Original Research Article

APPLICATION OF SCORING AND DECISION MODELSTO EVALUATE PROCUREMENT DETERMINANTS IN COMMUNITY PHARMACY PRACTICE IN A DEVELOPING COUNTRY

Abstract

Objectives:

In developing countries, medicine procurement is primarily intuitive and based on basic trading principles on the individual level. Hence, there is a need to evaluate the key factors and investigate the choice of supply channel among community pharmacists (CPs)using a preference model. The objectives of the study were to evaluate and score the determinant factors influencing Community Pharmacists' procurement decisions from supply channels (pharmaceutical companies-PC, Wholesaler-LW, and Open-Market-OM) in Nigeria. Also, to investigate preference decisions based on relative odds ratios using regression models.

Methods:

A descriptive, cross-sectional study that used structured questionnaires based on World Health Organization's recommendations for effective procurement decisions. A mixed-sampling method was used to administer the questionnaire to 393 community pharmacistsin Southwest, Nigeria. Descriptive and inferential statistics such as Friedman's test, chi-square, Henry Garrett's scoring and, multinomial regression (MNL) models were used for data analysis, using SPSS-25. The significance level was set at $p<0.05$.

Results:

Results showed that 59.8% (235) of respondents operated as retail practice, 14.8% (62) Wholesale, and 24.4% (96) combined practice. Mean Garrett's score was highest with 'quality-assurance (63.36),while 'Value-added service' had the least score (38.88) among 10 decision-factors. The median score was 52.82. Individual effects of 'quality-assurance, competitive-pricing, access-to-credit facilities, flexible payment schedule, range of products, the potential-for-profit, trade-discounts, and value-added service'were significant determinants of preference decisions ($p<0.01$; 95% CI) in the MNL model. Interaction effects of competitive pricing and access-to-credit facilities from suppliers had a significant effect on the MNLmodel($\square 2=493.411$; $p<0.01$; 95% CI). Study outcomes revealed odds ratios(OR) informing preference decisions of CPs among supply channels based on parameter estimates of determinants in the model.

Conclusion:

The model predicted preference for supply channels(PC, LW, and OM) at various significance levels of the predictors.The study provided a scoring template for evaluating buying decision parameters.The study provided informationthat is useful to improve our understandingof buying behavioramong CPs in pharmacy practice research

KeyWords: Community Pharmacists, Henry Garrett, Multinomial Regression Analysis,Preference, Procurement, Pharmacy Practice

INTRODUCTION

Procurement is an integral part of ensuring availability and access to essential medicines, with due consideration for quality, proper quantification, and appropriate pricing. The World Health Organization stipulated the core procurement principles to include; procure the most cost-effective medicines, in the right quantities, with requisite quality and quantity, from reliable suppliers, with assured timely delivery at minimal costs[1-4].The procurement process requires management and organizational skillsets to be fully optimized and result-oriented. They include

inventory management, transportation, logistic management, information, and communication technology, human resource management, time management, cost, and operations management. These should represent the best and standardized practice to be truly effective and efficient[5-10].

