

Modelling Customers' Buying Behaviour of Jan Aushadhi (Generic Medicines)

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ABSTRACT

Background: Jan Aushadhi, a scheme to make affordable generic drugs available to large sections of population was launched by the Government of India across the country in the year 2008. This exploratory research was conducted to study the attitude of customers (Bengaluru, India) towards acceptance of Jan Aushadhi and an attempt was made to model buying behavior in order to suggest mechanisms to speed up the acceptance. **Materials and Methods:** Data was collected using structured questionnaire. Z-test and Exploratory factor analysis was conducted for hypothesis testing. Discriminant analysis was conducted to model consumption. **Results and Conclusion:** The variables that discriminated consumers from non-consumers were 'effectiveness', 'doctor's opinion', 'lower price', 'Quality', 'less expensive than other branded medicines', 'doctor's prescription', 'convenience', 'doctor informs', 'home delivery' and 'brand reputation'. Results found that 'doctor's prescription', 'lower price', 'availability of Jan Aushadhi outlet', 'quality of generic medicine' and 'recommendation from others' had a significant influence on acceptance of Jan Aushadhi. Therefore, the study recommends the doctors to prescribe generic medicine, increase the number of Jan Aushadhi outlets and provide awareness about the quality and efficacy of Jan Aushadhi.

Key words: Jan Aushadhi, Model, Customers' attitude, Generic medicine, Segment, Exploratory Factor Analysis, Discriminant Analysis, Spearman's Correlation, Z - test, Bengaluru, India.

INTRODUCTION

Population and Healthcare in India

India with around 1.35 billion population is the second most populous country in the world. More than 50% of India's current population are below the age of 25 years and over 65% are below the age of 35. About 72.2% of the population lives in 638,000 villages and the rest 27.8% in about 5,480 towns and urban cities.¹ Rangarajan committee found that 29.5 percent of total population lived below poverty line in India during 2011-2012.² World bank report of 2006 stated that 34.7 % of Indians earn less than US\$ 1 per day and majority of them worked in unorganized sector with an average salary of less than 0.5 \$ per day found by Balse.³ In India, healthcare delivery is provided either by government

agencies or private entities. The Government provides healthcare through Primary Healthcare Centres (PHC) and limited secondary and tertiary care institutions. The rural India is predominantly served by primary healthcare centres. Patients in developing countries bear 80 percent of healthcare expenses from their pockets, of which 70 percent are for medicines.⁴ Health Insurance of any kind that covered rural population stood at 14.1 percent and 18.1 percent in urban India.⁵

Pharma Business in India

The value of pharma sector in India was at US \$33 billion in 2017. The industry was expected to expand at a CAGR (Compounded annual growth rate) of 22.4 per cent and be

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valued at US\$ 55 billion by 2020. Pharma exports from India stood at US\$ 17.27 billion in 2017-18 and was expected to reach US\$ 20 billion by 2020. India was also the largest exporter of generic drugs in the world and supplied close to 40 percent of generic drugs to USA.⁶ But the local Indian population had less access to affordable and quality drugs.⁴ Accessibility of affordable medicine in India remained an important concern. In India, Delhi offers 48.8 per cent affordable medicines and in rest of the states, availability of affordable medicines is even very less in percent found by Kotwani.⁷

Jan Aushadhi in India

With an objective of making available quality generic medicines at affordable prices to all in India, 'Jan Aushadhi Scheme' was launched by the Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Government of India in November 2008 across the country. The 'Jan Aushadhi Scheme' was later renamed as 'Pradhan Mantri Bhartiya Jan Aushadhi Pari Yojana' (PMBJP) and given a thrust by government led by Honorable Prime Minister Sri Narendra Modi.⁸ In the Budget Speech of 2016-17, opening 3,000 PMBJP Kendra's were announced to provide proper distribution of affordable and quality generic medicines (Jan Aushadhi) to people of India. The medicines available across different categories at Jan Aushadhi are priced 50-90% lesser than their branded equivalents.

