

**PHARMACOECONOMICAL ASPECTS OF SELF-MEDICATION; A COMMUNITY PHARMACY SURVEY IN NORTHERN KERALA**NAINA LIZ PUTHIYEDAM<sup>1</sup>, ANJANA SAJAN<sup>1\*</sup>, ARUNA T<sup>1</sup>, VINEETH VS<sup>1</sup>, KIRON SS<sup>2</sup>, SMRITHY SUNNY<sup>2</sup><sup>1</sup>Department of Pharmacy, College of Pharmaceutical Sciences, Government Medical College, Kannur, Kerala, India. <sup>2</sup>Department of Pharmacy, Faculty of College of Pharmaceutical Sciences, Government Medical College, Kannur, Kerala, India. Email: anjanasajan11@gmail.com*Received: 26 July 2022, Revised and Accepted: 12 September 2022***ABSTRACT****Objectives:** The main objectives of the study were to identify the socio-economic characteristics of lay persons who engage in self-medication activities, to determine the economic aspects of self-medication, to conduct cost minimization analysis, and to determine the consequences of self-medication.**Methods:** A cross-sectional survey was conducted in community pharmacies throughout Northern Kerala for a period of 6 months from April 2021 to September 2021. A total of 300 participants were selected through consecutive sampling.**Results:** 117 people were from upper middle class families based on Kuppuswamy's scale. A majority of participants considered self-medication for economic benefits which confirmed that self-medication is closely related to the financial background of the respondents. The costs saved were measured by calculating the costs associated with hospital visits by them or family in the past 6 months for similar manifestations. During the study, the cost of branded drugs prescribed was determined as 70–1498.78% more than the generic versions. Hence, participants were spending much more on their treatment unaware about other alternative options. 117 participants experienced an adverse drug reaction after taking the medication, and 134 participants responded that their symptoms were not improving and 99 entrants had to visit the hospital who had an economic burden due to delay in detection of the disease.**Conclusion:** Thus, the study concluded that there is a strong relationship between pharmacoeconomics and self-medication behavior.**Keywords:** Self-medication, Community pharmacy, Health economics, Pharmacoeconomics, Cost minimization, Consequences.© 2022 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>) DOI: <http://dx.doi.org/10.22159/ajpcr.2022v15i12.45982>. Journal homepage: <https://innovareacademics.in/journals/index.php/ajpcr>**INTRODUCTION**

Self-medication involves the use of medicinal products by the consumer to treat self-recognized disorders or symptoms, or the intermittent or continued use of a medication prescribed by a physician for chronic or recurring diseases or symptoms [1]. In practice, it also includes use of the medication of family members, especially where the treatment of children or the elderly is involved [1]. Self-care emphasizes the importance of self-treatment, that is, self-determined treatments and non-medication practices [2]. The main objectives of the study are to identify the socio-economic characteristics of lay persons who engage in self-medication activities [2], to determine the economic aspects of self-medication, to conduct cost minimization analysis [3-5] and to determine the consequences of self-medication [6].

The socio-economic background of the people is a salient factor that leads to self-medication behaviors. Since pharmacoeconomics runs through the thread of our socio-economic system, pharmacoeconomics and self-medication behavior can be connected [7]. The need to minimize cost of drug therapy is urgent as the prices of many drugs are rising sharply [4,8,9]. Self-medication is aimed at reducing high costs of health-care products for people who are unaware of the availability of least costly alternatives in the market. Pharmacoeconomic studies help in highlighting the price difference between generic and branded drugs [4,5]. The study helps to make best possible decisions regarding common brands ensuring maximum available economic benefits [5]. Cost minimization is a method of pharmacoeconomic evaluation which compares the cost of different products having equivalent outcomes [3,7,10,11]. It also helps in understanding and comparing different products in the market which allows the consumers to obtain products based on their financial ability [3,7,10,11].

Along with these potential benefits, self-medication also comes with several risks [12,13]. The risks associated are mainly due to the lack

of awareness, knowledge, and misinformation which can be identified and avoided [12,13].

