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Gardening Perception and Practices Related to the Medicinal Plantation: A Factor Loading Analysis

SHIVANI SRIVASTAVA* and SHAHEEN FATIMA

Department of Home Science, Netaji Subhash Chandra Bose Government Girl's PG College, Lucknow, India.

Abstract

A medicinal plant contains a substance that can be used for therapeutic purposes or to make valuable medications. Most underdeveloped nations rely on traditional medicinal herbs as a normative foundation for sustaining proper nutrition and health. The general and specific benefits of medicinal cultivars for those suffering from mental illness, intellectual incapacity, and other medical conditions. The aim of the study to assess perception and practices of medicinal plant gardening among respondents, assess the association between the perception and practices among respondents related to the medicinal plantation. Methodology of the study inculcate an Exploratory and cross-sectional Study in the Urban Area of district Lucknow explores gardening practices, and identifies the strengths and weaknesses of gardening practices among respondents. The study includes a survey to explore the current trends of gardening attitudes and practices among 400 respondents through a structured interview schedule. With the help of the structured questionnaire, the data from the respondents was tabulated and analysed by using appropriate tests and software. The results showed that most individuals had a practice of changing the soil and using natural fertilizer for the proper growth of medicinal plants and that respondents had a positive attitude towards expanding garden space for further medicinal plantation cultivation. It was additionally found that better cultivation techniques of medicinal plant gardening in the community necessitate appropriate intervention and planned implementation. The study explores the awareness, perception, and training needs related to medicinal plants among different demographic groups and examines the association between demographic variables and respondents' perceptions. Key findings suggest that education and type of house significantly influence awareness levels. Thus, this study aims to bridge the knowledge gap by analysing demographic patterns in medicinal plant awareness, evaluating training

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CONTACT Shivani Srivastava shivanisrivastava1964@yahoo.com Department of Home Science, Netaji Subhash Chandra Bose Government Girl's PG College, Lucknow, India.

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needs, and recommending strategies for promoting sustainable medicinal plant cultivation. By integrating scientific training, government initiatives, and community participation, medicinal plant utilization can be greater, contributing to health benefits, economic empowerment, and environmental sustainability.

Introduction

The primary manifestations of cirrhosis, fever, cold, cough, rheumatic pain, burns, fungal infections, insect bites, influenza, diarrhoea, jaundice, and stomach-aches are all addressed using medicinal plants.[1] Throughout the pandemic, an assortment of traditional medicinal plants and herbs were used as remedies in the case that there were no suitable medications to treat COVID-19. This led to improved health outcomes for COVID-19 patients.[2] The Indian subcontinent is one of the 12 most prominent biodiversity hotspots in the world, encompassing 16 distinct agro-climatic zones, 10 vegetation zones, 25 biotic provinces, and over 426 species-specific habitats.

Nearly 20% of the world's plant species, or more than 45,000 species, are heritage.[3] According to UNESCO (1998), a greater reliance on the use of plants for medicinal reasons in developed nations has resulted from the extraction and production of numerous drugs and chemotherapeutics from these plants as well as from traditionally used remedies derived from herbs in rural areas.[4] There were 95 species in foremost, from 48 categories and 88 classes, that were utilized to treat different illnesses; 53 of them species, from 36 families, were used as wild foods. Trees comprised 44.42% of the therapeutic uses, followed by herbs (29.57%) and climbers (12.64%). The sustainable management of highly valued species and nutritional security must be connected to policies of medical plants and uncultivated foods according to various vulnerability classifications.[5] Consuming fruits and vegetables on a regular schedule offers a varied, flavoured, colourful, pleasant, low-calorie, protective, and micronutrient-rich diet, to nutritional importance. An estimated 2.7 million (4.9%) deaths per year are attributed to erroneous ingestion, which also includes gastrointestinal cancers, strokes, and ischaemic heart disease[6] Kitchen gardening practices reduce vegetable spending, increase vegetable variety, increase crop diversity in the kitchen garden, improve self-esteem and motivation, increase community connection after beginning kitchen gardening, and improve the social environment. Strategies commonly used are supplementation, preferably in conjunction with public health interventions such as promotion and awareness of health benefits outcomes of medicinal plants and their importance in daily gardening practices.[7] Objectives of the study stated as, to study the perception and practices of medicinal plant gardening among respondents and find out the association between demographic variables and respondent's perceptions and practices related to the medicinal plantation.

