

DETERMINATION OF FACTORS INFLUENCING PHARMACISTS WHILE RECOMMENDING IMMUNE-ENHANCING PRODUCTS VIA ANALYTIC HIERARCHY PROCESS

Short title: Factors Affecting Recommendation of Immune Enhancers

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ABSTRACT

INTRODUCTION: Immune enhancers are taken attention day by day. Besides, during the Covid-19 pandemic, there has been an increasing demand for immune enhancers. Pharmacists are seen as trustable providers about complementary and alternative medicines, dietary and herbal supplements, immune-enhancers, and so on. This study aims to prioritization of criteria that affect community pharmacists' recommending behavior regarding immune enhancers.

METHODS: This paper adopts the Analytic Hierarchy Process (AHP) to rank different criteria substantial for affecting community pharmacists' recommending behavior regarding immune enhancers. In this direction, firstly seven criteria were identified through literature review and views of pharmacists who have community pharmacy experiences. These are; (i) ease of access, (ii) selling price, (iii) package, (iv) content (appropriateness to patient health status), (v) expectation of patient, (vi) quality, and (vii) trust to the manufacturer. Then, a questionnaire including criteria was prepared and delivered to community pharmacists. The data obtained from 93 participants were transferred to the SuperDecisions software. The hierarchical structure of the analytic hierarchy process was established, and pair-wise comparisons were made.

RESULTS: This study showed that the most important criterion was the ease of access (28%). Secondly, pharmacists give importance to the content of the product while advising immune-enhancers (%22). Besides, it was determined that the least important criterion was the package of the product (4%).

CONCLUSION: This study will contribute to the literature by facilitating the process of assessing factors that pharmacists pay attention to while recommending immune-enhancing products. In addition, the present study results will shed light on firms, producing such

products, to shape their supply chain management strategies, especially about marketing and selling.

Keywords: Immune-enhancers, pharmacist, analytic hierarchy process

INTRODUCTION

Immunity plays a crucial role in protecting against harmful agents, particularly pathogenic organisms like bacteria, viruses, fungi, or parasites (1). Recently, strong immunity has been thought of as an indicator of a healthy life. This situation also has increased individuals' demand for immune-enhancing products. In addition, it is seen that healthcare professionals recommend immune enhancers for diseases for which there is no definitive treatment yet (2). The COVID-19 pandemic is one of the best examples of this situation. These products have also been commonly recommended to prevent COVID-19 (3).

Immune-stimulants are synthetic or biological-originated biomolecules that help to regulate, suppress, and stimulate the immune system, including different product groups such as vitamins, minerals, probiotics, antioxidants, herbal and dietary supplements, and some of the complementary and alternative medicines (4-6). Usage of these products is gradually increasing (7,8). The safest place where these products are offered to the market is pharmacies. Besides, it is known that individuals trust pharmacists while choosing them (9-11).

In the literature, studies about these products mainly focus on pharmacists' roles, knowledge, and attitude (12,13). Boon et al. summarize pharmacists' role in natural health products/dietary supplements in three main topics: demand, safety issues, and accessibility from pharmacies (14).

The number of studies dealing with pharmacists' behavior to recommend different immune-enhancing products is quite limited. In a qualitative study conducted in Australia, Culverhouse and Wohlmuth express that *providing health benefit* is the primary driver of recommending complementary medicines for pharmacists and states *customer demand, company profile, and cost* as some other factors (10). According to Kanjanarach et al., Thai pharmacists' selecting criteria of dietary supplements and complementary medicines (DS/CM) are determined as the credibility of the firm, customer income, product appearance, and firm's approach to unsold products (15). A study was conducted with community pharmacists ranking the factors that influence the purchasing decision of medicines, and these factors are stated as customers' satisfaction, profitability, promotion, and original-generic drug price difference, respectively (16).

In this regard, this study aims to evaluate and prioritize factors, determined considering the studies mentioned above, which affect the community pharmacists' recommending behavior related to immune-enhancers in Turkey. To the best of the authors' knowledge, this is the first study that prioritizes the pharmacists' selection criteria of immune-enhancers via the Analytic Hierarchy Process (AHP) approach.

Materials and Methods

Within the scope of this study, prioritization of the factors affecting pharmacists' choice of immune enhancers for patients will be done with the AHP method. A questionnaire form was prepared according to the AHP approach in line with this purpose.

The AHP is one of the multi-criteria decision-making techniques based on pair-wise comparisons, developed by Thomas L. Saaty in the 1970s (17). The AHP can be used in health management and patient-related issues (18,19, 20).