**METHODS**

A cross-sectional survey was conducted over a period of 6 months from April 1, 2021 to September 31, 2021, among people who took self-medication from community pharmacies in the districts of Kozhikode, Kannur, and Malappuram of Northern Kerala. A total of 300 subjects participated in the study.

**Study design**

This study was a cross-sectional survey.

**Study location**

Community Pharmacy based study done in Vinaya Pharmacy, Neethu Medical Store, Life Medicals, Unity Medicals – in Kannur district, Karassery Medical Store-in Kozhikode district and Aswathy Medicals, KM Medicals - in Malappuram district of Northern Kerala, India.

**Study duration**

The study duration was from April 1, 2021 –September 31, 2021.

**Sample size**

300 subjects.

**Inclusion criteria**

All people aged between 18 and 60 years of age who took self-medication from the above community pharmacies during the study period were included in the study.

### Exclusion criteria

The following criteria were excluded from the study:

1. Patients who were admitted in the hospitals or in nursing homes
2. People who cannot comprehend the questionnaire
3. People with unsound mind or who were emotionally compromised.

### Survey procedure

A well-designed questionnaire was constructed to obtain the data for the study. Since the study was done during COVID-19 pandemic, consecutive sampling was carried out and a total of 300 subjects were selected. To collect the data, the researchers visited community pharmacies and interviewed the subjects directly. Two questionnaires were prepared; one for the pharmacists and other for the study subject. Both of these questionnaires were standardized.

#### Questionnaire for pharmacists

Formulated to identify the common brands given for minor ailments from their pharmacies and the data obtained were used to devise the questions for cost minimization [14].

#### Questionnaire for study subjects

Questionnaire was prepared both in English and local language (Malayalam) for the study subjects and consisted of three parts: Part 1: Socio-demographics and socio-economics - included eight questions such as date of visit, telephone number, gender, age, occupation, educational qualification, monthly family income, and health insurance which was evaluated using KUPPUSWAMY SCALE, Part 2: Economical Aspects of self-medication - included 19 questions and Part 3: Consequences - included six questions.

#### Standardization of questionnaire

For standardization of questionnaire, the questionnaire was initially presented to qualified and efficient persons from the profession. Based on their recommendation and suggestions proper modifications were done.

#### Conducting telephone survey

The consequences of self-medication were identified by carrying out a follow-up after a period of 2 weeks through a telephone interview.

The expenses for a hospital visit spent by the study subjects in the past 6 months for similar symptoms were evaluated. These included direct medical costs, direct non-medical costs, and indirect non-medical costs. For each ailment, the most commonly used drug was identified and variation in the brand price and generic price were determined using cost minimization analysis. The cost of each brand was obtained from pharmacies and the generic price from <http://janaushadhi.gov.in> and then compared.

Percentage of cost variation =

$$\frac{\text{Cost of the brand} - \text{cost of generic version} \times 100}{\text{Cost of generic version}}$$

### Statistical analysis

All collected data were analyzed at the end of the study using appropriate statistical tool. Data processing, tabulation of descriptive statistics, calculation, and graphical representation were done using statistical software version 21 Statistical Package for the Social Sciences. Spearman's Correlation was used to identify the relationship between two variables with a cutoff value of  $p < 0.05$ .

## RESULTS AND DISCUSSION

The questionnaire was answered by 300 participants, out of which 52.3% were females and 47.7% were males. The total participants in the study were categorized into four different groups based on their age. The largest fraction of people involved in self-medication belonged to the age group of 31–40 and the least were from 51 to 60. Thus the mean age of the respondents was ascertained to be  $37.993 \pm 10.1385$ .

The data on occupation proposed that the largest proportion of participants who indulged in self-medication were professionals and also indicated that 1% of entrants were unemployed irrespective of their education. The highest number of participants (84) taking self-medication were graduates, and 69 participants had post graduate or professional degree. Since most of the respondents were from highly educated families, self-medication behavior and educational qualification have a linear relationship. Regarding income, majority (33.3%), had monthly family income between Rs. 29973 and Rs. 49961 and a much less fraction of respondents (5%) had an income of 2 lakhs approximately.