Factors contributing to Cost of Branded Medicines and Generic Drugs

Main reasons for pricing of medicines / drugs has been the research and development costs.⁹ Drug research is expensive and development takes many years. First time molecules consume a lot of time for development and take elaborate time for clinical trials to ensure safety and efficacy of drugs to the patients who consume the drug. By the time branded drugs gets approved, company would have spent large sums of money running into millions of India Rupees or US Dollars. Generic medicines do not go through this cycle and hence the cost of generic medicine is cheaper and takes less time for development. The generic drug manufacturer invests primarily on production and distribution of drugs to the market. Hence, they can sell generic medicines at lesser prices than compared to branded drugs. Another reason for high cost of branded drugs are the costs of marketing. Branded drugs spend huge sums of money in marketing new drugs to consumers/patients and doctors. They invest in the channels whose primary member is their medical representative who in turn visits the doctors across various hospitals and promote

the drugs through doctors. Generic manufacturers spend less money on advertising and marketing. Most of the drugs introduced by generic manufacturers have already been in the market and the generic formulations are already well known to patients and health care providers. Healthcare costs are the second most frequent reason for rural indebtedness in the country. A major component of healthcare costs is medicines. According to Planning Commission estimates, the cost of medicines in India ranges from 50 % to 80 % of the total cost of treatment. Since 80 % of out-patient care and 60 % of in-hospital care occurs at private facilities in India, households are exposed to private sector market to buy medicines. A large population of the people find it difficult to afford such expensive brand-named category of medicines as some of them are sold by drug manufacturers at significantly higher prices than their generic equivalents.³

Literature Review

Perception of Customers

Lacocca *et al.*¹⁰ found that customers had a strong preference for branded drugs/ medicines. In addition, consumers exhibited high switching costs for prescription drugs. Brand loyalty is strong enough for a group of consumers such that manufactures do not lower prices. Patients have a strong personal preference toward specific brand drugs. The brand loyalty was strong for the manufacturers to not lower the prices.

Fraeyman *et al.*¹¹ studied the consumers' perception of generic medicines in Belgium. It was found that elder customers were confused about different packages, less educated consumers were not confident about quality and effectiveness of generic medicines. Consumers' recognition of active substance in few generic were poor and consumers exhibited a tendency to switch to generics due to high cost of branded medicines.

Bulsara *et al.*¹² found Australian senior consumers' mistrust in generic medicines was due to factors like – mistrust in foreign generics, doubts about their equivalence, lack of uniform information and confusion in packaging and labelling.

Himmel *et al.*¹³ found that majority of patients seemed to be familiar with the term "generic drug". Majority of them expressed negative feelings towards generics with regard to their quality and efficacy. They perceived inexpensive drugs to be inferior and were not satisfied with doctors' information on substitution. A small fraction of those patients who had consumed the generic drugs were not satisfied with the therapeutic benefit from the drug.

Most of the studies have been conducted across different parts of the world and a detailed study measuring the customers' attitude, opinions and willingness to purchase in the Indian context is lacking. Studies especially in the urban areas are very few.

Perception of Physicians

Gupta *et al.*¹⁴ found that good percentage of doctors had knowledge about generic medicines. They had a positive opinion about safety, efficacy and quality of generic medicines. Many of them prescribed generic drugs. These observations were supportive towards adoption of generic medicines.

Physicians in Saudi Arabia were studied for the perception, attitude and opinion on generic drugs by Salhia *et al.*¹⁵ The low market share was attributed to low prescription levels which in turn was a result of low levels of knowledge of generic drugs among senior physicians in the Saudi Arabian hospitals studied.

Sanyal and Datta¹⁶ investigated the relationships between country of origin and brand equity of branded generic drugs. In Indian pharma market, study pointed out that country of origin positively influenced the doctor's loyalty and consistent prescription of branded generic drugs. Physicians preferred pharma brands from countries that exhibited good research and development, quality, propensity for newer drug development and maintained prestige in terms of drug manufacturing.

A national survey in USA studied by Paul *et al.*¹⁷ examined that the primary care physicians strongly believed that direct to consumers advertisement overstated efficacy of generic medicines and did not provide sufficient information about risk factors. This paper brought out the negative attitude of primary care physicians towards advertisement of generic drugs.

Comprehensive studies about attitude and opinion of physicians towards generic drugs especially in urban areas of India are very few.

Quality of Generic Drugs

The quality of generic medications were not any different from the quality of the costlier branded medicines available in the market and the test was done on a specific drug for controlling blood sugar levels – Metformin taken as a sample from a pharma company.¹⁸ But this study was conducted on a single drug taken from a specific pharma company. A comprehensive research comparing the quality of drugs across different categories of branded and generic drugs is not available easily.