Materials and Methods

The study 'GARDENING PERCEPTION AND PRACTICES RELATED TO MEDICINAL PLANTATION: A FACTOR LOADING ANALYSIS' evaluates medicinal planting and determines its advantages and disadvantages by conducting a household survey among urban residents in the Lucknow district. The study includes a baseline survey to assess people's perceptions and practices of gardening, identify the types of herbicides and fertilizers used, and examine waste management approaches.

It is a field study that includes a sample size of 400 respondents and covers specific zones (North, East, West, South, and Central) of the Lucknow district.

Sample Size

A statistical approach for descriptive research has been invented to calculate the sample size. The following formula is used for determining the sample size.

$SS= \{Z^2 \times (p) \times (1 – p)\} / C2$, this formula calculated the sample size of the selected population.[8]

Instrument Dependability

Using SPSS 20.0, a reliability test was carried out on seven parameters or variables. The Cronbach's

alpha test resulted in 0.692, which is approximately 0.7, which is good, indicating that the scale is reliable.

Dependent variables involve Attitude and Practice with immunity booster plants.

Independent variables are age, gender, education, profession, locality, type of house, religion, family type, and monthly income of the respondent, included as demographic variables, etc.

Selection of Tool and Analysis

The most important component of an investigation involves selecting the right tool. An assessment schedule was developed, including statements and questions related to data on medicinal plant perceptions and practices.

Collected data were classified, tabulated, and analyzed by using appropriate tests (frequency, percentage, chi-square, and factor loading test) and SPSS software.

Research Hypothesis

There is a significant difference between demographic variables and perception towards medicinal plantations among respondents.

There is a significant difference between demographic variables and practice towards medicinal plantations among respondents.

Null Hypothesis

There is no significant difference between demographic variables and perception towards medicinal plantations among respondents.

There is no significant difference between demographic variables and practice towards medicinal plantations among respondents.

Result

Table 1 shows that a large proportion (83.0%) of respondents were educated up to Higher Secondary (10+2). Additionally, all respondents (100%) living in government-provided housing favoured increasing the gardening area more than those living in flats or residential houses.

Table 1: Perception of respondents regarding increasing the garden area of the medicinal plantation

Variable	Yes %	No%
1. Education		
a)Up to Higher Secondary (10+2)	83.0	17.0
b)Graduate/ postgraduate	72.4	27.6
c)Professional Courses	65.1	34.9
2. Type of house		
a)Flats	83.9	16.1
b)Residential House	72.4	27.6
c)Government Provided House	100.0	0.0

Hence it shows that high education level doesn't correlate with the respondent's perception towards the increasing area of medicinal plant gardening. The attitude of the respondents is reflected by the knowledge perceived about the beneficial effects and importance of medicinal plantations. The supporting study showed the significant relationships between participation in gardening activities, type of residence, ownership of residence, father's occupation, and place of residence. It determined that the female students who were living in rural homes and villas and their fathers engaged in agriculture had a positive attitude about their participation in gardening.[9]

Table 2: Medicinal Plantation Perception: A Factor Loading Impact Analysis

Statement	Factor loading value
1. Some immunity booster plants are already being grown in our homes.	.742
2. We should plant at least one plant /tree in our every special day.	.735
3. Freshly grown Tulsi leaves or any other herb are more beneficial than the products available in the market	.634

4. Micronutrient deficiencies cannot be met by home-grown fruit and vegetable production.	.797
5. Government is not taking proper initiative towards gardening of medicinal / immunity booster plants.	.786
6. Trained gardener is not necessary for gardening of medicinal / immunity booster plants	.702
7. Gardening of medicinal / immunity booster plants require more space.	.768
8. Medicinal/immunity booster plants can protect against various problems related to the health.	.688

