

Determining Filipino Consumers' Criteria for Purchasing Over-the-Counter (OTC) Medicines Using Analytical Hierarchy Process (AHP)

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Abstract—Over-the-counter (OTC) medicines, otherwise known as Nonprescription medications, aid in treating common ailments such as the flu, coughs, and colds and for the relief of aches, pains, and itches. There is a wide variety of products available with common active pharmaceutical ingredients and overlapping intended use. This study aims to determine the criteria of Filipino consumers when purchasing Over-the-counter medicines using Analytical Hierarchy Process (AHP). The first stage of the AHP was utilized to develop criteria for the decision problem. A web-based survey questionnaire was then created to collect data to understand better and determine consumer preferences. The AHP result was analyzed and derived through Goepel's AHP Excel Template. It demonstrated that Filipino consumers, out of the six criteria, Quality of product ranked the highest when purchasing OTC medicines. This result will provide insights and serve as a reference for the health regulatory agencies' programs and pharmaceutical drug manufacturers' marketing strategies.

Keywords—pharmaceutical drugs, medicine preference, over-the-counter (OTC) medicine, analytical hierarchy process (AHP)

1. Introduction

The Right to Health is one of every person's basic human rights, as it views health as a fundamental and vital value. Each individual has the right to enjoy a dignified life in the best possible health (CESCR General Comment No. 14, 2000). Thus, when the well-being of an individual is discussed, the subject of health is brought up. Each country has promoted and incorporated this fundamental right in its legislation and constitution. Each of these safeguards and promotes the state's protection and promotion of an individual's right to health [1].

In the Philippines, it is the government's role to inculcate health consciousness in citizens and approach healthcare delivery with a people-centered and people-oriented perspective (R.A. 11223, 2.1.d). Due to the fact that the pandemic is still affecting everyone, people are more concerned of their health. Being conscious of one's health necessitates being aware of the types of health care that are available and accessible. According to the committee on the Economic, Social and Cultural Rights (CESCR General Comment No. 14, 2000), access to health services, goods, and facilities should be universal and free of discrimination [2][1]. Additionally, the Philippines has enacted the Generics Act of 1988, better known as Republic Act 6675. This is to ensure an adequate supply of pharmaceuticals with generic names at the lowest feasible price, hence ensuring the availability of cost-effective alternatives to well-known pharmaceutical brands [3].

Medical medications for treating common ailments are one of these accessible items. Self-medication has expanded in recent years since the use of medicine to treat ailments, and is frequently regarded as one of the most cost-effective medical procedures ever established (World Health Organization, 2006) [4]. According to the research of (World Self-Medication Industry, n.d.) [5], around 25% of the population has used nonprescription medications to address non-chronic diseases. Nonprescription drugs, more commonly referred to as over-the-counter (OTC) drugs, can be purchased without a physician's prescription. These medications are safe and effective, particularly when the consumer is informed about the active pharmaceutical ingredients and adheres to the label's directions or those of a healthcare professional (U.S. Food and Drug Administration, 2018) [6].

According to Consumer Healthcare Products Association research on November 24, 2010, 87% of physicians agree that OTC medications are a vital component of healthcare and should be provided without a prescription. Additionally, experts concur that these medications make it easier and faster for patients to maintain their health. Thus, 81% of the adults surveyed in the United States have utilized these as their first line of defense against mild ailments [7].

Medications are categorized according to the disease being treated, further classified according to the brand and formulation. The wide variety of accessible medicines with a typical active pharmaceutical ingredient (API) and overlapping intended uses makes it an interesting subject to research Filipino consumers' criteria when deciding which medicine and brand to purchase. This study, therefore, aims to ascertain the priority of the important factors that Filipino consumers consider when selecting which OTC medicine to purchase. Generated results and analysis may help provide vital information for health and regulatory agencies for information dissemination for consumer awareness and manufacturers with their communication and marketing strategies. The scope of this study is related to the preferences of Filipino consumers when it comes to purchasing OTC medications for common illnesses such as the flu, coughs, and colds. The study uses the Analytical Hierarchy Process (AHP) but is limited at its first and second stage of hierarchical level, which are the building criteria for the decision problem and pairwise comparison respectively.