Pricing of Generic Drugs

Smit and Bredenkamp¹⁹ have studied the differences in prices of branded and generics in South African Market, the results pointed out that new generics competed among themselves by significantly lowering prices. The originator drug also lowered prices relative to prices of generics to be competitive in the market. Hence generic drugs helped bring down the prices of the originator as well as generic drugs in the same class to make it more affordable to the customers in South African Market.

The early generic entrant enjoys a substantial market share and profit advantage over the second and the third entrants and the advantage was due to the response of the retail pharmacy channel in caring for consumer preferences and ability to extract price concessions from subsequent generic manufacturers as observed by Yu and Gupta.²⁰

Substantial savings could be achieved by switching to generic equivalents from originator drugs and this study was conducted across 17 countries by comparing costs across a range of drugs. The promotion of generic drugs could be achieved by promoting generic substitution by pharmacists and increasing confidence in generics by professionals and the public as studied by Cameron *et al.*²¹

Rojas²² found that there were significant differences in the prices charged by pharmaceutical companies for identical drugs across countries in Central America. The price differences were due to economic factors like per capita income, market size and nature of social security system. Companies sold pharma drugs at higher prices in countries that had larger segments with high income and exhibited willingness to pay higher prices. This essentially implied that pharma drugs have to be priced lower in places with lower income and willingness to pay lower prices only.

Research problem

Much of the research done in India have focused on proving the quality of generic drugs. Some of the Indian studies found that quality across the categories of drugs and their branded equivalents were the same for the drugs considered for the study and the approach were pharmacopoeial tests. Consumer adoption studies in terms of consumers' attitude (Awareness, Opinion and intention to purchase generic drugs) were not much in India and there existed an important opportunity to research this area.

A model to predict customers' adoption of generic medicine had not been developed and this would help government agencies promoting generic drugs, pharmaceutical companies and pharmaceutical retailers operating in generic drugs, to address important variables that predicted adoption and non-adoption. This study would help in furthering the cause of generics and outcomes would help in expanding the generics market share.

Objectives

1. To study the attitude of customers towards Jan Aushadhi (generic drugs).
2. To segment the customers based on their attitude (Awareness, opinions and Intention to purchase).
3. To Test Hypotheses relating to opinion about availability of Jan Aushadhi, Cost of Jan Aushadhi.
4. To Test Hypotheses about relationship between consumption of generic medicine and a) doctors prescribing generic medicine, b) Others recommendations, c) quality and 4) customers age group.
5. To develop a two group Discriminant model to predict consumption of Jan Aushadhi.

To support the study, relevant hypotheses were proposed and tested:

Hypothesis 1

H_0 = Availability of Jan Aushadhi is not an important variable in consumption of Jan Aushadhi

H_1 = Availability of Jan Aushadhi is important variable in consumption of Jan Aushadhi

Hypothesis 2

H_0 = Cost of Jan Aushadhi is not an important variable in explaining consumption of Jan Aushadhi

H_2 = Cost of Jan Aushadhi is an important variable in explaining consumption of Jan Aushadhi

Hypothesis 3

H_0 = There is no relationship between the patient's doctor prescribing generic medicine and the patients consuming generic medicine for personal use

H_3 = There is a relationship between the patient's doctor prescribing generic medicine and the patients consuming generic medicine for personal use

Hypothesis 4

H_0 = There is no relationship between consuming generic medicine and other's recommendation

H_4 = There is a relationship between consuming generic medicine and other's recommendation

Table 1: Objectives and Methods used.

Objectives	Methods
1. To study the attitude of customers towards Jan Aushadhi (generic drugs)	Focus Group Discussions, Literature review and Descriptive Statistics
2. To segment the customers based on their attitude (Awareness, opinions and Intention to purchase)	Exploratory Factor Analysis
3. To Test Hypotheses relating to opinion about availability of Jan Aushadhi, Cost of Jan Aushadhi	Z Test, Exploratory factor Analysis, Correlations
4. To Test Hypotheses about relationship between consumption of generic medicine and a) doctors prescribing generic medicine, b) Others recommendations, c) quality and 4) customers age group	Spearman's Correlation
5. To develop a model to predict consumption of Jan Aushadhi	Two Group Discriminant Analysis