Access to quality medicines is a perennial issue of concern in low- and middle-income countries (LMIC), where the public health Infrastructure is yet to achieve optimal functionality in human capacity coupled with limited financialresourcesfor the supply and provision of essential medicines[2,11-12].This creates a window of opportunity for community pharmacies to provide services to bridge this resource gap prevalent in publicly managed health institutions. Unfortunately, in LMICs, community pharmacists (CPs) are also constrained in this respect, hence the imperative for resource prioritization and efficient decision-making when it comes to medicine procurement. World Health Organizationenumerated key attributes of a functional procurement system, namely; procuring at the lowest purchase price, timely delivery, proper quantification & product range, appropriate payment planning, and ethical, professional & mutually beneficial buyer-seller relationship[2,4].In developing countries, most patients obtain their prescribed medications from retail pharmacies and this is done essentially as an out-of-pocket expenditure. Thus, leaves the final cost to the patient to prices fixed by the retailer which oftentimes is a reflection of how the products are sourced. However, most studies have been focused on procurement challenges from the perspective of public health institutions and procurement agencies, with little done on community pharmacy in developing countries[7-8,11-12].To the best of our knowledge, there is little or no study on how procurement decisions are evaluated in community pharmacies in LMICs, thus leaving this gap in research. Therefore, this study explored using quantitative research techniques, the determinants informing buying decisions by community pharmacistsin Southwest Nigeria. Community Pharmacists (CPs) are frontline healthcare personnel at the primary healthcare level[13,14]. They are expected to ensure safe, accessible, and affordable medicines. Most studies on procurement decision-making are often focused on hospital settings. Hence, there is the need to investigate the utilization and rating of these parameters among community pharmacists (CPS). Despite the chaotic nature of drug supply in Nigeria, three major supply channels exist; Pharmaceutical companies (PC), Wholesalers (LW), and Open drug market (OM), for meeting the needs of CPs. There are over 200 registered local and international pharmaceutical companies and/or their representative in Nigeria. The drug distribution network which serves as the source of medicine supply to CPs includes Wholesalers who oftentimes bridges between CPs and pharmaceutical companies,and the chaotic open market which is often questioned for quality and standards[15-16,17-18]. The main objective of the study was touse Henry Garrett's scoring method and multinomial logistic regression to evaluate the dominant factors influencing Community Pharmacists' decision to procure from supply channels in South Western, Nigeria. Therefore, to provide a scoring template for evaluating buying decision metrics.The validity of the decision factors and Preference decisions were tested using statistical measures such as Friedman's ANOVA test, Kendall W, and Bonferroni test. Finally, the Multinomial logistic regression technique (MNL) was used to evaluate the implicit relationships and interaction effects between the preference decisions by community pharmacists and the factors. Henry Garrett's ranking method was used to measure the mean rank score of each determinant. The study employed the use of the Henry Garrett Ranking Method as a prioritization technique to rank the various normative buying decision determinants among community pharmacists[19,20]. Henry Garrett Ranking method is widely used in social and management sciences to quantitatively measure the perception of respondents by applying a quantitative weighting and rating scale[21-25].

MATERIALS AND METHODS

Questionnaire Design

A structured questionnaire was developed based on a comprehensive literature review and from the opinions of experts in the field. The questionnaire is composed of two parts namely Part 1 consists of socio-demographic variables. Part 2 consists of discrete choice questions focused on the rating of 10 buying criteria according to the level of importance ranging from 1 to 10 where 1 is the most important criteria and 10 are the least criteria rating.

Study design

A cross-sectional study which used literature guided questionnaires administered to a pool of community pharmacists in selected cities in South West, Nigeria

Ethics Statement

Ethical approval with approval number HPRS/381/371 dated 10th May 2021 from the Department of Health Planning, Research and Statistics, Ministry of Health, Ogun State, Nigeria. Informed consent was obtained from respondents before the administration of the questionnaire.

Eligibility Criteria

Only Community pharmacists and/or pharmacist managers with direct supervisory roles in procurement were included in the study. Pharmacists with no supervisory role in procurement operations were excluded. Non-Pharmacists were excluded. The rationale for this is to ensure that only those with sufficient and current experience on procurement issues are used

Sample frame

All community pharmacists in major cities in Lagos, Ogun, and Oyo states in the southwest, Nigeria

Sample size determination

Raosoft sample size calculator was used. A 5% margin of error and 95% confidence level with a 50% response distribution set for sample size determination (Raosoft, 2016). The sample size was set at 315 from a sample population of 1,732 community pharmacists in Lagos, Ogun, and Oyo states[26,27]. The targeted sample population in this study was 393. This was done to cover for new registration of community pharmacists from 2018 to 2021 and account for likely attrition[28].

Sampling technique and Data Collection

A mixed sampling method was adopted for the administration of the questionnaires in the study. Firstly, purposive (judgmental) sampling was used with stringent criteria for only community pharmacists with supervisory roles or responsibilities on procurement. Those who strictly play patient care roles were excluded from the study. The random sampling method was thereafter used for the purposively selected group. This was done to minimize researcher bias inherent in purposive sampling.