This paper is structured as follows: Chapter2 includes a review of the literature on the application of AHP in multiple fields. Chapter 3 evaluated the data obtained from the survey. The AHP results were extensively analyzed in Chapter 4. Finally, Chapter5 summarizes and concludes the study with a suggestion for future research.

2. Review of Related Literature

This chapter summarizes the results of literature review undertaken in different fields, with an emphasis on applications of the Analytical Hierarchy Process (AHP) and other techniques that may also be associated with it. These include the following:

In the article of (Rajesh and Malliga, 2013), they have established an integrated technique for strategic supplier selection combining Analytical Hierarchy Process (AHP) and Quality Function Deployment (QFD). According to them, strategic collaboration with better suppliers is needed to improve quality, flexibility, and lead time. The voice of the company's stakeholders must be considered while choosing suppliers. In supplier selection, the House of Quality was used to identify supplier traits that have the most impact on achieving the company's objectives. QFD evaluates significant criterion weightings generated from stakeholder requirement importance ratings and relationship weightings between stakeholder requirements and evaluating criterion. Using AHP, alternative suppliers are analyzed and compared based on the ranking criteria [8].

According to (Elahi et al., 2017), the pharmaceutical industries produce medications to treat illnesses; thus, it is essential that pharmaceutical companies handle the challenges linked to retailers' preferences for these medicines to remain competitive in this field. The authors investigated the elements that influence Retailers in selecting pharmaceutical products. They ranked them by applying the analytical hierarchy process (AHP) with the support of the Expert Choice Software version 11.0. Their results show that the quality of products comes first, followed by variety, availability, quantity flexibility, reasonable pricing, and delivery deadline [9].

Another study by (Elahi et al., 2016) emphasized the importance of getting an insight into physicians' preferences in prescribing the drugs. They have used the Analytical Hierarchy Process (AHP) and Quality Function Deployment (QFD). An expert panel was interviewed as part of their research to ascertain the factors influencing physicians' decisions. AHP produced using Expert Choice software showed that, from a physician's perspective, the quality of the product offering is the most critical factor in prescribing the pharmaceuticals, followed by the company's reputation, the relationship enjoyed with the company, and so on. In terms of technical factors, based on the relationship matrix between AHP and QFD, brand image is ranked first out of sixteen, followed by the quality of raw and packaging materials, skilled manufacturing employees, and so on [10].

(Kleinstäuber et al., 2021) undertook an intervention study to alter patients' perceptions and preferences for generic medications by educating them about the generic drug approval process and bioequivalence of generic and branded medications. As mentioned in the study, the effectiveness and safety of generic medicines are expected to be comparable to that of their more expensive counterparts. Switching formulations, however, should be done on a case-by-case basis, in consultation with the patient, and under close observation. Physicians, pharmacists, and patients should all be made aware of the difficulties associated with generic substitution, even more so in a period when health economics favor extensive generic use [11].

To the best of researchers' knowledge, no study has been conducted explicitly on the preferences of Filipino consumers when purchasing OTC medications. Our research will be the first on this subject. However, we found a survey conducted among university students in the Philippines addressing brand preference for pharmaceutical medications. According to (Badong et al., 2017), students at the University of Santo Tomas in the Philippines conducted a quantitative study to compare students' brand preferences for various over-the-counter medicines. The most desired pharmaceutical brands across all categories are as follows: Analgesics (Biogesic, Tylenol, and Tempra); Nonsteroidal anti-inflammatory drugs (NSAIDs) (Advil, Medicol Advance, and Midol); Cough and cold preparations (Neozep, Bioflu, and Decolgen); Antidiarrheals (Diatabs and Imodium); Laxatives (Duphalac, Lilac, and Movelax); Multivitamins (Enervon, Centrum (are Omepron, Risek, and Losec). Survey results indicate that the majority of Pharmacy students chose products manufactured by reputable manufacturers. However, in other Health-Allied courses, the majority of participants selected products suggested by family and friends. The criteria impacting participants' brand preferences for a variety of over-the-counter medications were similar in the Pharmacy students and other Health-Allied students [12].

The gathered related works aided the researchers in gaining a better understanding of the Analytical Hierarchy Process's (AHP) use and benefits. Related literature guided the researcher in developing criteria for a decision problem regarding Filipinos' preferences for over-the-counter medications. The researchers were also educated on the other possible techniques that could be used in conjunction with AHP to achieve optimal results.