Hypothesis 5

H_0 = There is no relationship between consuming generic medicine and quality

H_5 = There is a relationship between consuming generic medicine and quality

Hypothesis 6

H_0 = There is no significant difference between Customers age group and consumption of Jan Aushadhi

H_6 = There is a significant difference between Customers age group and consumption of Jan Aushadhi

MATERIALS AND METHODS

Focus Group Discussion

To satisfy Objective 1, a focus group discussion was conducted among customers and non-customers of affordable generic drugs (Jan Aushadhi) to understand their attitudes. Attitude is combination of Awareness, Opinion and Intention to purchase (reference). The members of focus group were drawn from consumers of Jan Aushadhi and consumers of Branded medicines (Non-Jan Aushadhi). All the nine members were aware of Jan Aushadhi. Three healthcare professionals were also members of the focus group to bring in the perspective from healthcare providers. The focus group discussion was recorded on video and discussion was

Table 2: Variables considered for the study.

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Variables	
Less Expensive than Other brands	Convenience
Doctor's prescription	Home delivery
Doctor informs	Pharmacist has got sufficient knowledge
Consuming generic medicine	Doctor has a good opinion
Availability for all kind of disease	Should be available in pharmacy
Jan Aushadhi should be available in pharma	Doctors should prescribe
Prescribed medicines available	Costlier medicine better quality
Lower prices	Attractive packaging better quality
Quality	Reputation of brand
Effective as other brands	Pharmaceutical chains promoting leads to higher trust
Jan Aushadhi packaging	Doctor's recommendation
Recommendation from others	Owner of pharmacy promoting leads to higher trust
	Central and State Government promotion

analysed for understanding the attitude of consumers and non-consumers of Jan Aushadhi. The variables brought out in focus group discussions and variables collected through literature review are listed in Table 2. To Satisfy Objective 2, an Exploratory Factor Analysis (EFA) was conducted using Varimax Rotation technique. EFA was conducted to understand the underlying nature of relationship between variables, as a means of dimension reduction and for the conduct of hypothesis testing. Results are listed from Tables 5, 6 and discussed under results and discussions. Factors whose Eigen values were more than 1 were selected for consideration.

To satisfy Objectives 3 and 4, Spearman's correlation test and Z Test were used

Spearman's Correlation Test

Correlation test was conducted to test the hypotheses that were developed to establish the relationship between variables. Results are provided in Tables 7-9.

Z – Test

Z Test was used to test the hypotheses developed. Results are provided in Table 10.

Objective 5 was satisfied by using two group discriminant analysis with the variables listed in Table 1 taken as independent variables and predictor variable was 'Use generic medicines for personal use'. The respondent values of predictor variable obtained on Likert scale where '1' was Strongly Disagree and '5' was Strongly Agree was further codified to either '0' or '1'. '1' represented usage and '0' represented non-usage. '1', '2', '3' were codified into '0'. '4' and '5' were codified into '1'. Table 3 – 5 provides the results of two group Discriminant analysis. The two groups had significant degree of separation which was indicated by Wilk's Lambda being 0.478.

Sampling method Sample size and Data collection

The study was exploratory in nature and the samples were collected across Bengaluru. Using a convenience sampling, 161 Customers were surveyed across Bengaluru. Data was collected using a questionnaire. The questionnaire has two main sections – a) Demographic data and b) Scaled questions to measure attitude towards consumption of Jan Aushadhi. The scales were five-point Likert Scales. Reliability test was conducted and Cronbach's alpha of 0.781 was acceptable. SPSS used to conduct the tests. Cell size method was used to determine the sample size. For factor analysis, the cell size had to be at least 5 times the number of variables.²³ This research considered 24 variables.

RESULTS

Descriptive Statistics

Table 3 describes the demographic profile of the 161 respondents. It includes distribution of gender, age and occupation.

Table 4 Lists out the variables, mean values and Standard deviation of variables

It can be observed from table that availability in all pharmacies, less expensive than other branded medicines, doctor's recommendation, doctor's prescription, promotion by pharmacy owner, promotion by state and central government and availability across all Jan aushadhi pharma and availability at lower prices are very important variables that have a mean value > 4.0. These variables are followed by other variables. It can be interpreted that consumers place more important to availability, doctors prescribing them, pharmacists and government promoting them followed by lower prices. Trust, availability and lower prices are very important variables as per the observations.

Table 3: Demographic Summary of Sampled profile.