The categorization based on Kuppuswamy's scale is given in Table 1. Data on the occupation of the head of the family was collected and scored based on Kuppuswamy's scale. Among 300 participants, 60 (20%) were found to be professionals who indulged in self-medication and only a small fraction of the respondents, that is 3 (1%) taking self-medication were unemployed irrespective of their education. The educational status showed that the highest number of participants taking self-medication were graduates, 84 (28%). The data on monthly family income illustrated that a large group of participants that is, 100 (33.3%), had a monthly family income of Rs. 29973–Rs. 49961.

The total score was calculated by adding up all the three scores, namely, education, occupation and total family income. According to the total score thus calculated, the families were placed in the appropriate socio-economic class as given in Table 2. In this study, 117 people (39%) were from the upper middle class based on Kuppuswamy's score.

The economic value of self-medication was determined in terms of measures related to time, cost, and productivity. Evidence from

**Table 1: Categorization based on Kuppuswamy's scale**

Indicators	Frequency
Occupation	
Unemployed	3
Elementary occupation	14
Plant and machine operators and assemblers	27
Craft and related trade workers	24
Skilled agricultural and fishery workers	36
Skilled workers and shop and market sales workers	46
Clerks	27
Technicians and associate professionals	54
Professionals	60
Legislators, senior officials, and managers	9
Educational qualification	
Primary school certificate	18
Middle school certificate	26
High school certificate	40
Intermediate or diploma	63
Graduate	84
Profession or honors	69
Illiterate	0
Monthly family income	
Rs. 10002–Rs. 29972	36
Rs. 29973–Rs. 49961	100
Rs. 49962–Rs. 74755	84
Rs. 74756–Rs. 99930	44
Rs. 99931–Rs. 199861	21
>Rs. 199862	15

**Table 2: Kuppuswamy score**

Total score	Socioeconomic class	Frequency
26–29	Upper	36
16–25	Upper middle	117
11–15	Lower middle	95
5–10	Upper lower	52
<5	Lower	0

literature analyses show that the practice of self-medication for minor ailments had considerable value to patients, peers and employers with regard to cost savings and improved productivity [15]. The minor ailments included in the study were aches/headaches/migraine, gastroesophageal reflux disease/ulcer/heartburn, allergy/rashes, muscle pain/back pain/neck pain, constipation, diarrhea, cough/cold/sore-throat, nausea/vomiting, bacterial, and fungal infections. The distribution of participants taking various medications for these ailments is explained in Fig. 1.

Elucidating the reasons of self-medication, about 107 participants (35.7%) consider cost savings while 106 (35.3%) of the total 300 participants intend to save time. 57 (19%) of the respondents used old prescriptions to avoid hospital visits for minor ailments and only 30 (10%) sought self-medication for their convenience. A study by Alghanim on self-medication practice among patients in a public health-care system [16] concludes the reasons were lack of time (52%) and cost savings (42.9%).

In the study population, the correlation between occupation and reasons for self-medication by Spearman's correlation was found to be significant with  $p=0.027$  as given in Fig. 2.

The correlation of monthly family income to the reasons for self-medication by Spearman's correlation was found to be significant with  $p=0.039$  as given in Fig. 3. It was found that out of 100 participants who had a monthly family income of Rs. 29973–Rs. 49961, cost savings were the major reason for self-medication for 47 of them.

The criteria for the selection of drug for self-medication depended on various determinants. Around 120 respondents (40%) considered pharmacist's advice while selecting a drug, followed by the price of the drug 90 (30%) and previous experience 45 (15%), brand 30 (10%), and advertisement 15 (5%). While interviewing the participants, the sources of information were reported as old prescriptions 52 (17.3%), Friends/peers/family 39 (13%), internet 80 (26.7%), and pharmacist 129 (43%). The Alghanim's study from Saudi Arabia [16] indicates sources of information as pharmacists 74%, previous prescription 50.8%, relatives/friends 20.3%, and mass media 16.9%.

