plants were more appropriate and useful than chemical drugs. But, women and men living in urban and rural areas believed in the effectiveness of herbal therapy almost twice as much as the men and residents of Isfahan. The results of a study in Portugal showed that concomitant use of medicinal plants and herbal medicines with conventional medications were 86.2% and 81.3% of the elderly, respectively (Machado et al., 2014). On this basis, they developed a notebook and a primer for extension and dissemination of such information and the improvement of the use of herbal medicine among the elderly.

In a study in west of Mazandaran Province, Ahvazi et al. (2012) showed that local people used a few medicinal plants (14 species) to cure different diseases. Investigating the effective factors on the amount of knowledge about existent medicinal plants in Arasbaran region shows that there is a significant relationship between access to health center and knowledge but people's age and education level and the amount of chemical drugs consumption do not have significant relationship with this case (Zolfaghari, 2012). Results of a research in the U.S. indicated that 86% of the studied patients were willing to use different methods of traditional and alternative medicine, especially medicinal plants but they did not follow such remedies due to the lack of enough information and awareness as well as physicians prescribing (Evans et al., 2008). On the other hand, as it was mentioned, people do not highly believe in the use of medicinal plants under medical supervision. A study in Italy also approved this proposition. The women studied in Zaffani et al. (2008) believed that herbal remedy was a kind of natural

remedy and was safer than chemical treatments. Therefore, there is no need to ask physicians' opinions about how to use medicinal plants. So it is seen that arbitrary use can reduce market and weaken this industry by having negative side effects. The Iranian strategic document of natural resources researches development states problems and limitations of medicinal plants industry in the field of collecting and producing extraction from natural fields, required inputs, sowing to harvesting operation and finally, products marketing and trading. In this report, the most important challenges and problems of this industry were introduced as the lack of coordination between research units that causes the researches remain incomplete, conducting parallel and unnecessary researches, inadequate coordination and relationships between executive and research departments including producers' little attention to researches and their results, researchers, society requirements and researches applicability, lack of adequate oversight and inattention to international standards in withdrawal extracting from the nature, production, packaging, processing and export of medicinal plants (Karami & Hayati, 2010). These researchers believe that attention to educational requirements and raising awareness level, professional skills and knowledge, medicinal plants utilizers and producers, identifying effective factors on acceptance and development of these plants and participating in protection of natural reservoirs by farmers, ranchers and rangeland managers are necessary beside to research approaches and programs. On the other view, lack of appropriate culture for cultivation and consumption of medicinal plants is another problem in developing this industry in Iran. Lack of supportive legislation for this beneficial part of agricultural production is also one more problem of this industry (Farokhi, 2012). Vejdani and Solgi (2012) considered expensive price of the products as compared with exporting countries, lack of proper understanding of foreign markets and the lack of direct communication with major buyers, problem about standard level and lack of adequate investment in foreign markets by the government as major problems of production and exporting me-

dicinal plants. Van de Kop et al. (2006) referred to high risks, transaction costs and lack of trust among chain actors as factors preventing small-holder producers from taking up cultivation of medicinal plants. Saadabadi (2010) points to some problems of medicinal plants industry and states some other points including efficient management (such as extensive promotions about properties of herbal medicines) and organizing experienced and complete research groups as the major strategies. He also points to producing new technology and market information for producers and farmers, fundraising and financial resources inside and outside of the country and export development, informing the farmers about prospective medicinal plants cultivation, active participation of farmers in training farms, telephone and free consultation with them, and creating financial and spiritual support for them as the strategies to develop this industry.

Medicinal plants industry has a specific situation and relative advantages in Markazi Province due to its natural geographic position. This industry plays an important role through dedication of significant portion of the income and employment of agricultural and medicinal-health part in economic and social activities of the province. 7500 medicinal plant species grow in the province, and the most important medicinal plants of the province include yarrow, tarragon, chives, sagebrush, vegetables, amaranth, ivy, and coriander (Mirdavoudi, 2012; Mohammadi, 2012). Nevertheless, not only is there no planned and enough data about this industry but it also is not considered by administrators of the province and particularly agricultural section. Major factor of this industry growth or “production” has been neglected. On the other hand, there are no experts and extension agents with direct responsibility. Also, there is no specific long-term program to develop this industry in the province. Young generations are also less familiar with medicinal plants and their benefits and use (Mohammadi, 2012). Undoubtedly, there is a need for actual data about the last production status, export and effective components on its development for setting goals, developing plans and taking necessary activities to achieve the

goals for the long-term quantitative and qualitative promotion of medicinal plants industry. Given that there are not such scientific data, it is necessary to carry out the present study. Accordingly, the main purpose of this study was to identifying educational, research and extensional factors affecting the development of the medicinal plants industry. The specific objectives were to: (1) determine the current state of medicinal plants in Markazi Province, (2) identify the demographic characteristics of the respondents; (3) identify factors affecting the development of the medicinal plants industry.

