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Factors affecting consumers' behavior toward using medicinal plants

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ABSTRACT

Traditional medicinal practices relying on herbal remedies are prevalent in developing nations. Despite their extensive use, concerns persist regarding the lack of knowledge and perception associated with herbal therapy. This study aims to identify the factors influencing consumers' behavior toward the use of medicinal plants in treatment. An analytical descriptive approach was employed to elucidate consumers' responses to the study variables and assess the impact of factors on their behavior. The study focused on consumers of medicinal plants, with a sample size of 550 participants. The analyzed data unveiled a significant impact ($\alpha = 0.05$) for four key variables: quality, trust, reference groups, and culture, influencing consumers' behavior regarding the use of medicinal plants. Product availability and cost emerged as additional considerations. The cultural dimension took precedence in consumers' priorities, followed by trust, reference groups, quality, availability, and concluding with price. Overall, consumers in the study expressed positive assessments across all dimensions, reflecting a high level of satisfaction from their perspective. Measuring knowledge and assessing consumers' attitudes toward using medicinal plants are crucial steps in understanding the factors influencing their behavior in utilizing herbal medications. This understanding can inform strategies to enhance consumer engagement and promote informed decisions regarding herbal therapy.

INTRODUCTION

The global surge in demand for botanicals and alternative medicine has led to an accelerated proliferation in the production of nutraceuticals and herbal supplements. These products are now widely available in pharmaceutical markets and grocery stores, making them easily accessible to consumers worldwide [1]. In developing nations, traditional medical practices heavily rely on medicinal herbs, with the treatment of illnesses using herbal products deeply embedded as a cultural element [2].

The high demand for herbal remedies as part of primary healthcare has raised concerns about safety, prompting the need for strict regulatory guidelines and quality control procedures throughout the entire production process, from plant authentication to packaging [3,4]. In developing nations, consumers are drawn to phytotherapeutic agents due to their perceived roles in maintaining health, cost-effectiveness, and availability [5]. Some individuals even rely on herbal remedies for managing chronic conditions such as diabetes [6]. However, there is a lack of awareness among consumers regarding the potential toxicity and health interactions of herbal remedies, despite their time-proven safety [7]. Recent reports

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have highlighted the undesirable and harmful effects of certain phytomedicines [8,9].

Consumer behavior in this context is influenced by various factors related to acquisition, usage, and management, leading to decisions regarding the purchase, possession, or use of herbal products or services to meet their needs [10]. Understanding consumers' behavior is a significant challenge for marketers, as it is often irrational, unpredictable, and may differ from consumers' declarations. Hence, collective efforts should focus on better understanding consumer behavior to inform the design, programming, and marketing strategies [11].

In recent years, research has explored the correlation between socioeconomic and demographic characteristics and personal and community knowledge of medicinal plants. Positive correlations were found between knowledge and age, while negative correlations were observed between knowledge and years of schooling, attributed to rapid sociocultural changes, and globalization processes in the study area [11]. Conversely, poor ethnobotanical knowledge was linked to deficiencies in the healthcare system and transportation infrastructure [12].

Consumers' attitudes and behavior toward medicinal and aromatic plants have been associated with demographic and socioeconomic status. Previous studies segmented the market into behavioral, attitudinal, and sociodemographic clusters, revealing that values and lifestyle influence the purchase intention of herbal medicines. Older and lower-educated consumers tended to be skeptical about synthetic medicines due to concerns about adverse effects and cost, preferring natural products for non-therapeutic purposes. Higher income and education levels influenced the purchasing tendencies of another cluster, with branding and advertising campaigns playing a significant role [13]. The third cluster leaned toward natural products due to caution about synthetic and processed alternatives, influenced by their religious beliefs [14,15].

This article's focus is to delve into the variables influencing consumers' behavior in utilizing herbal medicines, considering factors such as age, education, income, and societal changes that impact their choices and preferences.

MATERIALS AND METHODS

The study objective

The main objective of the current study is to measure the impact of independent variables; culture, price, reference groups, availability, trust, and quality on the dependent variables; the consumers' behavior toward using the medicinal plants in the treatment.