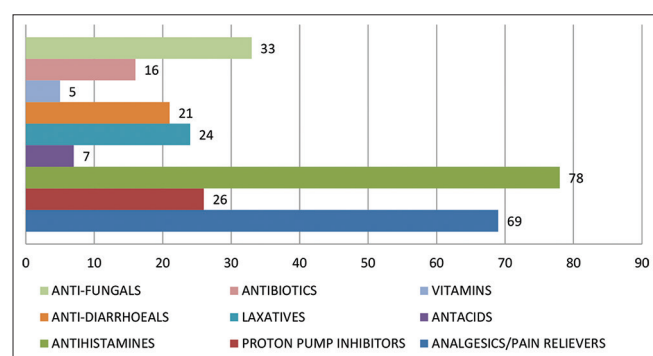


Fig. 1: Distribution of participants taking self-medication



Fig. 2: Correlation of occupation and reasons for self-medication

For more than half of the sample population (66.7%), the patient or their family member had visited hospital for the similar symptoms in the past 6 months. The costs associated with these visits were evaluated and it was found to be the major reason for their current self-medication behavior. The costs of hospital visits in the study covered Direct Medical Costs, Direct Non-Medical Costs and Indirect Non-Medical Costs as given in Table 3. Direct medical costs include consultation costs and diagnostic costs, direct non-medical costs include transportation costs, and other costs such as food, lodging, and clothing and indirect non-medical costs result from the loss of productivity. Out of the 200 respondents, the total costs associated with hospital visits for a vast majority of people 92 (30.7%) was found to be > Rs. 1000 followed by 64 people (21.3%), who spent a total sum ranging from Rs. 500 to Rs. 1000 for hospital visits while only 44 participants (14.7%) had spent <Rs. 500 for these visits. Clearly, there are cost differences between self-medication and hospital visits for the same kind of symptoms.

The cost minimization analysis was done by comparing the brand price and generic price of the most common drug used for each ailment by the participants which is explained by percentage of cost variation in Table 4.

Only 237 participants responded to the telephonic interview conducted 2 weeks after their visit to the pharmacy. 117 participants declared

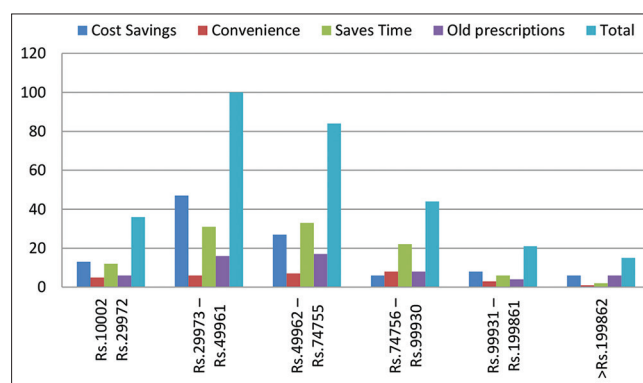


Fig. 3: Correlation of monthly family income with reasons for self-medication behavior

Table 3: Costs associated with hospital visits

Cost	Frequency	Percentage
Direct medical costs		
Consultation cost		
<Rs. 100	8	2.7
Rs. 100–Rs. 300	156	52.0
>Rs. 300	36	12.0
Diagnostic tests		
<Rs. 100	6	2.0
Rs. 100–Rs. 500	78	26.0
>Rs. 500	21	7.0
Direct non-medical costs		
Transportation costs		
<Rs. 100	55	18.3
Rs. 100–Rs. 500	123	41.0
>Rs. 500	22	7.3
Food, lodging, clothing		
Yes	104	34.7
No	96	32.0
Indirect non-medical costs		
Leave from work		
Yes	134	44.7
No	66	22.0
Medical allowance		
Yes	69	23.0
No	65	21.7

Table 4: Cost minimization analysis

Ailment	Name of drug	Common brand	Brand price	Generic price	% cost difference
Aches/Headache	Paracetamol	T. Dolo	Rs. 2.06	Rs. 0.723	184.92
Allergy	Cetirizine	T. Okacet	Rs. 1.85	Rs. 0.4	362.5
Heartburn/GERD	Pantoprazole	T. Pantop	Rs. 9.12	Rs. 0.997	814.74
Constipation	Bisacodyl	T. Gerbisa	Rs. 1.12	Rs. 0.495	126.26
Diarrhoea	Loperamide	T. Andial	Rs. 2.2	Rs. 0.616	257.17
Bacterial infection	Azithromycin	T. Azee	Rs. 23.9	Rs. 13.57	76.12
Fungal infection	Fluconazole	T. AF	Rs. 13	RS. 3.804	241.74
Vomiting	Ondansetron	T. Emeset	Rs. 5.26	Rs. 0.329	1498.78