Concerning the Inadequacy, the above table shows that a high factor loading value (.797) related to micronutrient deficiencies cannot be met by home-grown fruit and vegetable production and possesses a low factor value (.702) if a trained gardener is not necessary for gardening of medicinal plants. Awareness regarding medicinal plants like tulsi, turmeric, giloy, ginger, and garlic, which can be grown in pots, has increased, especially after COVID-19. The data also shows that gardening of medicinal plants requires more space showing a high factor value (.768). Other perceptions related to medicinal gardening have the factor value as follows, some medicinal plants are already being grown in homes (.742), plantation of one plant on a special day (.735), freshly grown plants are more beneficial than the products available in the market (.634), the government should not taking proper initiative towards medicinal plant gardening (.786) and medicinal plants can protect against various health-related problems (.688). Thus, it could be inferred that most of the respondents were considering extending their garden space, indicating their intention to do so but their inability due to space constraints.

As a result, education and awareness-raising are required regarding the proper application of various cultivation places. According to the data interpretation above, the respondents' high perception of medicinal plant gardening is indicated by the high factor loading value. Study findings showed that farmers had a moderate level of understanding regarding the production and sale of aromatic and medicinal plants. According to an additional study, students' perceptions of medicinal plantations reveal that girls were not more conscious of the significance of medicinal plants. Unplanned urban development and poor management are the main obstacles to the effective use and conservation of forest resources.[3]

It has determined that raising public awareness of the beneficial effects of medicinal plants is of paramount importance.[10]

Table 3: Medicinal Plant Gardening practices among respondents

Statement	%	Statement	%
1.Purpose of gardening		**5. Time allocation for gardening**	
a)Hobby /utilization of free time	36.0	a)Less than ½ hours	33.5
b)Satisfaction and happiness	40.0	b)½ hours -1 hours	45.8
c)Easily availability of vegetables	12.0	c)1 ½ hours-2 hours	17.5
d)Medicinal plants	10.0	d)More than 2 hours	3.2
e)Due to COVID scenario	2.0		
		6.Fertilizer used for gardening	
2.manager of home garden		a) Market-based fertilizer	27.0
a)Family member	78.5	b)Homemade fertilizer	40.5
b)Gardener	2.5	c)Both	32.5
c)Both	19.0		

3.Area used for home garden	
a)Open space	39.0
b) Balcony	21.0
c) Indoor area	19.0
d)Rooftop garden	21.0
4.Potential size of garden a garden	
a)Small (less than 20 sqft)	43.0
b)Medium (20-50 sqft)	45.5
c)Large (more than 50 sqft)	11.5
7. Problem faced during gardening	
a)Weeding	25.0
b)Attack by birds and insects	25.0
c)Flower and fruit dropping	10.0
d)Rotten fruit	4.0
e)Time management	10.0
f)Lack of proper place	11.0
g)Financial problem	2.0
h)Lack of knowledge	7.0
i)Non-availability of good seeds	6.0
8. Measures used for pest control	
a)Using pesticides	32.3
b)Using natural methods	46.0
c)None	21.7

The above table-3 shows that 40% of respondents were doing gardening because they feel happiness, satisfaction, and stress buster, and the remaining were doing gardening because of utilization of free time as a hobby (36.0%).22.0% of respondents were doing gardening to get fresh fruits, vegetable, medicinal plantsHence, it was found that a higher number of respondents engaged in gardening because it brings them happiness, satisfaction, and stress relief. They consider it a hobby and a way to utilize their free time. A small proportion of respondents stated that their primary purpose for gardening was to obtain fresh fruits, vegetables, and medicinal or immunity-boosting plants.