		N
Gender	Male	101
	Female	60
Age	20-35 years	50
	35-50 years	56
	Above 50 years	55
Occupation	Student	12
	Employed	62
	Self-employed	52
	Others	35

Table 4: Mean and Standard Deviations of variables.

Available in pharmacy shops attached to hospital shops	4.29
Less expensive than other branded medicines	4.25
Doctor's recommending Jan Aushadhi	4.22
Doctors prescribe Jan Aushadhi	4.14
Owner of pharmacy promoting Jan Aushadhi	4.11
Central and State Government promotion of Jan Aushadhi	4.09
Available at lower prices	4.03
Available in all pharma stores	3.96
Quality of Jan Aushadhi (generic medicine) is same as branded	3.81
Branded pharmaceutical chains promoting Jan Aushadhi	3.79
Jan Aushadhi (generic medicine) is as effective as other branded medicines	3.7
Home delivery for Jan Aushadhi	3.6
Jan Aushadhi packaging is attractive	3.35
Pharmacist has got sufficient knowledge	3.27
Availability of generic medicine for all kind of disease	3.17
doctor has a good opinion about Jan Aushadhi	3.14
Reputation of the pharmaceutical brand indicates better quality	3.11
Consume generic medicine for my personal use	3.07
Jan Aushadhi (generic medicine) outlets are convenient	3.02
Prescribed generic medicines normally available in the Jan Aushadhi outlet	2.85
Costlier is the medicine, better is the quality	2.61
My doctor prescribes generic medicine	2.51
Attractive packaging means the better quality	2.39
Doctor informs about the differences between prescribed medicine and generic medicine	2.3

DISCUSSION

From Table 5, the value of KMO statistics obtained is 0.740 (> 0.5) which is a good indicator of sampling adequacy. Bartlett's test has a significance value pf 0.000 and is an indicator that test data is appropriate

Table 5: KMO and Bartlett's test.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.740
Bartlett's Test of Sphericity	Approx. Chi-Square	1400.085
	df	210
	Sig.	.000

for conduct of factor analysis. Table 6 provides details on number of factors, their constituent variables and percentage variance explained by each factor. 7 factors were extracted that had Eigen value of more than 1.0 using Varimax rotation method and total variance explained was 70.83 % which is good in exploratory studies.

From Table 6, it can be observed that Factor - 1 is loaded with variables that have brought out the importance of availability at lower prices, Consume personally, consume Jan Aushadhi, quality is same as branded medicines, effective as branded medicines and hence the factor was named "Value for money". This factor brings out the fact that Indian consumers give importance to quality, effectiveness coupled with lower prices. Factor - 2 has variables Doctors should prescribe, Branded Pharma shops to promote, Reputed doctors to recommend, Owner of pharma shop to promote and availability on Pharma shops of hospitals. This grouping of variables brings out the recommendation power of doctors, Pharma shop owners and promotion by branded Pharma shops along with availability at pharmacists at hospitals. In a way, this point towards the trust in the experts' opinion and promotion by reputed pharma shops and hence this factor has been named as "Trust". Factor - 3 has variables that such as costs, packaging and reputation of brand signaling quality of medicines. All these point towards quality as the key indicator and hence the factor is named "Quality". The fourth Factor has been named as "Education by doctors" which brings out the importance of doctors prescribing the generic medicine and also educating the patients about similarities and differences between Low cost generics and branded medicines to help make patients make informed choices about the drugs they are consuming. The fifth factor - "Convenience of Availability" is so named as the loaded variables of the factor indicate the availability of generic medicines in all pharmas and attractive packaging. The sixth factor is "Home delivery" which has the variables - home delivery and promotion by government. The seventh factor "Overall availability" is having variables available for all diseases and available in Jan Aushadhi outlets.

Table 6: Factors, Constituent variables, Eigen Values and % variance explained.