The study model

Based on the study problem and its objectives, the study model was proposed and shown in Figure 1 to explain the impact of some factors affecting the consumer's behavior toward using medicinal plants in treatment.

The study hypotheses

Several theories have been hypothesized to understand the consumers' behavior toward using medicinal plants for
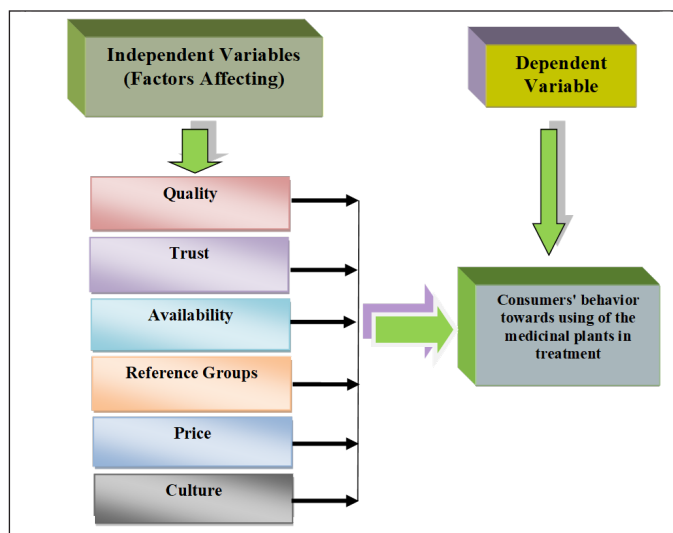

Figure 1. The study model, containing the research problem, objectives, and hypothesis. The hypothesis of this study is to investigate consumer's behavior factors (quality, trust, availability, reference groups, price, and culture) on consumers' behavior toward using medicinal plants for treatment.

treatment. The main hypothesis (H_0) is the impact of the variables: quality, trust, availability, reference groups, price, and culture on the consumers' behavior. The other sub-hypothesizes were derived from the main one and include H_{01}; the effect of product quality, H_{02}; the effect of the trust, H_{03}; the effect of product availability, H_{04}; the effect of the reference group, H_{05}; the effect of the price, H_{05}; the effect of the culture.

The study approach

This study relied on both descriptive and analytical approaches. The first was used to describe the responses of the consumers regarding their characteristics and to assess the factors that might affect their behavior toward utilizing medicinal plants for therapeutic purposes. The studied factors are quality, trust, availability, reference groups, price, and culture. The second approach was used to verify the existence of the affecting factors on consumers' behavior toward the research subject.

Data collection

Data were collected primarily from the respondents through the distributed questionnaire that represents the main study tool. In addition, available databases and national libraries have been utilized as secondary resources. These include reference books, periodicals, post-graduate thesis and dissertations, and other informative data sources related to the study subject. The retrieval and validity rates of the distributed questionnaires were as follows: for the electronic questionnaires, the retrieval rate was 97.3% (distributed 450, retrieved 438), and the validity rate was 96.7% (3 responses were excluded). For the paper questionnaires, the retrieval rate was 67.0% (distributed 100, retrieved 67), and the validity rate was 63.0% (4 responses were excluded).

The Likert scale of five levels was adopted to conduct the study; five strongly agree, four agree, three fairly agree, two

disagree, and one strongly disagree. Three ranks were calculated utilizing the five Likert scales using Equation 1:

$$\text{Category length} = (5-1/3 = 1.33) \tag{1}$$

Therefore, three levels of the assessment degree of the consumers' responses are explained by this equation: assessment levels (1–2.33-Weak agreement); (2.34–3.67-Medium agreement); and (3.68–5-High agreement).

Structure validity and reliability

The questionnaire was distributed to experts in phytotherapy, pharmacy, marketing, and research methodology. Feedback was taken into consideration to prepare the questionnaire in the final form. To verify the reliability of the study tool, Alpha Cronbach's and the reliability coefficient represented by Alpha Cronbach's coefficient were used. The reliability percentage for the whole tool reached 88.1% and the reliability coefficients ranged between (0.637 and 0.881). Accordingly, the scales exhibited a strong internal consistency [16].