Therefore, more awareness is needed to increase awareness regarding the gardening of medicinal and immunity booster plants. 39.0% of respondents use open land space or lawn area of the home for gardening and both balcony and rooftop were chosen equally by 21.0 % of respondents and 19.0 % of respondents use indoor space. Therefore, it is concluded that the majority of people use open land space for medicinal plant gardening and less use of other in-house space (Balcony, indoor, rooftop) for gardening, therefore more awareness is needed regarding utilization of other in-house space also. By relieving stress associated with COVID-19, horticultural activities enhance psychological well-being. As anticipated, gardening has been associated with decreased psychopathological sustaining by reducing COVID-19-related distress, according to a mediation model assessed using a boosting strategy.[11] There is an association between home gardening and physical and mental well-being.[12] Gardening was impeded by a lack of time (53%) and budgetary constraints, such as irrigation (51%) or fuel (49%) for transportation respectively.[13] On the other hand, 78.5% of respondents indicated that a family member manages their home garden, 2.5% chose a gardener, and 19.0% stated that both the gardener and a family member manage the garden. Therefore, it can be concluded that most respondents' gardens are managed by family members, suggesting that people dedicate time to their plants, with only a few gardens being managed solely by gardeners.

Concerning the size of the garden area data reveals that 45.5 % of respondents have medium size garden areas. Only 11.5% of respondents have a large gardening area in the house. Therefore, it is concluded that the majority of respondents have small (43.0%) and medium-sized (45.5.0%) gardens in their houses which shows there is a need for more awareness regarding various other types of gardening methods like pots, plastic bags, or different type of container that can be adopted easily by people who have less space for gardening. The above-tabulated data regarding time spent on gardening practices indicates that 45.8% of respondents dedicate around ½ to 1 hour to gardening, while only 17.5% of respondents spend 1 ½ to 2 hours on gardening.

It can be concluded that most respondents spend half to one hour on gardening because the majority

(42.5% and 45.5%) have small and medium-sized gardening areas in their homes.

Concerning the problems faced during medicinal plant gardening practices majority (50%) of respondents faced problems with weeding and attack of birds and insects while the remaining respondents faced problems of lack of proper place(11.0%), flower and fruit dropping(10.0%) and time management(10.0%). Therefore it is concluded that the majority of respondents commonly face problems of weeding and attack of birds and insects so awareness is needed in this area and training can be provided.

The above table also shows that higher (46.0%) numbers of respondents were using homemade or natural pesticides 32.3% were using market-based pesticides for pest control. Hence it is found that many people are using natural and homemade pesticides but several of them do not know the right method for the preparation of natural pesticides. Therefore training should be given regarding the preparation of natural pesticides. So it is concluded that most of the respondents do not know the preparation process therefore training can be given regarding the preparation of natural pesticides for better cultivation of plants. According to research that supports the current study, smaller amounts of market-based pesticides were found to be beneficial in maintaining soil health in household areas and attaining sustainable vegetable crop production.[14]

Table 4: Disposal techniques of gardening waste material among respondents

Variable	Burning%	composting %	Throwing in dustbin %	Throwing on open area%
1. Gender				
a)Male	18.3	51.2	27.0	3.5
b)Female	8.5	49.6	29.2	2.7
2. Locality				
a) North	4.8	60.2	25.3	9.7
b) East	8.0	50.6	35.6	5.8
c) West	10.5	44.7	26.4	18.4
d) South	13.1	52.4	27.4	7.1
e) Central	21.7	40.6	27.5	10.2

The above table-4, related to the practice of respondents indicated that 50.2% of male respondents used composting techniques followed by a similar ratio, (49.6%) among female respondents. The remaining male respondents were throwing in the dustbin (27.0%), open land space (3.5%), and also burning (18.3%) their garden waste. It was found that almost half of the respondents were not using their garden waste as composting. This shows that more effort and training is needed to increase the appropriate composting practices in households. A majority (60.2%) of north zone respondents were doing composting systems for garden waste disposal, throwing of garden waste in dustbins is more practiced in the east zone (35.6%), and throwing of garden waste in open land space is seen higher in the west zone(18.4%). Supporting research shows that 40% of respondents presently utilize vermicomposting, which is a relatively low adoption rate, and indicates that expanding awareness of the composting approach can be beneficial for home gardening.[15] Some alternative holding methods—drying, composting on an open compost place, and collecting in black bin liners—were performed on the plant pieces; each can be utilized in a home garden.[16] Emphasizes empowering communities by determining the optimum composting method based on local waste generation, available funds, labor and land needs, and citizen behavior adjacent to garden waste disposal.[17]