Factor	Factor Name	Variables	Eigen Value	% variance Explained
Factor 1	Value for money	Consume generic medicines Consume personally Available at lower prices Quality is same as branded As effective as others	4.936	17.55
Factor 2	Trust	Doctors should prescribe Branded Pharma shops to promote Reputed doctors to recommend Owner of pharma shop to promote Availability on pharma shops of hospitals	2.574	14.15
Factor 3	Quality Indicators	Higher the cost means higher the Quality Better packaging means better quality Reputation of brand signals quality	2.104	10.21
Factor 4	Education by Doctors	My Doctor prescribes generic medicines Doctors informs the differences	1.586	8.67
Factor 5	Convenience of Availability	Should be available in all pharma Attractive Packaging	1.381	7.68
Factor 6	Home delivery	Home delivery Central and State Government Promotion	1.275	6.72
Factor 7	Overall Availability	Available for all diseases Available in Jan Aushadhi outlets	1.020	5.83
Cumulative % Variance				70.83

Hence, it can be observed from the results of factor analysis that important factors are “Value for money”, “Trust”, “Quality”, “and Education by Doctors”, “Convenience of Availability”, “Home delivery” and “Overall Availability”. This means consumers give importance to value for money, look for trust through certain indicators, they would examine quality signaled through specific indicators, they would want education by doctors and would value convenience of availability of Jan Aushadhi.

Hypotheses Testing

Testing for Hypotheses 1 and 2

H_0 = Availability of Jan Aushadhi is not an important variable in consumption of Jan Aushadhi

H_0 = Cost of Jan Aushadhi is not an important variable in explaining consumption of Jan Aushadhi

It can be observed from Table. 6, Availability of Jan Aushadhi is a very important variable that is present in second factor and cost is an important variable that is present in the first factor. Hence both cost and availability are important variables in the explaining consumption of Jan Aushadhi. Hence hypotheses H_0 is rejected.

Testing for Hypothesis 3

As the concept of Jan Aushadh was new in India, there existed a need to establish the relationship between

doctors prescribing the generic medicines and patients consuming the generic medicines. Earlier research studies had studied the doctors’ perception about generic medicines and an Indian study had pointed out that doctors were more favorable to generic drugs manufactured in countries that were known for pharma quality and country of Origin had an influence on them prescribing generic drugs to their patients. In the current content of Jan Aushadhi, as most of the generic medicines were manufactured within India, there existed a need to study the relationship between doctors prescribing generic medicines and patients consuming them.

H_0 = There is no relationship between the patient’s doctor prescribing generic medicine and the patients consuming generic medicine for personal use.

From Table 7, there was a positive and significant correlation between doctor prescribing generic medicine and patient consuming generic medicine for personal use (0.437). The p value = 0 and is less than 0.001 which meant that significant correlation existed between doctor prescribing generic medicine and patient consuming generic medicine for personal use. Hence hypothesis H_0 is rejected.

As word of mouth is a very important method of spreading the awareness and recommending the use of generic medicines to others as well, it was decided

Table 7: Spearman's Correlation to test Hypothesis 3.

Correlations				
			I consume generic medicine for my personal use	My doctor prescribes generic medicine
Spearman's rho	I consume generic medicine for my personal use	Correlation Coefficient	1.000	.437**
		Sig. (2-tailed)	.	.000
		N	161	161
	My doctor prescribes generic medicine	Correlation Coefficient	.437**	1.000
		Sig. (2-tailed)	.000	.
		N	161	161

** . Correlation is significant at the 0.01 level (2-tailed).

Table 8: Spearman's Correlation to test Hypothesis 4.

Correlations				
			I consume generic medicine for my personal use	Would you recommend generic medicine to others?
Spearman's rho	I consume generic medicine for my personal use	Correlation Coefficient	1.000	-.469**
		Sig. (2-tailed)	.	.000
		N	161	161
	Would you recommend generic medicine to others?	Correlation Coefficient	-.469**	1.000
		Sig. (2-tailed)	.000	.
		N	161	161

** . Correlation is significant at the 0.01 level (2-tailed).

to test the hypotheses to bring out the relationship between consuming Jan Aushadhi and recommending the Jan Aushadhi to others. If established, this result could result in a meaningful marketing tactic to employ recommendation behavior to spread awareness and promote consumption. This has been tested through Hypothesis 4.

Testing for Hypothesis 4

H_0 = There is no relationship between patients consuming generic medicine their recommendation to others

From Table 8, there was a positive and significant correlation (0.469) between consuming generic medicine and recommendation. The p value is = 0 was less than 0.001 which means significant correlation exists between consuming generic medicine and recommendation

It can inferred that there is a positive relationship between patients consuming generic medicine and their recommendation of generic medicines to others, hence H_0 is rejected.