Data Analysis

Data were analyzed using Statistical Package for Social Sciences version 25 Descriptive statistics such as mean, standard deviation, and median. Inferential statistical measures such as Friedman's ANOVA test, Kendall W, and Bonferroni test.Henry Garrett's ranking method was used to measure the mean rank score of each determinant. Multinomial logistic regression analysis (MNL) was used to investigate the interaction effects of buying criteria on the channel preference decisions of community pharmacists. Study outcomes for MNL were procurement decisions premised on channel preferences for; pharmaceutical companies (PC), wholesalers (LW), and Open market channels (OM).

Friedman's two-way Analysis of Variance test of Ranks

The rationale for the use of Friedman's test was to determine if the ranked responses of factor/determinants were statistically different. In this study, it was hypothesized that there is a difference in the mean of the ranks of the decision factors used by community pharmacists. The results of Friedman's two-way analysis of variance test showed that there is a significant mean difference in the ranks (2 (9) = 673.406, p< 0.0001).Kendall W coefficient of concordance test showed that showed significant effect 2 (9) = 668.520, P<0.0001, W=0.19) implying that there is a significant effect of the mean difference in ranks based on the responses of community pharmacists. This was a result of significant pairwise comparisons between the various decision factors using pairwise comparison.

Henry Garret's Ranking Method

This analytical method was used to identify and rank according to the order of importance. It identified the most important, dominant, and relevant buying criteria by surveyed community pharmacists using a ranking method[13,14]. It is computed by using this score conversion formula:

Percent Position = 100 (R-0.5)/N

Where;R= rank and N = total number of variables of decision factors

In this method, each buying criteria is ranked based on frequencies of responses from respondents, thereby ranking from the first item to the last or vice-versa. Thereafter, a score conversion formula is used to generate the percent position of each criterion. Henry Garrett's conversion table is used to obtain individual Garrett's values. [20]The Garrett value for each item is multiplied with the frequencies to give total values. The total value for each item obtained is divided by the total number of respondents to give mean values. The mean rank score values are ranked according to magnitude.Decision Rule; Item with the highest mean score is the most important criterion

RESULTS

Response rates and Demographic statistics

A total of 393 responses were valid out of 550 questionnaires randomly administered to purposively selected community pharmacists (CPs). This represented a response rate of about 72%. This was more than the calculated sample size of 315 for the study, therefore adequate for further analysis.The distribution of individual and organization-based demographic characteristics of respondents showed that 54.5% (214) were malesand 45.5% (179) females. Ownership status showed that 53.4% (209) sole ownership, 15.8% (62) partnership, and 30.8% (122) pharmacist-managers. Years of experience as a pharmacist showed 39.7% (156) within 1 to 5 years, 48.6% (191) between 6 to 15 years, and 11.7% (46) greater than 15 years. Conversely, years of experience as a business manager showed 58.7% (231) were within 1 to 5 years, 34.1% (134) between 6 to 15 years, and a minority7.1% (28) had greater than 15 years of business experience. The business model operated by CPs was 59.8% (235) core retail, 15.8% (62) wholesale, and 24.4% (96) having both models. Employee count revealed the majority 56.7% (223) had 1 to 5 persons, 30.5% (120) had 6 to 10 persons, and 5.9% (23) had 11 to 15 persons while 7.2% (27) has over 15 employees.

Correlation analysis of Decision factors and Preference for Channels

(Table 1) showed that there is a significant positive correlation between the predictor variables 'quality assurance', and the dependent variable 'preference for procurement channels' at $p<0.01$. However, a negative correlation existed with 'competitive pricing', 'range of products, and 'potential for more profit'($p<0.01$)

Table 1.
Correlation Analysis of Preference Decisions (PP) versus Decision Factors used by Community Pharmacists

Study Variables	Mean	SD	PP	QA	TOD	CP	ACF	FPT	GWR	ROP	POP	TDP	VAS
PP	1.62	0.797	1.000										
QA	2.80	2.533	.157**	1.000									
TOD	4.77	2.517	-0.009	.148**	1.000								
CP	4.84	2.794	-.183**	-.071	.179**	1.000							
ACF	4.71	2.624	0.030	-.080	-.106*	0.025	1.000						
FPT	5.09	2.380	-0.029	-0.064	-.190**	-0.085	0.314**	1.000					
GWR	5.95	2.729	-0.017	-0.080	0.014	-.182**	-0.013	.119*	1.000				
ROP	6.08	2.645	-.104*	-.192**	-.109*	.028	-0.013	0.098	0.112*	1.000			
POP	4.95	2.708	-.159**	-.200**	-.204**	0.013	-0.002	-.052	-.129*	0.048	1.000		
TDP	7.07	2.556	0.085	-.050	-0.054	-.071	-.108*	-.048	-.032	-.034	0.122*	1.000	
VAS	7.20	2.762	-0.008	0.010	0.025	-.120*	-.218**	0.207**	-.022	0.041	-.054	0.184**	1.000