3. Methodology

3.1. AHP Method

This study utilized the Analytical Hierarchy Process (AHP), with the primary objective at the first hierarchy level (i.e., to ascertain how Filipino customers prioritize criteria when purchasing OTC medications). At the second level of the hierarchy is the factors' relative importance to be evaluated through Pair-Wise comparison (i.e., the Cost, the Brand/Manufacturer, the Quality of Product being offered, Availability, Advertisements, and the Recommendation from Others). Fig.1 and Table I best illustrate the AHP hierarchy elements and the pair-wise comparison scale used in this study.

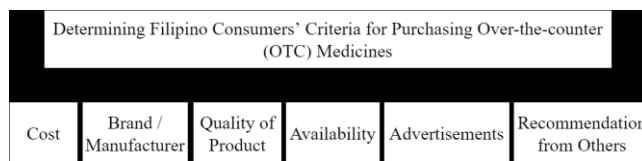


Fig. 1: Hierarchy of analysis for this study.

Table 1: Pair-Wise Comparison Scale for AHP Preferences

Rating	Prioritization of Preferences
1	• Not Applicable (if 1 and 2 have same importance)
3	• SOMEWHAT MORE IMPORTANT
5	• MORE IMPORTANT
7	• MUCH MORE IMPORTANT
9	• ABSOLUTELY MORE IMPORTANT

3.2. Data Gathering

An online survey in Survey Monkey was created and distributed through various online platforms and communications to ascertain how Filipino consumers prioritize criteria when purchasing OTC medications. The survey ran from January 15 - 25, 2022. Responses from sixty-five (65) participants were analyzed and narrowed down to twenty (20) participants with an acceptable inconsistency ratio (ICR). All data was collated to analyze and compare AHP pairwise factors. The analysis was conducted using Goepel's AHP Excel Template [13].

4. Results and Discussion

4.1. Quantitative Results of the Online Survey (65 Responses)

It can be observed that in Table II, the respondents are mainly employed individuals from Luzon and with an age group of early 20's up to the early 40's. In Table III, factors were ranked based on consumers' prioritization when purchasing OTC medicines. Results show that the Quality of Products has the highest rank. Table IV details the rating provided to the respondents to accomplish the pairwise comparison of the identified factors in purchasing OTC medicines.

Table 2: Results for Q1-Q4 Questions

Q1. What is your age group?	
Under 18	1.54%
18-24	26.15%
25-34	29.23%
35-44	36.92%
45-54	4.62%
55-64	1.54%
65+	0%
Q2. Are you currently _____?	
Employed	70.77%
Self-employed	6.15%
Unemployed and actively seeking for work	3.08%
Unemployed but not currently looking for work	
Unable to work	0%
A student	
A homemaker	3.08%
Retired	0%
	13.85%
	3.08%
Q3. To which gender identity do you most identify with?	
Female	50.77%
Male	44.62%
Non-binary	3.08%
Prefer not to share	1.54%

Q4. Where are you currently located?	
NCR – National Capital Region	46.15%
CAR – Cordillera Administrative Region	0%
BARMM – Bangsamoro Autonomous Region in Muslim Mindanao	
Region I – Ilocos Region	0%
Region II – Cagayan Valley	
Region III – Central Luzon	3.08%
Region IVA – CALABARZON	0%
Region IVB - MIMAROPA Region	23.08%
Region V – Bicol Region	23.08%
Region VI – Western Visayas	0%
Region VII – Central Visayas	1.54%
Region VIII – Eastern Visayas	0%
Region IX – Zamboanga Peninsula	3.08%
Region X – Northern Mindanao	0%
Region XI – Davao Region	0%
Region XII – SOCCSKSARGEN	0%
Region XIII – Caraga	0%
	0%
	0%

Table 3: Results for Q5 Question

Q5. How do you rank below factors when purchasing over-the-counter medicines with 1 being the highest? (Values in %)						
	1	2	3	4	5	6
Cost	27.69	20.00	24.62	12.31	12.31	3.08
Brand /Manufacturer	20.00	18.46	20.00	21.54	16.92	3.08
Recommendation from others	6.15	10.77	16.92	26.15	27.69	12.31
Quality of Products	36.92	30.77	12.31	7.69	7.69	4.62
Availability	7.69	18.46	26.15	24.62	16.92	6.15
Advertisements	1.54	1.54%	0	7.69	18.46	70.77