As the concept of Jan Aushadhi has been new in India and literature also tested the relation between quality and consumption of Generic medicines, there existed a need to test the relationship between perception of

Quality of Jan Aushadhi and consumption of Jan Aushadhi and hence Hypothesis 5

Testing for Hypothesis 5

H_0 = There is no relationship between consuming generic medicine and quality

From Table 9, there was positive and significant correlation between consuming generic medicine and quality (0.598). The p value 0 was less than 0.001 which means statistically significant correlation exists between consuming generic medicine and quality. Hence hypothesis H_0 is rejected.

Testing for Hypothesis 6

There was a need to test of there was a considerable difference between age groups and hence the younger age group has been considered as up to 35 years and the elderly age group has been considered as above 35 years. Earlier research had suggested that the elderly segment exhibited a negative attitude towards consumption of generic medicines abroad and in India it was required to check if any significant differences existed between younger generation and elderly as considered in this study. Based on this study, further investigations could be taken up with marketing implications.

Table 9: Spearman's Correlation test for Hypothesis 5.

Correlations				
			I consume generic medicine for my personal use	Quality of Jan Aushadhi (generic medicine) is same as branded
Spearman's rho	I consume generic medicine for my personal use	Correlation Coefficient	1.000	.598**
		Sig. (2-tailed)	.	.000
		N	161	161
	Quality of Jan Aushadhi (generic medicine) is same as branded medicines in terms of its chemical composition	Correlation Coefficient	.598**	1.000
		Sig. (2-tailed)	.000	.
		N	161	161

** . Correlation is significant at the 0.01 level (2-tailed).

Table 10: Z Test Results.

Hypothesis	Z theoretical (Range)	Z Calculated	Result
6	+ 1.96 and -1.96	-2.54	Rejected H_0

Table 11: Wilks' Lambda.

Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.478	109.603	21	.000

H_0 = There is no significant difference between Customers age group and consumption of Jan Aushadhi.

It was found from Table 10 that the mean values are different for the both the groups (Group 1 = 2.68 and Group 2 = 3.25) showing difference between each other. The Z-value was found as -2.54 (negative), this value does not lie within the acceptance region of theoretical Z-value + 1.96 and -1.96 (5 % significance level and two tailed) and hence hypothesis H_0 is rejected. There is a significant difference in age groups in terms of consumption of generic medicines.

Development of a Model to Predict Consumption of Jan Aushadhi using two group Discriminant Analysis: Results and Discussions

It was found from value of Wilks Lambda that the two groups were distinctly different (Table 11). Wilk's Lambda is 0.478 which is close to zero showed a high degree of separation between two groups.

From Table 12, it has been found that 86.3 percent of the cases were classified correctly and hence the classification power is high for the model.

Table 12: Classification results.

Classification Results ^a					
		I consume generic medicine	Predicted Group Membership		Total
			No	Yes	
Original	Count	No	75	12	87
		Yes	10	64	74
	%	No	86.2	13.8	100.0
		Yes	13.5	86.5	100.0

a. 86.3% of original grouped cases correctly classified.

Table 13 provides the list of variables that predicted the outcome and the important predictor variables (based on coefficients were) were – As Effectiveness as other branded medicines (0.861), Lower prices (0.421), Doctor has a good opinion about the generic medicine (0.337), quality is same as branded (0.204), Owner of Pharmacy promoting leads to higher trust (0.239) followed by others.

Based on the results of Discriminant Analysis, the model to predict would be

Consume Jan Aushadhi (Yes – '1') = - 6.305 + 0.204 (less expensive than branded) + 0.022 (Doctor prescribes) – 0.252 (Available for all diseases) + 0.038 (Available in all pharmas) – 0.013 (Available in Jan Aushadhi outlets) + 0.421 (Available at lower prices) + 0.204 (Quality is same as branded) + 0.861 (As effective as Branded) + 0.128 (Attractive package as Branded) + 0.180 (outlets are convenient) – 0.132 (pharmacists has sufficient knowledge) + 0.337 (doctor has good opinion) + 0.002 (availability in all pharma shops) + 0.074 (doctors to prescribe) – 0.181 (cost and quality go together) – 0.076 (attractive packaging and quality go together) – 0.449 (branded pharma chains promotion leads to trust –

Table 13: Coefficients of variables (Unstandardized).