Note: *p<0.05, **p<0.01, N =393

Where: PP= Preference Decisions, QOP = quality assurance of Products, TOP = timeliness of delivery, CPO = competitive pricing, ACF = access to credit facility from supplier, FPT = flexible payment timelines, GWR= good working relationship, ROP = range of products, POP = potential for more profit, TDP = offer of trade discounts and promos, VAS = value-added service (quality of)

Garrett's Percent and Corresponding Value

As shown in (Table 2), Ranks 1 to 10 were calculated based on individual respondents' ranking of each Decision factor, and Garrett's corresponding value to each rank ranged from 10 to 85 representing the lowest and highest values respectively.

Table 2.
Computation of Percent Position and corresponding Garrett's Value

Rank	100(R-0.5)/N	Percent Position	Garrett's value
1	100(1-0.5)/10	5	82
2	100(2-0.5)/10	15	70

3	100(3-0.5)/10	25	63
4	100(4-0.5)/10	35	58
5	100(5-0.5)/10	45	52
6	100(6-0.5)/10	55	48
7	100(7-0.5)/10	65	42
8	100(8-0.5)/10	75	36
9	100(9-0.5)/10	85	29
10	100(10-0.5)/10	95	18

N= 393, R= ranks from 1st to 10th, Garrett's value obtained from Garrett's table

Estimation and Ranking of Factors based on Garrett's scores

(Table 3) shows the Total Garrett values obtained by multiplying frequencies in each rank with corresponding Garrett scores. The average score was obtained by dividing by the number of respondents. 'Quality assurance' had the highest-ranked factor followed by 'Access to credit facility and 'Timeliness of supply'. The least ranked variable was 'Quality of Value-added service'.

Table 3.

Statistics of Computed Garrett Score and derived Ranks to each Factor

Factors	Total	Mean score	Ranks
Quality assurance of Products supplied	26,864	68.36	1st
Timeliness of supply/Delivery	21,254	54.08	3rd
Competitive pricing	21,172	53.87	4th
Access to Credit facility	21,434	54.54	2nd
Flexible payment timelines	20,460	52.06	6th
Good working relationship	18,473	47.01	7th
Range of Products offered	18,115	46.09	8th
Potential to make more profit	21,057	53.58	5th
Trade discount and promo offers	15,643	39.8	9th
Quality of Value-added services provided	15,280	38.88	10th

Multinomial logistic regression model of Decision factors and Procurement decisions

The overall fit of the basic multinomial regression model was confirmed by the following parameters; Goodness of fit (Pearson $\chi 2$=699.060, p<0.0001: Deviance= 430.209, p=1.000) proved that model is fit since the p-value is not significant; model fit characteristics $\chi 2$(df=180, N=393)=303.458, p<0.0001) was significant; classification table of observed versus predicted values representing 74.8% with even distribution in each variable item (PC=85.2%; LW=58.1%; OM=62.8%) and Nagelkerke R^2 (0.629) & McFadden R^2 (0.399) showed that the model accounted for 39.9% to 62.9% of the variance in the model.