MATERIALS AND METHODS

The present study was carried out to determine the current state of medicinal plants in Markazi Province and to investigate the research, extensional, and educational factors affecting the development of this industry.

This study followed a descriptive survey research design. The target population comprised 50 extension agents, researchers, managers, and experts who were concerned with the subject of medicinal plants. Due to limited number of the statistical population, census method used for sampling. The main research tool was a questionnaire which its validity was confirmed by a panel of experts, and using Cronbach’s alpha (0.78) the reliability of the instrument was approved. Both descriptive and analytical (factor analysis) statistics were applied to yield the present result.

In this study, equation (1) was used to understand and prioritize methods and strategies for developing medicinal plants industry of Markazi Province (Hajimirrahimi & Zamani, 2002):

$$(EF-PS) \times EF = PR \quad (1)$$

Where, EF is the efficacy of medicinal plants industry development, PS is the current state of the factors and PR is the priorities of policies, approaches, and strategies.

RESULTS AND DISCUSSION

Based on the information summarized in the Table (1) below, in terms of level of education, 49% of respondents had a Master of Science

(MSc) and a Doctor of Philosophy (Ph.D. /D.Phil.) degree and 37.7% of them had a Basic Science (BS). The statistical population was well knowledgeable and scientifically able to answer the study questions, which could enhance the credibility of the results. The academic major

Table1
Frequency Distribution of Personal Characteristics of Respondents

Variable	levels	Frequency	Percent	valid percentage
Education level	Associate's degree	7	13.2	13.2
	Bachelor's degree	20	37.7	37.7
	Master of Science (MSc)	20	37.7	37.7
	Doctor of Philosophy (Ph.D.)	6	11.3	11.3
Fields of study	Total	53	100.0	100.0
	Plant sciences	22	41.5	45.8
	Natural resources	14	26.4	29.2
	Soil science	1	1.9	2.1
	Plant medicine	3	5.7	6.2
	Pharmacy	2	3.8	4.2
	Extension and education	5	9.4	10.4
	Animal science	1	1.9	2.1
	Non response	5	9.4	100.0
	Total	53	100.0	
Work experience in agricultural* fields (year)	10 years or less	9	17.0	25.0
	10- 20 years	20	37.7	55.6
	21≥ years	7	13.2	19.4
	Non response	17	32.1	100
	Total	53	100	
Experience in cultivation of medicinal plants (year)**	10 years or less	16	30.2	61.5
	11- 20 years	8	15.1	30.8
	21≥ years	2	3.8	7.7
	Non response	27	50.9	100.0
	Total	53	100.0	
Work experience in management and planning of medicinal plants development (year)***	10 years or less	14	26.4	77.8
	11- 20 years	4	7.5	22.2
	Non response	35	66.1	100.0
	Total	53	100.0	
Work experience in education and extension of medicinal plants (year)****	10 years or less	20	37.7	74.1
	11- 20 years	7	13.2	25.9
	Non response	26	49.1	100.0
	Total	53	100.0	
Training courses related to medicinal plants *****	1-2	15	28.3	60.0
	5-3	9	17.0	36.0
	6<	1	1.9	4.0
	Non response	28	52.8	100.0
	Total	53	100.0	

*Mean of work experience= 15.39, SD= 7.56 and range between 2 to 30 years.

**Mean of experience in cultivation- horticulture= 10.23, SD= 8.97 and range between 1 to 40 years.

***Mean of experience in management and planning= 6.53, SD= 6.55 and range between 1 to 20 years.

****Mean of experience in education-extension= 7.19, SD= 6.3 and range between 1 to 20 years.

*****Mean of training courses related to medicinal plants= 2.86, SD= 1.93 and range between 1 to 8.

of 45.8% of respondents were plant science and 29.2% of them studied in natural resources. As shown by the results, 97.9% of respondents were familiar with medicinal plants. In order to assess relevant work experience, working in the fields of agriculture, cultivation-horticulture of medicinal plants, management, as well as planning of medicinal plants and educational-extensional affairs of medicinal plants were examined. In addition, respondents were divided into three general categories in terms of work experience including 10 years or less, 10 to 20 years and more than 20 years. Accordingly, more than half of the respondents (55.6%) had work experience between 10-20 years in agriculture.