Table 4: Results for Q6 Question

Q6. How do you rate the importance of factors 1 and 2 below?			
Criteria1	Criteria2	Preference	Level of Preference
Cost	Availability	Criteria1 or Criteria2?	1 - Not Applicable (if both have same importance) 3 - SOMEWHAT MORE IMPORTANT 5 - MORE IMPORTANT 7 - MUCH MORE IMPORTANT 9 - ABSOLUTELY MORE IMPORTANT
	Brand / Manufacturer		
	Recommendation from others		
	Quality		
	Advertisements		
Availability	Brand / Manufacturer		
	Recommendation from others		
	Quality		
	Advertisements		
Brand / Manufacturer	Recommendation from others		
	Quality		
	Advertisements		
Recommendation from	Quality		
	Advertisements		

others			
Quality	Advertisements		

Table 5: Results for Q7 Question

If you are to purchase medicine when you are running a fever and have headache due to a cold, which would be your preferred option? Please rank below options with 1 as highest. (Values in %)				
	1	2	3	4
Biogic (Paracetamol / SRP PhP 2 per ablet) (Generic brand)	17.46	19.05	23.81	39.68
Tempra (Paracetamol / SRP PhP 5 per tablet)	7.94	28.57	31.75	31.75
Biogesic (Paracetamol / SRP PhP 4 per tablet)	60.94	20.31	10.94	7.81
Neozep (Phenylephrine HCl, chlorphenamine maleate, paracetamol / SRP PhP 5.50 per tablet)	14.29	31.75	33.33	20.63

The final question in the survey comes in Table V, where respondents were asked which OTC medication, particularly Paracetamol, they would choose if they had a fever and a headache. The results indicate that majority of the respondents chose a well-known brand name, which was recently reported to be out of stock in most pharmacies in the country due to a surge in Covid-19 cases.

4.2. Goepel AHP Results of 20 responses with acceptable ICR

For Q6 shown in Table IV, most of the respondents were observed with high consistency ratio (CR>0.10). Goepel’s AHP Excel Template could accommodate maximum of 20 responses and researchers randomly pooled 20 responses that would provide a consolidated Consistency Ratio of below 10%. The sampled responses represents 30% of total responses. Figure 2 below shows the consolidated results from Goepel’s AHP template.

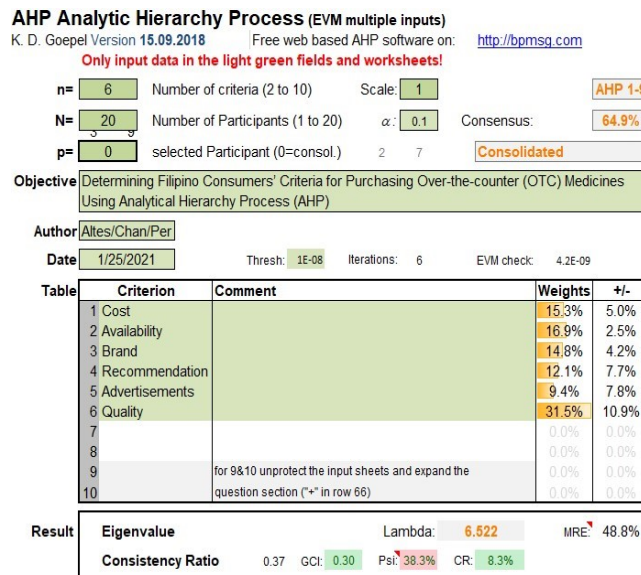


Fig. 2: Goepel AHP consolidated results from sampled 20 responses.

It can be observed from the results that the Quality of products is considered as the most important factor by consumers in selecting OTC medicine. There is, however, a difference in the priority ranking for the other factors

depending on the mode of question to the respondent. Results for Q5 shown in Table III show that after (1) Quality, (2) Cost factor is considered next followed by (3) Brand/Manufacturer, (4) Availability, (5) Recommendation from others, and (6) Advertisements. This ranking is different from the generated results for Q6, wherein respondents were requested to perform pairwise comparisons as part of AHP. Twenty (20) responses were consolidated using Goepel's MS Excel AHP template, and the overall consistency ratio is monitored to be below 10% [13].