In this study, the hierarchical structure of the AHP was established and solved via the SuperDecisions decision support software. Criteria are identified according to the literature (10,14,15, 21-26) and views of pharmacists who have community pharmacy experiences.

These are; (i) ease of access, (ii) selling price, (iii) package, (iv) content (appropriateness to patient health status), (v) expectation of patient, (vi) quality, and (vii) trust to the manufacturer (Figure 1).

Data collection

The ethics committee's approval was taken from the Izmir Katip Çelebi University Social Research Ethics Committee (04.09.2020-No.2020/09-08). Online questionnaires were delivered to community pharmacists in Turkey between 10 September 2020 and 19 October 2020. Participants were informed about the study, and consent was obtained.

The literature states that the sample size can be one or more, around 109 on average in AHP studies (19). One hundred two community pharmacists answered the questionnaire in this study, despite working conditions during the Covid-19 pandemic. Nine of them are not included in the analysis due to a lack of answers. Therefore, 93 participants' evaluations are considered.

RESULTS

The study takes arithmetical averages of pair-wise comparison matrices created by pharmacists. Table 1 summarizes the findings obtained from the pair-wise comparison matrices for the criteria.

Given in Table 1, calculated averages are rounded to the nearest integer. The information in Table 1 can be summarized as follows: "ease of access" is about 3.769 (almost 4) times more important than "package", "selling price" is about 4.432 (almost 4) times more important than "package", "content" is about 6.403 (almost 6) times more important than "package", and "quality" is about 4.387 (almost 4) times more important than "expectations of patient" etc. After that, data are transferred to the SuperDecisions software. The priority values of the criteria and the consistency rate are calculated. The inconsistency rate is calculated as 0.093, which should be less than 0.1 (17). In this regard, this value is under the acceptable level of inconsistency. The priority values of the criteria are given in Table 2.

In Table 2, the "ease of access" is found as the most important criterion (28%). Three other criteria follow it, "content" (22%), "selling price" (19%), and "quality" (14%).

DISCUSSION

The immune-enhancing products are generally included in over-the-counter (OTC) drugs. Pharmacist opinion highly influences customers' decisions while selecting these products (21). Moreover, Chan and Tran mentioned that individuals had seen community pharmacies as preferable places for OTC products due to having the opportunity to access trustable information and safe products (27). Therefore, it can be considered that pharmacists' influence in selling these products is essential. To the best of the authors' knowledge, this is the first study assessing community pharmacists' recommending behavior for immune-enhancers and revealing the order of importance of the criteria via the AHP. According to the study results, the most and least important criteria were the ease of access and the package.

Procurement of health products is one of the pharmacists' main functions according to Good Pharmacy Practice (GPP) Guidelines (28). Additionally, it is known that today pharmacy practices change from product-oriented to patient-oriented. However, as stated by Moltó-Puigmarti et al., it should be noted that patient-oriented service delivery's complete success depends on patients' access to the relevant product (22). In other words, pharmaceutical care services offered in pharmacies should be both product and patient-oriented. In this context, accessibility to a product is of paramount importance. Especially, accessing OTCs such as immune-enhancers became more crucial during the COVID-19 pandemic. Indeed, considering the questionnaire applied in the current study during the Covid-19 pandemic, it should not be surprising that the first criterion becomes ease of access from the view of pharmacists.

Community pharmacists are closely concerned with their patients' health status via pharmaceutical care services. These services also balance selling a product and meeting

patient healthcare needs. According to clinical decision making process, “identifying alternatives” and “choosing among alternatives” are included as main steps for pharmacists (29). These steps affect pharmacists’ recommending behavior about a product. Taking the medication history of a patient is a necessary process. Inaccurate or incomplete medication history can lead to negative consequences (30). It is known that concomitant usage of drugs or herbal supplements with other medications can cause unwanted drug interactions (31). This situation is vital, primarily when the pharmacist evaluates the drugs or non-pharmaceutical products used by the patients and offers the patient suggestions about these products. This is why immune enhancers’ content becomes an important factor after accessing these products. Pharmacists attach importance to selecting the most appropriate product for consumers/patients. Similarly, De Tran et al. stated that while recommending an OTC product, Vietnamese community pharmacists are most significantly influenced by the *combination of active ingredients, range of dosage forms, and quick onset of action*, related to the product (23). When selecting dietary/nutritional supplements, Nickerson-Troy et al. expressed that pharmacists should pay attention to patient characteristics, such as disease state and concomitant usage with medicines/supplements (24). Depending on the most commonly cited bioethics principles, pharmacists should first consider the patient's benefit (beneficence) and prevent patients from being harmed (non-maleficence) (32,33). As Hanna and Hughes's study emphasized, pharmacists should provide patient safety while offering an OTC to a patient (25). This is another indicator that evaluating product content regarding patient health status is critical, while pharmacists recommend immune-enhancers.