Table 5: Practice among respondents related to the change of soil and fertilizer timely to improve plant growth

Variable	Yes %	No%	Sometimes %
1. Gender			
a) Male	43.5	10.4	46.1
b) Female	29.8	11.6	58.6
2. Profession			
a) Own business	26.3	5.3	68.4
b) Govt. service	35.4	14.6	50.0
c) Private sector	34.6	11.1	54.3
d) Agriculture	87.5	12.5	0.0
e) Homemaker	24.6	9.0	66.4
f) Any other	39.3	13.2	47.5
3. Family			
g) Joint	46.2	10.9	42.9
h) Nuclear	28.5	11.4	60.1
4. Monthly Income			
i) Less than 10,000	52.9	11.8	35.3
j) 10,000- 25000	42.5	8.1	49.4
k) 5,000-50,000	25.8	12.1	62.1
l) More than 50,000	31.3	12.2	56.5

Table -5, indicates that the respondents' practices related to the change of soil and use of fertilizer reveal, that 43.5% of the male respondents practices of change of soil and used fertilizers timely for appropriate growth of medicinal plants The most effective crop and fertilizer management techniques, such as using neem oil-coated urea, cultivating nutrient-efficient genotypes, applying nutrients in a balanced manner, implementing preventive measures, and using organic farming methods made possible by enabling policies, can reduce fertilizer use by 20–30%.[18] Many South Asian farmers are unaware of the fertilizer quantities recommended by scientists.

How well farmers comprehend and implement new, suitable agronomic management practices will determine whether the benefits of better fertilizer and organic matter management are realized.[19]

Incorporating crop residue is a common soil management technique used to maximize the physical environment of the soil for plant growth. This practice mitigates bulk density, soil temperature, compaction, runoff, and erosion while increasing moisture storage, rooting depth, soil organic carbon, and nutrient status.[20] Concerning the profession (87.5%) which indicated the profession of respondents is correlated with the gardening practices of a medicinal plantation. On the other hand majority (46.2%) of respondents belong to joint families and respondents were having monthly income less than 10,000 (52.9%) followed by a monthly income of 10,000-25,000 (42.5%) followed appropriate gardening practices related to the change of soil and used fertilizer for proper growth improvement in a medicinal plantation. The underlying study emphasizes how a farmer's age, educational attainment, and farm size affect how they utilize various information sources concerning gardening techniques.[21]

Table 6 indicates that the p-value from the chi-square test is 0.042, which is less than 0.05. Therefore, the null hypothesis (Ho) is rejected at the 5% level of significance, meaning there is a significant association between the education of respondents

and their thoughts on increasing the gardening area.The p-value from the chi-square test is 0. 030 < 0.05, this means there is a significant association between the house type of respondents and thinking about increasing the gardening area. This concludes that those respondents who were living in different houses (flats, residential houses, and government-provided houses) have practices about increasing the gardening area. Concerning the association of gardening with the practices of respondents related to the disposal of gardening waste and timely change of soil and add fertilizer for the appropriate growth of medicinal plantation gender (p-.003 < 0.05) and locality (p-.020 < 0.05) of the respondents is significantly associated and, gender(p-.031 < 0.05), profession (p-0.12 < 0.05), type of family(p-.002 < 0.05), house type (p-.013 < 0.05) and monthly income(p-.034 < 0.05), these variable factors were significantly associated with gardening practices of the respondents. A study related to the associated factors, reveals that Farmer's decisions to implement adaptation strategies were also found to be significantly affected by cultivated land area, seed, fertilizer, pesticide, water, age, education, experience, income, land size, and training.[22] Lack of access to extension services proved to be an important factor in the adoption of gardening practices, although marital status, formal education, and regular off-farm income had little bearing on decisions concerning the improved plantation.[23]