Statistics

The data analysis utilized tools from the Statistical Packages for Social Sciences. The statistical procedures involved descriptive statistics, mean SD, frequency analysis, regression, and the computation of the variance inflation factor (VIF). These essential metrics in regression analysis were employed to assess the overall fitness of the regression model and identify possible issues associated with multicollinearity.

RESULTS

Sociodemographic distribution

The study focused on consumers of medicinal plants within the capital city. The sample size, determined using the Sekran table [17], involved distributing 550 questionnaires, resulting in a response rate of 91.8%. Seven responses were excluded due to low validity, leaving 498 valid responses for further analysis. The demographic breakdown revealed that 55.6% of respondents were male, 45.4% were aged between 30 and 39 years, 52.4% held a bachelor's degree, and 55.4% had a relatively low income (less than 500 JD/month). Marital status indicated that approximately half (48.8%) of the respondents were married. Refer to Table 1 for a detailed presentation of the sociodemographic distribution of the respondents.

The relative importance (RI) analysis for each tested factor is detailed in Table 2. In terms of importance and customer priorities, the culture dimension ranked highest, succeeded by trust and reference group dimensions. Subsequently, the quality, availability, and price dimensions followed in that order. All arithmetic means of the tested dimensions exceeded the test criterion, signaling a positive assessment of the study sample by plant consumers.

Table 3 provides an overview of the assessment of study dimensions. The evaluation of the quality dimension, from the consumers' perspective in the study sample, was positive and varied between high and medium, with a mean increase of

Table 1. The demographic characteristics of the sample ($N = 498$).

No.	Personal characteristics	Categories	Frequency	Percentage %
1	Gender	Male	277	%55.6
		Female	221	%44.4
2	Age/Year	18 to less than 30	202	%40.6
		30 to less than 40	226	%45.4
		40 to less than 50	50	%10.0
		50 Year and more	20	%4.0
3	Scientific qualification	Secondary and less	212	%42.6
		Bachelor	261	%52.4
		Postgraduate	25	%5.0
4	Income/JD	Less than 500	276	%55.4
		500 to less than 1,000	167	%33.5
		1,000 to less than 2,000	40	%8.1
		2,000 JD and more	15	%3.0
5	Marital status	Single	226	%45.4
		Married	243	%48.8
		Other	29	%5.8

Table 2. Respondents' trends for the factors affecting the consumers' behavior ($N = 498$).

No.	Affecting factors on the consumer' behavior	Mean	Std. deviation	RI	Assessment level
1	Quality	3.78	0.49	4	High
2	Trust	3.81	0.46	2	High
3	Availability	3.64	0.52	5	Medium
4	Reference groups	3.79	0.50	3	High
5	Price	3.63	0.49	6	Medium
6	Culture	3.82	0.48	1	High

3.78. This average mean surpassed the test criterion of three, indicating a positive assessment ranging from high to medium. Similar patterns were observed for the trust, availability, reference, price, and culture dimensions, with a general mean of 3.81, 3.64, 3.79, 3.63, and 3.82, respectively. Consequently, consumers' behavior toward using medicinal plants in treatment was appraised as positive and high from their viewpoint in the study sample (Table 3).

The study hypothesis

The examination of the tested hypotheses unfolded as follows: initially, the null hypothesis (H0) posited no impact ($\alpha \leq 0.05$) of factors (quality, trust, availability, reference groups, price, and culture) on consumers' behavior toward using medicinal plants for treatment. Sub-hypotheses for each factor were established, namely H01 (quality), H02 (trust), H03

Table 3. Respondents' trends for the factors affecting the consumers' behavior toward using medicinal plants for treatment ($N = 498$).

No.	Paragraphs	Mean	Std. deviation	Rank	Assessment level
36	You believe that the medicinal plants' quality has an effective impact on led the consumers to use it.	3.85	0.65	4	High
37	You believe that there is a high trust in medicinal plants, which leads the consumers to use them.	3.91	0.75	2	High
38	You believe that existence the of medicinal plants and their availability play a big role in pushing the consumers to use them.	3.82	0.56	5	High
39	You believe that the reference groups have an effective impact on consumer behavior toward medicinal plants.	3.86	0.65	3	High
40	You believe that the price of the medicinal plants is appropriate, which leads the consumers to use them.	3.79	0.71	6	High
41	You believe that the individual's culture in the environment in which they live has an impact on using the medicinal plants.	4.07	0.81	1	High
-	General mean	3.92	0.44	–	High

Table 4. Results summary of the multiple linear regression method related to the main hypothesis of the study.