New resources are required for pharmacies' financial survival due to the regulations restricting health expenditures. In the literature supporting non-prescription sales is seen as crucial for improving pharmacy economies (21,34,35). The market size of natural health products/dietary supplements is increasing, and these products have good profitability for pharmacies (14). In the present study, considering the effect of the product-selling price on pharmacy profitability, selling price is one of the most important factors affecting pharmacists' recommending behavior related to immune-enhancers. Turkish Pharmacists Association published a report addressing community pharmacies' economic and financial situation in Turkey in 2019. According to this report, there is insufficient improvement in community pharmacies' economies (36). This is an expected result when considering community pharmacies' financial situations in Turkey. In contrast, De Tran et al. revealed that Vietnamese community pharmacists are least influenced by the economic factors, including *financial pressure of excess stock, profit from the product, and volume selling product* while suggesting an OTC (23).

According to Kanjanarach et al., motivation for recommending DS/CM often comes from customer demands (15). Welna et al. exhibited that the first two factors that affect community pharmacists' decisions about stocking natural products were patients' requests and the demand of consumers/popularity, respectively (26). Contrarily, in the present study, patient expectation was not one of the primary factors for pharmacists.

Kanjanarach et al. stated that Australian and Thai pharmacists consider firms' credibility while selecting DS/CM (15). De Tran et al. expressed brand factor, including confidence in the manufacturer, was of medium importance among five factors about Vietnamese community pharmacists' OTC recommendation (23). Welna et al. put forth that manufacturers' reputation and “willingness/ability to provide product quality data” were the first five of eighteen criteria affecting pharmacies' natural product stocks (26). However, in the present study, quality and trust in the manufacturer did not take place in the upper ranks. Considering the immune-enhancers sold in community pharmacies are strictly controlled and licensed, pharmacists' priorities may be affected by this. The package was the least important factor affecting pharmacists' behavior while recommending immune-enhancers. It can be said

that pharmacists do not pay much attention to the package of immune-enhancer products. Similarly, in the study of Kevrekidis et al., packaging was the least affecting factor for customers while selecting OTCs (21).

CONCLUSIONS

Product selection and recommending decisions of pharmacists can directly affect the health outcomes of patients. In this regard using scientific methods to evaluate the decision process is vital. As it is known, pharmacists should be good decision-makers. In this study, one of the most widely used multi-criteria decision analysis techniques, AHP, was applied to investigate pharmacists' recommending behavior related to immune-enhancers. Examining the importance order of the criteria that affect pharmacists' recommending behavior related to immune-enhancers will fill the gap in the literature and contribute to the continuation of the services offered in the pharmacy without interruption.

The results obtained from this study raise several important issues that could spark further research especially on pharmaceutical production, marketing, logistics, and public relations. A similar study design can be adapted for companies with no immune-enhancing products but other natural health products/supplements.

The study results may shed light on pharmaceutical educators developing curriculums differently. The increased demand for supplements and OTCs, especially with the COVID-19 pandemic, has revealed that pharmacists should have knowledge of over-the-counter drugs and prescription drugs and manage these products correctly. For this reason, it is necessary to include these products in pharmacy faculty curricula. It is thought that the results of the study will be instructive about the points to be considered in presenting these products to patients.

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Tables

Table 1. Pair-wise comparisons of criteria

Criteria	Averages	Criteria
Ease of access	2.694	Selling price
Ease of access	2.276	Content
Ease of access	3.769	Package
Ease of access	2.209	Quality
Ease of access	2.109	Expectations of patient
Ease of access	2.450	Trust to the manufacturer
Selling price	2.121	Content
Selling price	4.432	Package

Selling price	2.099	Quality
Selling price	2.430	Expectations of patient
Selling price	2.369	Trust to the manufacturer
Content	6.403	Package
Content	2.731	Quality
Content	4.173	Expectations of patient
Content	3.785	Trust to the manufacturer
Quality	2.159	Package
Expectations of patient	2.222	Package
Trust to the manufacturer	2.230	Package
Quality	4.387	Expectations of patient
Quality	3.572	Trust to the manufacturer
Expectations of patient	2.900	Trust to the manufacturer

Table 2. Priorities of criteria

Criteria	Priorities
Ease of access	0.2752
Content	0.2167
Selling price	0.1859
Quality	0.1418
Expectation of patient	0.0785
Trust to the manufacturer	0.0589
Package	0.0431

Figure 1. Hierarchical representation of the proposed issue