Canonical Discriminant Function Coefficients	
	Function
	1
Jan Aushadhi medicine is less expensive than other branded medicines	.264
My doctor prescribes generic medicine	.022
There is an availability of medicine for all kind of disease in Jan Aushadhi outlet	-.252
Jan Aushadhi should be available in all pharma stores	.038
Prescribed generic medicines normally available in the Jan Aushadhi outlet	-.013
Generic medicines are available at lower prices	.421
Quality of Jan Aushadhi (generic medicine) is same as branded medicines in terms of its chemical composition	.204
I am of opinion that Jan Aushadhi (generic medicine) is as effective as other branded medicines	.861
Jan Aushadhi packaging is as attractive as other branded medicine packaging	.128
Jan Aushadhi (generic medicine) outlets across Bengaluru are convenient to me	.180
Pharmacist has got sufficient knowledge about Jan Aushadhi	-.132
My doctor has a good opinion about Jan Aushadhi	.337
Jan Aushadhi (generic medicine) should be available in pharmacy shops attached to hospital shops	.002
Doctors should prescribe Jan Aushadhi for all the patients if it is available	.074
Costlier is the medicine better is the quality	-.181
Attractive packaging means the better quality	-.076
Branded pharmaceutical chains promoting Jan Aushadhi leads to higher trust in Jan Aushadhi	-.449
Popular Doctor's recommending Jan Aushadhi leads to higher trust	-.063
Owner of pharmacy promoting Jan Aushadhi leads to higher trust	.239
Central and State Government promotion of Jan Aushadhi leads to higher trust	-.032
My doctor informs about the differences between prescribed medicine and generic medicine	.003
(Constant)	-6.305
Unstandardized coefficients	

0.063 (popular doctor recommending leads to higher trust) + 0.239 (owner of pharma promoting leads to higher trust) – 0.032 (promotion by Government leads to higher trust) + 0.003 (doctor informs differences)

DISCUSSION AND CONCLUSION

Modeling, Segments discovered and Hypothesis testing

From the discriminant analysis, it was evident that variables - Effectiveness as other branded medicines, Doctor has a good opinion about the generic medicine, Lower prices, Quality and Owner of Pharmacy promoting leads to higher trust can be used as predictor variables to model the consumption of Jan Aushadhi (Generic Drugs). Customers were segmented based on their attitude and opinions using Exploratory Factor Analysis and it was found that “Value for money”, “Trust”, “Quality”, “and Education by Doctors”, “Convenience of Availability”, “Home delivery” and “Overall

Availability”. Were important segments discovered. Availability of generic medicines, cost of generic medicines, quality, doctors prescribing generic medicines were the variables that influenced the consumption of Jan Aushadhi (Generic Drugs). Patients who used generic drugs also recommended generic drugs to others which is a very important finding in this study. Hence based on the above results, it was evident that generic drugs can be promoted better using doctors, pharmacists and customer's word of mouth.

Limitations and Future Scope

This study is confined to urban areas and can be extended to rural areas where a vast population have to rely on generic medicines. This study can be extended to rural areas of Karnataka which can provide a holistic view of attitude and acceptance of Jan Aushadhi by both rural and urban customers of Karnataka. A limited timeframe for completing this research had the sample

size being restricted to 161 and was based on cell size requirements.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

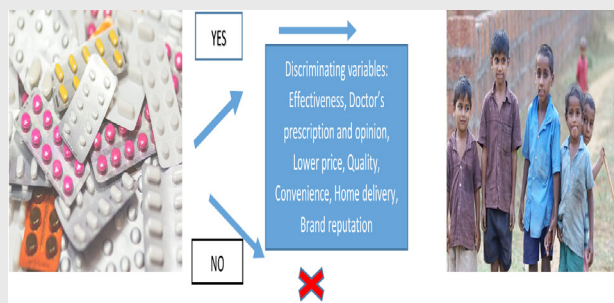
ABBREVIATIONS

US, USA: United States of America; **PMBJP:** Pradhan Mantri Bhartiya Jan Aushadhi Pari Yojana; **CAGR:** Compounded annual growth rate.

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PICTORIAL ABSTRACT



SUMMARY

It was evident from the research that generic drugs could be promoted better by doctors, pharmacists and customer's word of mouth. Generic drugs also have to be made available easily to customers and this can improve consumption. Quality and efficacy generic medicines have to be highlighted better to increase the awareness among customers.

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