Correlation coefficient (R)	Determination coefficient (R2)	Calculated (F) value	Significant of (F)	df.	Tabulated (F) value
0.787	0.619	133.067	0.000	(6, 491)	2.10

(availability), H04 (reference groups), H05 (price), and H06 (culture), each with an alpha level of 0.05.

A valid linear regression test was executed to yield results, affirming validity through a significantly higher calculated F value compared to the tabulated value (133.067 *vs.* 2.10). Moreover, 61.9% of the variance in consumer behavior was encompassed in the linear regression model (R^2 coefficient = 0.619), with regression coefficients proving significant for four influential factors: quality, trust, reference groups, and culture ($\alpha = 0.05$). Comprehensive statistics are provided in Table 4.

Consequently, the null hypothesis (H0) was rejected, and the alternative hypothesis (H1) was embraced, asserting a statistically significant impact ($\alpha = 0.05$) for four factors—quality, trust, reference groups, and culture—on consumers' behavior toward using medicinal plants in treatment.

The culture dimension emerged as the most influential factor, with a quantified effect expressed by $\beta = 0.167$. Conversely, regression coefficients for the availability and price dimensions lacked confirmed significance, as their calculated T values fell below the tabulated value (-1.054 and 0.331 compared to 1.96). Thus, there was no statistically significant impact ($\alpha = 0.05$) for the availability and price dimensions on consumer behavior toward using medicinal plants in treatment.

Similarly, sub-null hypotheses H01, H02, H03, H04, H05, and H06 were rejected, while alternative hypotheses H11, H12, H13, H14, H14, and H15 were accepted. These alternative hypotheses posit statistically significant effects of quality (H11), trust (H12), availability (H13), reference groups (H14), price (H15), and culture (H16) variables on consumers' behavior toward using medicinal plants in treatment.

The validation of data properties, including normal distribution, homogeneity, sampling adequacy, and the presence of multicollinearity, proceeded as follows: homogeneity was confirmed through One-sample *t*-tests, establishing calculated T values (35.178, 38.825, 27.525, 35.145, 28.588, 37.543, and 46.401) greater than the T-Tabulated value (1.96) with all significant values below the significance level ($\alpha = 0.05$).

The Kaiser-Meyer-Olkin (KMO) test indicated the sufficiency of the sample (KMO = 0.766), exceeding 0.5 and demonstrating that more than 50% of the data is covered in the study, with a statistical significance value below the significance level ($\alpha = 0.05$) [18].

In addition, the VIF test attested to the absence of a multicollinearity problem among the independent variables (factors affecting consumer behavior) represented by quality, trust, availability, reference groups, price, and culture. VIF values for all variables (1.376, 2.288, 1.513, 1.666, 1.737, and 1.533) were less than the critical value of 10, and tolerance values were less than 1 [19].

DISCUSSION

In this study, a notable majority of respondents, particularly males, demonstrated a pronounced inclination toward consuming herbal products for therapeutic purposes. Consistent with findings in various geographical regions [20,21], higher rates of herbal consumption were observed among men, suggesting that gender may play a pivotal role as a motivating factor for engaging in phytotherapeutics. The prevalence of individuals in their thirties (30–39 years old) among respondents aligns with the youthful demographic composition in the study area (https://dosweb.dos.gov.jo/ar/), indicative of a population likely to possess elevated levels of awareness and knowledge, with over half holding a bachelor's degree.

In evaluating consumer priorities, the cultural dimension emerged as the top consideration, followed by trust, reference groups, quality, availability, and concluding with price. Overall, consumers in the study sample expressed a positive assessment of all studied dimensions, reflecting a favorable perspective from their viewpoint.

The findings are consistent with recent research emphasizing the economic and quality aspects as driving factors for herbal medicine use [21]. Consumers exhibited a strong belief in the safety and efficacy of herbal remedies

for various disorders, aligning with previous reports on their use for conditions such as kidney stones, hyperglycemia, and infertility [6,20,22]. Notably, the current study underscores that both quality and trust play crucial roles in influencing customer behavior toward alternative medicine. In addition, the cultural dimension positively influences customers' attitudes, aligning with prior research and emphasizing the impact of lifestyle and social values [13].