They were very experienced in the field of agriculture because 75% of respondents had work experience of more than 10 year which implied a good understanding of the problems associated with the development of agriculture. A review of their experience in the field of cultivation-horticultural affairs of medicinal plants demonstrated that most of respondents had work experience of 10 years or less (61.5%) in the field of cultivation-horticultural affairs of medicinal plants. On the other hand, most of them had work experience of 10 years or less in the field of management and planning of medicinal plants. In addition, 77.8% respondents had 10 years or less work experience in the field of educational-extensional affairs of medicinal plants. Also, 96% of them had participated in 1 to 5 training courses related to medicinal plants. Consequently their knowledge about the qualitative and quantitative development of medicinal plants was adequate. However, 60% of the people had passed only 1 to 2 training courses. It was shown that although people under study were not graduated of medicinal plants disciplines, they had passed some courses in the field of medicinal plant. Therefore, it is very important to take relevant training courses. Participants evaluated their expertise capability as to be less than moderate in the field of scientific and extensional subjects of medicinal plants. In fact, they would highly need training while working in the field of scientific-applied sciences of medicinal plants ($M=2.62$, $SD=1.06$) (see Table 1).

The results of investigation of 26 educational, extension and research statements demonstrated that the mean score of their effect on development of medicinal plants was 3.92 out of 5. Based on qualitative classification, the amount of effect was evaluated to be high. In this regard, the following statements were found to be more effective than others: "informing and training of the people about medicinal plants use via television" ($M=4.17$), "informing and training of the people about medicinal plants via radio" ($M=4.17$), and "training the physician about the medicinal plants benefits" ($M=4.13$). Furthermore, it is cleared that statements including "extensional publication and its distribution among medicinal plants exporters of the province" ($M=3.69$), "trainings for exporters in frameworks of educational and skill standards" ($M=3.78$), and "training of rural women to produce medicinal plants" ($M=3.84$) were less effective on development of MPI (see Table 2). The findings confirmed that the attentions to these statements were inadequate (1.52 out of 5) which can be a cause of the current problems of this industry. In addition, it explains that current situation of educational, extension and research programs of medicinal plants in this province can be an important factor in its low efficiency (Table 2).

As regards equation (1), planners should devote more attention to these strategies than others: training of the people about understanding and using medicinal plants via the province television ($PR=11.74$), informing and training of the people about medicinal plants use via television ($PR=11.56$), training of the physicians about medicinal plants benefits ($PR=11.54$) and using the results of research plans in medicinal plants export units ($PR=11.52$), for developing the medicinal plants industry. On the other hand, strategies of (a) training of rural women to produce medicinal plants ($PR=9.14$), (b) adding courses of understanding and applying medicinal plants to academic programs of agriculture and medicine and ($PR=8.78$), and (c) expanding of academic subjects of medicinal plants ($PR=8.28$) had the lowest Means ranks (Table 2). In other words, pragmatism in the development of human resources is more considered than academic

Table 2

Statistical Distribution of Efficacy, Current Status and Improvement Strategies of Educational, Extensional and Research Programs