Table 6: Association between demographic factors and gardening perception and practice among respondents

Variable	Perception about increasing garden area (p- value)	Practice related to disposal of garden waste (p- value)	Practice related to timely change soil and add fertilizer (p- value)
1. Age of respondent	.149	.923	.283
2. Gender	.922	.003	.031
3. Education	.042	.168	.115
4. Profession	.558	.218	.012
5. Locality	.087	.020	.407
6. Family type	.246	.408	.002
7. Type of house	.030	.522	.013
8. Religion	.674	.734	.621
9. Monthly income	.076	.600	.034

Discussion

Within the other categories (graduate/postgraduate and professional courses) for medicinal plants, a larger (83%) portion of the targeted population was from only higher secondary education levels and had a positive perception of expanding the garden area, based on current research on medicinal gardening perception and practices among the studied community. It indicates that the perception of gardening is irrespective of one's level of education. In regards to gardening, the respondents' favorable gardening practices involved selecting an appropriate location, devoting time to gardening, and using natural fertilizer to promote healthy plant growth. These encouraging research findings point to the development of a successful future strategy for increasing knowledge and use of medicinal plants and herbs. Food insecurity and malnutrition can be addressed through gardening methods, which also offer resource-poor families income and livelihood options and a variety of ecological services.[24] Further government initiatives towards imparting knowledge and making policies and programs related to professional training in gardening techniques will empower the nation. Home gardening training programs can have a significant impact on the general development of communities by providing women a voice and supporting their full participation in domestic life. Through kitchen gardens, people get fresh and organic vegetables year-round and their nutritional needs are fulfilled.[25] The continuous and perpetual people's interest in medicinal plants has

brought about today's modern and sophisticated fashion of their processing and usage. Intervention services should be imparted, regarding useful medicinal plants and daily recommended dietary nutrition consumption that leads to a healthier way of life.

According to the study's findings, attempts are being made to close the gap between generations by providing ongoing professional assistance and teaching local communities how to maintain traditional knowledge and customs through methodical documentation.

It is concluded that the use of traditional medicines in local healthcare systems is widespread in developing nations, and researchers are becoming more interested in the enormous potential of ethnomedical knowledge for treating a wide range of illnesses. Improved methods of growing commercially viable ethnobotanical species should be promoted in the communities through proactive policy intervention, capacity building, and robust market connections. This will assure income generation, livelihood improvements, and consequently the continuing existence of these species.

Conclusion

The findings confirm that the community under study holds positive attitudes and practices regarding gardening, especially in terms of garden space utilization, disease prevention, and the role of government support for cultivating medicinal plants. The fact that family members manage home gardening activities suggests that they have a strong understanding of, and perspective on, the potential health benefits of medicinal plants. This reflects a collective recognition of their value and a commitment to their cultivation.

To enhance the impact of these practices, future efforts should focus on initiatives that improve the efficacy, efficiency, and responsible use of medicinal plants. This can be achieved by integrating medicinal plants into local, regional, and national health programs and strategies. Such integration would not only promote the benefits of these plants but also ensure their sustainable use in addressing public health concerns. Emphasizing educational programs, support systems, and policy frameworks that facilitate the use of medicinal plants can contribute to improved health outcomes and greater community well-being.

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Conflict of Interest

The authors do not have any conflict of interest.

Data Availability Statement

The manuscript incorporates all datasets produced or examined throughout this research study.

Ethics Statement

The study was approved by the Institutional Ethics Committee.

Informed Consent Statement: Before gathering data, we secured informed consent from all participating respondents regarding their responses, their perception assessment towards the medicinal plantation.

Author Contributions

- **Shivani Srivastava:** Conceptualization, Methodology, Writing – Original Draft.
- **Shaheen Fatima:** Writing – Review & Editing.

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