Key dimensions, namely quality, trust, reference groups, and culture, were identified as pivotal factors significantly shaping consumers' attitudes and behaviors regarding medicinal plant usage. The cultural factor emerged as the primary determinant in consumers' priorities, followed by trust, reference groups, quality, availability, and price according to the analyzed data. The study's examination of consumers' behavior toward medicinal plant usage revealed an overall positive perception. However, concerns regarding the pricing of herbal products surfaced as a hindrance, with dissatisfaction stemming from perceived high prices. This aligns with previous studies emphasizing the economic, quality, and safety considerations of herbal product usage. The study further corroborates the substantial influence of cultural and social factors on consumer attitudes and behavior. Lifestyle, consumer values, and trust were also identified as influential factors, highlighting the interconnectedness of consumer behavior and values [23].

CONCLUSION

In conclusion, this analytical descriptive study provides valuable insights into the intricate factors that shape consumers' behavior regarding the utilization of medicinal plants for treatment. Recognizing the pivotal roles played by culture, trust, quality, and reference groups, stakeholders are empowered to formulate strategies aimed at improving consumer attitudes and acceptance of treatments based on medicinal plants. This approach fosters a more comprehensive perspective on healthcare and well-being.

Furthermore, the study underscores the significance of enhancing consumer awareness and understanding of medicinal plants. By doing so, positive attitudes toward the use of medicinal plants for treatment can be cultivated, aligning with the broader goal of promoting holistic healthcare practices.

Perspective, limitation, and future recommendation

The findings of the present study delve into the factors influencing consumers' decisions regarding the use of herbal remedies as therapeutic agents. However, several limitations need to be acknowledged. First, the study's geographical scope is constrained, conducted exclusively in the capital city. In addition, the timing of the study in 2020 is a limiting factor, considering the impact of the pandemic on social communication. Furthermore, the study focuses solely on individuals utilizing medicinal herbs for treatment, introducing human limitations to the generalizability of the results. It is recommended that future research expands the analysis to encompass different geographical locations and considers the influence of other potentially relevant factors to provide a more comprehensive understanding.

CONFLICTS OF INTERESTS

The authors declare that they have no conflict of interest.

ETHICAL APPROVALS

The study protocol was approved by the Department's Graduate Studies Committee; Al-Zaytoonah University of Jordan with reference number QF22/0302.3.1 NO.8 dated 01/03/2021.

DATA AVAILABILITY

All data generated and analyzed are included in this research article.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors declares that they have not used artificial intelligence (AI)-tools for writing and editing of the manuscript, and no images were manipulated using AI.

REFERENCES

1. Ekor M. The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety. Front Pharmacol. 2014;4:177. doi: https://doi.org/10.3389/fphar.2013.00177

2. Neergheen-Bhujun VS. Underestimating the toxicological challenges associated with the use of herbal medicinal products in developing countries. Biomed Res Int. 2013;2013:804086. doi: https://doi.org/10.1155/2013/804086

3. Mukherjee PK, Banerjee S, Gupta BD, Kar A. Evidence-based validation of herbal medicine: translational approach. In: Mukherjee PK, editor. Evidence-based validation of herbal medicine. 2nd edition. Amsterdam, The Netherlands: Elsevier; 2022. pp. 1–41. doi: https://doi.org/10.1016/B978-0-323-85542-6.00025-1

4. Barnes J. Quality, efficacy and safety of complementary medicines: fashions, facts and the future. Part I. Regulation and quality. Br J Clin Pharmacol. 2003;55(3):226–33. doi: https://doi.org/10.1046/j.1365-2125.2003.01810.x

5. Awuchi CG. Medicinal plants: the medical, food, and nutritional biochemistry and uses. Int J Adv Acad Res. 2019;5(11):220–41.

6. Al-Halaseh LK, Al-Jawabri NA, Al-Btoush H, Al-Suhaimat R, Majali S, Hajleh MN, *et al. In vivo* investigation of the potential hypoglycemic activity of *Pennisetum setaceum*: justification

of the traditional use among Jordanians. Res J Pharm Technol. 2022;15(7):3185–9.