Statements/Strategies	(EF),(PS)	Mean	SD	Priority of strategies
Training of the people about understanding and using medicinal plants via the province television	EF	4.04	1.2	11.74
	PS	1.13	0.6	
Informing and training of the people about medicinal plants use via television	EF	4.17	1.12	11.56
	PS	1.4	0.6	
Training of the physicians about medicinal plants benefits	EF	4.13	1.16	11.54
	PS	1.34	0.52	
Using the results of research plans in medicinal plants export units	EF	4.02	1.17	11.52
	PS	1.15	0.36	
Using the results of research plans in processing units of medicinal plants	EF	4.01	1.1	11.45
	PS	1.17	0.38	
Applicability of the results of medicinal plants researches	EF	4.04	1.14	10.89
	PS	1.34	0.55	
Standardization of the occupations related to medicinal plants sales	EF	3.94	1.13	10.86
	PS	1.19	0.44	
Extensional training for medicinal plants producers	EF	4.04	1.2	10.66
	PS	1.4	0.6	
Extensional publication and its free distribution among medicinal plants consumers	EF	3.9	1.16	10.14
	PS	1.24	0.48	
Quality and quantity of research activities about marketing and export of medicinal plants	EF	3.9	1.2	10.09
	PS	1.32	0.51	
Extensional publication and its distribution among grocery and medicinal plants sellers of the province	EF	3.85	1.06	10.02
	PS	1.24	0.58	
Extensional publication and its distribution among medicinal plants producers of the province	EF	3.8	1.18	99.99
	PS	1.19	0.4	
Extensional planning for medicinal plants sellers of the province	EF	3.85	1.13	99.9
	PS	1.3	0.54	
Educational-extensional planning for medicinal plants exporters of the province	EF	3.8	1.1	9.8
	PS	1.2	0.45	
Technical and vocational education programs of medicinal plants	EF	3.9	1.12	9.8
	PS	1.4	0.66	
Informing and training of the people about medicinal plants via radio	EF	4.17	1.12	9.8
	PS	1.4	0.6	
Training and skill program for sellers and grocery stores	EF	3.8	1.2	9.7
	PS	1.32	0.34	
Development of educational and skill standards for each medicinal plant	EF	3.9	1.08	9.6
	PS	1.43	0.75	
Training of the people via local newspapers in the field of understanding and correct use of medicinal plants	EF	3.85	1.21	9.53
	PS	1.38	.62	
Quality and quantity of research activities on plantation problems of medicinal plants	EF	3.85	1.28	9.5
	PS	1.43	0.64	
Quality and quantity of medicinal plants research units in the province	EF	4	1.17	9.29
	PS	1.68	0.94	
Trainings for exporters in frameworks of educational and skill standards	EF	3.78	1.08	9.28
	PS	1.32	0.61	
Extensional publication and its distribution among medicinal plants exporters of the province	EF	3.69	1.14	9.25
	PS	1.22	0.46	
Training of rural women to produce medicinal plants	EF	3.84	1.18	9.14
	PS	1.53	0.64	
Adding courses of understanding and applying medicinal plants to academic programs of agriculture and medicine	EF	3.94	1.13	8.78
	PS	1.7	0.9	
Expanding of academic subjects of medicinal plants	EF	3.85	1.18	8.28
	PS	1.7	0.75	

Table 3
Specific Value of the Factors Variance Percentage

Factor	Specific value	Variance percentage	Cumulative percentage
Factor 1	1.5	16.54	16.54
Factor 2	1.2	13.18	29.72
Factor 3	1.09	11.47	41.19
Factor 4	1.05	10.37	51.56
Factor 5	1.01	10.2	61.76

certifications.

In this study, factor analysis was applied for internal grouping of topics related to educational-research programs of medicinal plants. KMO and Bartlett's tests results showed that the data were appropriate for factor analysis (KMO= 0.929, Bartlett test= 1638.50, $p < 0.01$). In order to determine the number of factors, Kaiser criteria and variance percentage were used. Accordingly, the factors with eigen value of greater than 1 were determined. Accordingly, five factors which explained 61.76% of total variance were extracted (see Table 3). In explaining the matrix of factors correlation, the variables whose factor load is higher than 0.5 and more, are in an acceptable significant level with considered factor. Table 3 presents variables which have the required correlation with each factor or their factor load is higher than 0.5.

In addition, factor Verimax rotation was used in order to simplify the factors structure and to make them interpretable as well as naming (see Table 4). The first factor which explained 16.54% total variance of development of educational, extension, and research factors, and was named as "training and extension of medicinal plants factor". This factor includes some variables such as: (a) extensional planning for medicinal plants sellers of the province, (b) extensional publication and its distribution among grocery and medicinal plants sellers of the province, (c) educational-extensional planning for medicinal plants exporters of the province, (d) training the people about understanding and using medicinal plants via the local television, (e) extensional training for medicinal plants producers, (f) extensional publication and its distribution among medicinal plants producers of the province, (g) training the physicians about medicinal plants benefits, (h) extensional publication and

its distribution among medicinal plants exporters of the province, (i) standardization of the occupation related to medicinal plants sales, (k) using the results of research plans in medicinal plants export units, and (l) training and skill program for sellers and grocery stores which had an acceptable correlation with the first factor. The second factor that was named "development the educational resources and training the Involved in" includes variables of (a) development of educational and skill standards for each medicinal plant, (b) trainings for exporters in frameworks of educational and skill standards and (c) quality and quantity of medicinal plants research units in the province. The second factor explained 13.18% of total variance of educational, extension and research factors on development of medicinal plants industry. The third factor named "technical and vocational education" explained 11.47% total variance and includes variable such as; (a) technical and vocational education programs of medicinal plants, and (b) training the people via local newspapers about understanding and correct use of medicinal plants. Other variables of factors indicated in Table 4.