Table 5: Consequences of self-medication

Indicators	Yes		No	
	Frequency	%	Frequency	%
Discomfort	117	39	120	40
Symptoms improved	103	34.3	134	44.7
Hospital visit	99	33	35	11.7
Economic burden	23	7.7	12	4.0
Condition worsened	73	24.3	60	20.0

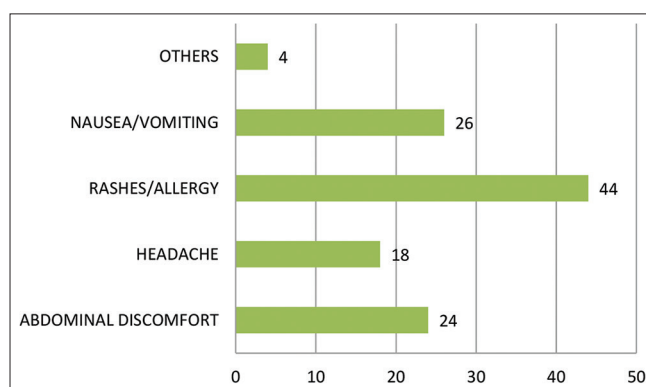


Fig. 4: Adverse effects of medication

that they experienced an adverse drug reaction (ADR) after taking the medication while 120 participants did not experience an ADR. The response of the participants to the consequences of self-medication was recorded as given in Table 5.

The adverse events experienced by the participants are shown in Fig. 4. Out of 117 participants who experienced discomfort after taking the medication, 24 (8%) had abdominal discomfort, 18 (6%) had headache, 26 (8.7%) had nausea/vomiting, and 44 (14.7%) developed allergy/rashes due to misinformation regarding medications.

## CONCLUSION

Pharmacoeconomics relates society and economy to drug therapy and provides strong evidence to the cost effectiveness of self-medication. Out of 300 participants, 107 (35.7%) opted for self-medication to save cost and also socio-economic characteristics of the participants can be a vital contributing factor that leads to self-medication behaviors. From the sample population, upper middle class and lower middle class had more tendency to go for self-medication than upper and lower classes. The study has shown a very significant difference of prices between branded and generic drugs. The cost of branded drugs prescribed was 76.12–1498.78% more than the generic versions. This denotes that numerous people were spending much more on their treatment, unaware about other alternative options. The study also analyzed the consequences of self-medication and found out that 117 of the participants experienced an ADR after taking the medication. About 134 of them responded that their symptoms were not improving and 99 of

them had to visit the hospital who declared that they had an economic burden due to delay in detection of the disease. This implies that there is lack of awareness among common people about self-medication. In an attempt to reduce the cost of treatment through self-medication, several people end up misdiagnosing their conditions which may lead to much more financial burden due to delay in obtaining proper medical care.

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## AUTHORS CONTRIBUTION

Anjana Sajjan: Conception and design, Resources and materials, Data collection and processing, Analysis and interpretation, literature search, Writing manuscript, Critical review. Aruna T: Conception and design, Resources and materials, Data collection and processing, Analysis and interpretation, literature search, Writing manuscript, Critical review. Naina Liz Puthiyedam: Conception and design, Resources and materials, Data collection and processing, Analysis and interpretation, literature search, Writing manuscript, Critical review. Vineeth V S: Conception and design, Resources and materials, Data collection and processing, Analysis and interpretation, literature search, Writing manuscript, Critical review. Kiron S S: Supervision, Conception, Analysis and interpretation, Writing manuscript, Final review. Smrithy Sunny: Supervision, Conception, Analysis and interpretation, Writing manuscript, Final review.

## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

## AUTHORS FUNDING

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