7. Al-Samydai A, Al-Mamoori F, Shehadeh M, Hudaib M. Anti–diabetic activity of cinnamon: a review. Int Res J Pharm Med Sci. 2018;1(5):43–5.

8. Alkhamaiseh SI, Aljofan M. Prevalence of use and reported side effects of herbal medicine among adults in Saudi Arabia. Complement Ther Med. 2020;48:102255. doi: https://doi.org/10.1016/j.ctim.2019.102255

9. Jayasinghe CD, Jayawardena UA. Toxicity assessment of herbal medicine using zebrafish embryos: a systematic review. Evid-Based Complement Altern Med. 2019;2019:7272808. doi: https://doi.org/10.1155/2019/7272808

10. Wilson RM, Gilligan C. Strategic marketing management: planning, implementation and control. 3rd ed. Oxfordshire, UK: Routledge; 2005.

11. Hajleh MN, Ali AS, Aloosi Z, Abuhamdan R, Naimat SA, Abdelfattah L, *et al.* Factors affecting purchasing behaviors of generic drugs versus originator counterparts in Jordan. J App Pharm Sci. 2021;11(9):009–17. doi: https://doi.org/10.7324/JAPS.2021.110902

12. Weckmüller H, Barriocanal C, Maneja R, Boada M. Factors affecting traditional medicinal plant knowledge of the Waorani, Ecuador. Sustainability. 2019;11(16):4460. doi: https://doi.org/10.3390/su11164460

13. Purwoko P, Wijaya T. Consumer value and lifestyle as a predictor of herbal medicine purchase intention in Surakarta-Indonesia. Glob J Health Sci. 2019;11(4):69–75. doi: https://doi.org/10.5539/gjhs.v11n4p69

14. Güney OI. Consumption attributes and preferences on medicinal and aromatic plants: a consumer segmentation analysis. Cienc Rural. 2019;49(5):e20180840. doi: https://doi.org/10.1590/0103-8478cr20180840

15. Kountur R, Huo Y. Contributing factors to the attractiveness of natural medicine products. Univ J Manag. 2013;1(3):148–53. doi: https://doi.org/10.13189/ujm.2013.010305

16. Cronbach LJ, Shavelson RJ. My current thoughts on coefficient alpha and successor procedures. Edu Psychol Meas. 2004;64(3):391–418. doi: https://doi.org/10.1177/0013164404266386

17. Bougie R, Sekaran U. Research methods for business: a skill building approach. Hoboken, NJ: John Wiley & Sons; 2019.

18. Hill BD. The sequential Kaiser-Meyer-Olkin procedure as an alternative for determining the number of factors in common-factor analysis: a Monte Carlo simulation. Stillwater, OK: Oklahoma State University; 2011.

19. Beddo V, Kreuter F. A handbook of statistical analyses using SPSS. J Stat Softw. 2004;11:1–4.

20. Al-Mamoori F, Al-Samydai A, Aburjai T. Medicinal plants for the prevention and management of nephrolithiasis: a review. Int J Sci Technol Res. 2019;8:2700–5.

21. Al-Somaiday HM, Al-Samaray ME, Al-Samydai A. Role of herbal medicine in oral and dental health; ethnopharmacological study of medicinal plants in Iraq/Baghdad. Int J Res Pharm Sci. 2020;11(1):553–60. doi: https://doi.org/10.26452/ijrps.v11i1.1857

22. Lali MA, Issa RA, Al-Halaseh LK, Al-Suhaimat R, AlRawashdeh R. Reduction of reproductive toxicity in murine sperm model using *Moringa peregrina* leaves extracts. J Appl Pharm Sci. 2023;13(11):056–6. doi: http://doi.org/10.7324/JAPS.2023.141064

23. Maha NAH, Ali AS, Mahmud Jasim AS, Humam MAS, Rudaina OY, AS AD. Cosmetics usage habits and effect on health seeking behavior among Jordanian women. Indian Drugs. 2022;59(3):62–6. doi: https://doi.org/10.53879/id.59.03.12752