All the variables had an acceptable correlation with the third factor in addition to explaining of educational, extension and research factors on development of medicinal plants industries' variance. So as is evident in graphical model of Figure 1, effective factors of educational, extensional and research programs of medicinal plants industry development include five important factors.

The results of variance analysis test of Kruskal-Wallis showed that most personal and vocational characteristics of the respondents did not cause significant differences in their attitudes towards efficacy and current status of most studied

Table 4

Grouping of Topics Relevant with the Effect's Factors of Educational, Extension and Research Factors on Development of Medicinal Plants on Development of Medicinal Plants after Factor Rotation

Factor	Variable	Factor load	
Factor 1: Training and extension of medicinal plants	Extensional publication and its distribution among medicinal plants producers of the province	0.843	
	Extensional publication and its distribution among grocery and medicinal plants sellers of the province	0.725	
	Extensional publication and its distribution among grocery and medicinal plants sellers of the province	0.725	
	Extensional publication and its distribution among medicinal plants exporters of the province	0.714	
	Training and skill program for sellers and grocery stores	0.662	
	Training of the people about understanding and using medicinal plants via the local television	0.659	
	Educational-extensional planning for medicinal plants exporters of the province	0.602	
	Training of the physicians about medicinal plants benefits	0.573	
	Extensional training for medicinal plants producers	0.559	
	Standardization of the occupation related to medicinal plants sales	0.546	
	Factor 2: Educational standards of MPI	Development of educational and skill standards for each medicinal plant	0.907
		Trainings for exporters in frameworks of educational and skill standards	0.768
Factor 3: Technical and vocational education	Quality and quantity of medicinal plants research units in the province	0.518	
	Technical and vocational education programs of medicinal plants	0.881	
Factor 4: Applicability and using the research results	Applicability of the results of medicinal plants researches	0.759	
	Training of the people via local newspapers in the field of understanding and correct use of medicinal plants	0.748	
	Using the results of research plans in export units	0.643	
Factor 5: Modification of official training program	Using the results of research plans in processing units of medicinal plants	0.592	
	Addition of courses of understanding and applying medicinal plants to academic programs of agriculture and medicine	0.892	
	Quality and quantity of research activities on plantation problems of medicinal plants	0.798	
	Informing and training of the people about medicinal plants via radio	0.504	
	Expanding of academic subjects of medicinal plants	0.502	

topics and strategies. It means that there was a kind of consensus about the status of the issues. Also, variable of education level resulted in a significant difference in respondents' views about the status of four topics including extensional publication and its free distribution among medicinal plants consumers ($p < 0.05$), technical and vocational trainings program of medicinal plants ($p < 0.05$), extensional training for medicinal plants producers ($p < 0.01$), and standardization of the occupation related to medicinal plants sales ($p < 0.05$).

The variable of "experience in agriculture sector" also caused significant differences in the positions of five topics including extensional planning for medicinal plants sellers of the province ($p < 0.05$), extensional publication and its free distribution among medicinal plants consumers ($p < 0.05$), adding courses about understanding and application of medicinal plants to academic programs of agriculture and medicine ($p < 0.05$), expanding of academic subjects of medicinal plants ($p < 0.05$) and training the physicians about medicinal plants benefits ($p < 0.05$). Also variable of "work experience