Results from this pairwise comparison show that (1) the Quality is considered as most important and followed by (2) Availability, (3) Cost, then of the (4) Brand/Manufacturer, (5) Recommendation from others, and lastly (6) Advertisements. Succeeding Table VI shows the summary of ranked factors based on the consumers' perceived importance and the ranking based on the pairwise comparison.

Table 6: Comparison of Priority Ranking Results

Factors were ranked based on perceived importance, Basis: 65 responses	Factors were ranked with pairwise comparison and using AHP, Basis: 20 responses
1. Quality of Products : 36.92%	1. Quality : 31.5%
2. Cost : 27.69%	2. Availability: 16.9%
3. Brand / Manufacturer : 20 %	3. Cost : 15.3%
4. Availability: 7.69%	4. Brand / Manufacturer: 14.8%
5. Recommendations from others: 6.15%	5. Recommendations from others: 12.1%
6. Advertisements: 1.54%	6. Advertisements : 9.4%

This consumer preference is partly tested by requesting respondents to rank their preference in fever OTC medicines with options including a generic medicine like Biogic and branded medicines such as Biogesic, Neozepe, and Tempra. The data indicate a significant preference for branded choice. (1) Biogesic – 60.94%, (2) Neozepe – 14.29%, (3) Biogic – 7.46%, and (4) Tempra – 7.94%. According to this set of results, consumers may perceive branded medicines to be of more outstanding quality than generic alternatives, even though the latter contains the same active pharmacological component and are less expensive. Even when the brand/manufacturer component is ranked lower, consumers perceive well-known brands as superior quality.

This discovery is consistent with the findings of the (Kleinstäuber et al., 2021) study, which found that participants initially preferred branded over generic medications. The apparent difference in quality was only altered when participants were shown educational videos about the generic drug approval procedure and medicine bioequivalence [11].

Preferences for pharmaceuticals based on perceived quality and consumer education substantially impact drug supply and future shortages. This scenario has been witnessed recently, particularly with the spike in demand for Paracetamol in the Philippines. The high demand for Paracetamol is due to the increase of Covid-19 cases after the Christmas holiday season. Drug stores reported having no stock of branded paracetamol medicines. The Department of Health (DOH) then urged the public to purchase generic alternatives with equivalent efficacy to the branded Paracetamol [3]. This kind of scenario is the same findings of (Cameron and Bushel, 2021) in their study. They regarded the risk of running into medicine shortages due to worldwide pandemics such as Covid-19 due to disruptions in demand and supply [15].

5. Conclusion

Through the conducted survey, it was determined that the Filipino consumers regard the quality of products to be the most essential aspect when purchasing OTC medications. Simplified ranking and Pairwise Comparison revealed some variation in ranking for the remaining factors. Ranking results are as follows (1) Quality, (2) Cost factor is

considered next followed by (3) Brand/Manufacturer, (4) Availability, (5) Recommendation of others, and (6) Advertisements. On the other hand, AHP pairwise comparison results have the following priority order: first is the (1) Quality, followed by the (2) Availability, (3) Cost, (4) Brand/Manufacturer, (5) Recommendation from others, and lastly, (6) Advertisements. The difference between the two sets of results are in the number of participants and the need to ensure a consistency ratio of <10% for the AHP approach [13].

Additionally, this study discovered that Filipino consumers regard branded OTC medications to be of higher quality than generic equivalents. This perceived difference in quality between branded and generic medicines may contribute to the Philippines' susceptibility to drug shortage scenarios, particularly during pandemics. Even with generic drug legislation in place in the country, there is still room to improve Filipino consumers' level of knowledge about the approval process for generic medicines and their bioequivalence to branded medicines. Eliminating this information gap would teach consumers that quality does not have to be restricted to branded products and would also help lessen vulnerability to medication supply disruptions.

This study, however, would be more significant if it drew a bigger sample size from diverse places throughout the country and if the household income was also considered. More extensive and diversified data will also help understand if the rural and urban location and household income affect the respondents' when purchasing OTC medicines. Further research on this topic could improve on these limitations by engaging more respondents from all the regions to better represent the generated results. Use of alternate AHP tool or software that could process more responses would be an advantage in analyzing the consolidated results for the aimed higher number of respondents with an expected more diversified data.

6. Acknowledgment

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