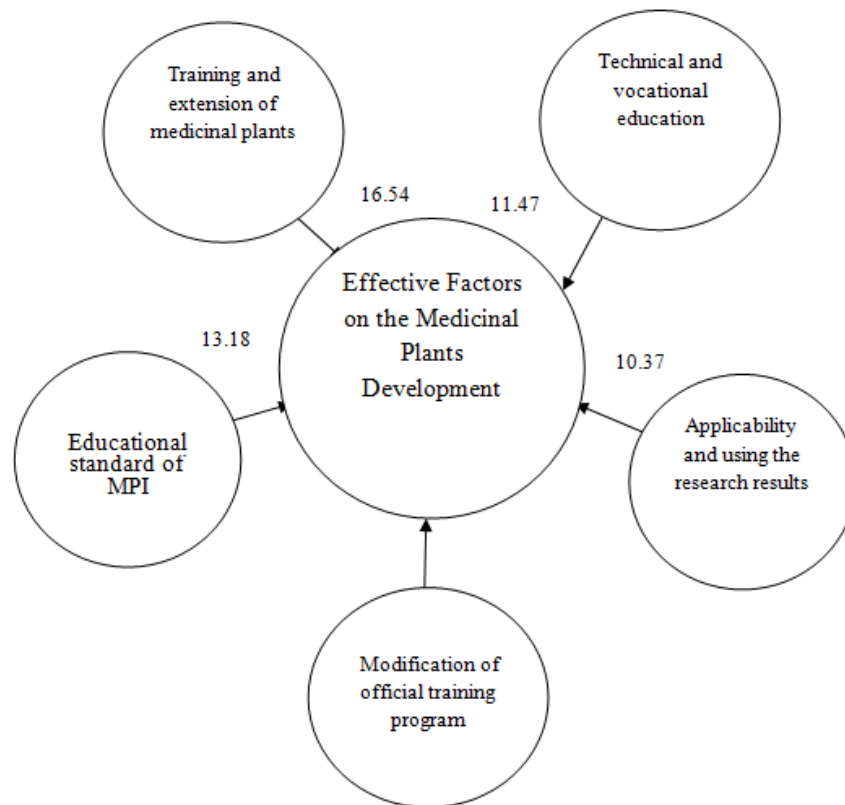


Figure 1. Factor Analysis of Respondents' Comments about Effects of Educational, Extension and Research Factors on Development of Medicinal Plants Industry

in educational and extensional tasks of medicinal plants” caused a significant difference in the position of only one topic (extensional publication and its free distribution among medicinal plants consumers ($p < 0.05$). On the other hand, results of the effect of professional perspectives of the statistical sample on position of studied strategies have demonstrated that, despite of ineffectiveness of these perspectives on evaluated strategies, among seven investigated perspectives three following views affected the position and situation of 26 studied of the effect of educational, extension and research factors on development of medicinal plants industry:

- Current status of the perspective of the development of medicinal plants prescription by physicians
- Current use of medicinal plants capacity in the province
- Evaluation of current views about medicinal plants development

Accordingly, it seems that these strategies have a stabilized situation considering their low standard deviations.

CONCLUSION

Generally, educational-research programs guarantee stability and development in all fields. In medicinal plants industry, too, these programs can play an important role in sustainable development by improving knowledge and skill capabilities of people working in this field in all stages of planting, harvesting, storage, marketing, exports processing and use of medicinal plants, and also by identifying the obstacles of quantitative and qualitative development as well as research activities. Considering the importance of development of MPI, the main goal of current research was to identify factors affecting the development of medicinal plants in Markazi Province of Iran. As shown by the results, it was found that most of the respondents were not expert in the field of medicinal plants and also the majority of them have not participated in training courses about medicinal plants so regularly. Moreover, they did not have much experience in practices related to the production medicinal plants. Considering this finding, it is necessary to pay more attention to the implementation of extension training courses. The

most important findings revealed that the average effect of the studied twenty-six strategies was nearly high (3.92/5). In this regard, the effect of following topics were higher than others: informing and training the people about medicinal plants via television, training the physician about medicinal plants benefits, and using the results of research plans in processing units of medicinal plants. A part of these results is consistent with Karami and Hayati (2010) and Farokhi (2012). Nevertheless, currently, attention to the mentioned topics is low (1.52 / 5). This result suggests that current situation of medicinal plants educational-research programs of the province can be an important factor in weakness and low efficiency of this industry. This result indicated that these strategies have a stabilized situation in medicinal plants industry development of the province. Finally, following strategies are required to be prioritized to improve future view of medicinal plants industry development of Markazi Province through improvement of educational, extensional, and research programs: (a) informing and training the people about medicinal plants via television, (b) training the physicians about medicinal plants benefits, (c) attention to applicability of medicinal plants researches, (d) using the results of research plans in medicinal plants export units, and (e) using the results of research plans in medicinal plants processing units.

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