Table 4

Predictor & Interaction Variables and Unique Effects to the Multinomial Logistic Regression Model

Model Variables	□ 2	df	p-value
DECISION FACTORS			
Quality assurance of products	54.450	18	<0.01
Timely delivery	28.798	18	0.051
Competitive pricing	49.714	18	<0.01
Access to credit facility	43.044	18	<0.01

Flexible payment timelines	35.314	18	<0.01
Good working relationship	35.711	18	<0.01
Range of Products offered	42.073	18	<0.01
More Profit potential	33.601	18	<0.014
Trade discounts & promos	45.324	18	<0.01
Value-added service	40.918	18	*0.01
INTERACTION FACTOR			
Competitive Pricing * Access to Credit facility©	493.411	170	<0.01

Note: p<0.05, p<0.01, ©= the only significant interaction term, □ 2= chi square statistic, 95% CI

On the other hand, the impact of the interaction effects of the deciding factors on the preference of community pharmacists for procurement was also evaluated using MNL. The objective was to identify the most dominant interplay of factors informing preference. The overall fit of the interaction-effect multinomial regression model was confirmed by the following parameters; Goodness of fit (Pearson $\chi2$=465.991, p=0.999: Deviance $\chi2$=485.967, p=0.991) proved that model is fit since p-value is not significant; model fit characteristics $\chi2$(df=14, N=393) =176.144, p<0.001) was significant; classification table of observed versus predicted values representing 65.6% with even distribution in each variable item (PC=90.0%; LW=30.2% & 32.1% OM). And Nagelkerke R^2 (0.546) & McFadden R^2 (0.328) showed that the model accounted for 32.8% to 54.6% of the variance in the model.

Association between Predictor, Interaction variables and Effects in Multinomial Logistic Model (MNL)

(Table 4) summarizes the contribution of decision factors and their Interaction effects on the MNL model; it shows that only the 'Timely delivery factor' was not a significant contributor to the model and hence cannot be considered for further analysis and consideration. Other parameters showedvery significant contributions at a p-value less than 0.01

Comparative effects of Decision factors influencing preference for supply channels using MNL

As shown in (Table 5), beta coefficients (β), p-values, and Odds ratios (OR) showed the various output of decisions based on the ratings of each factor by respondents in the study. The Open market channel (OM) was used as the comparator or reference preference category while the odds ratios (OR) were obtained from respondents' choices of each pharmaceutical company (PC), Local Wholesale channels (LW) respectively. Significant preference decisions were obtained for; 'quality assurance'for PC, and LW. In the same vein, 'access to credit facilitywas significant for LW, while 'good working relationship with suppliers' for LW and, 'range of products for LW. 'More profit potential' and 'trade discounts' gave significant p-values for PC. 'Trade discount' for LW, 'value-added service' for LW and PC gave significant results.

Interpretation of MNL Output for each decision factor (determinant) using parameter coefficient estimates (β)

As shown in (Table 5), Item 1 is interpreted thus; For a Unit change in the predictor 'quality assurance', the likelihood or logit of choosing PC (outcome) relative to the OM (reference group) is expected to increase by7.521, given that the other variables in the model are held constant.

In other words, the odds or likelihood of a procurement manager who considers 'quality assurance' in his or her purchasing decision-making is 7.521 times more likely to use the PC channel compared to OM.

Conversely, Item 3 depicts; the odds or likelihood of a procurement manager who considers 'access to credit facilities in his or her purchasing decision-making is 8.014 times more likely to use the LW channel compared to OM.

Table 5.
Comparison of Effects of Supply preference Decisions across three Channels using Multinomial Logistic Regression

s/n	Decision Factors	OM versus.	β	SE	df	p-value
1	quality assurance of products=1	PC	7.521	3.058	1	0.014
	quality assurance of products=10	PC	0[b]		0	
2	quality assurance of products=1	LW	6.9	2.991	1	0.021
	quality assurance of products=10	LW	0[b]		0	
3	access to credit facility=1	LW	8.014	2.988	1	0.007
	access to credit facility=10	LW	0[b]		0	
4	good working relationship=1	PC	4.519	2.731	1	0.098
	good working relationship=10	PC	0[b]		0	
5	good working relationship=1	LW	8.126	2.848	1	0.004
	good working relationship=10	LW	0[b]		0	
6	Range of products offered=1	LW	8.066	2.999	1	0.007
	Range of products offered=10	LW	0[b]		0	
7	more Profit potential=1	PC	5.684	2.854	1	0.046
	more Profit potential=10	PC	0[b]		0	
8	more Profit potential=1	LW	8.176	3.02	1	0.007
	more Profit potential=10	LW	0[b]		0	
9	Trade discounts & promos=1	PC	5.883	2.973	1	0.048
	Trade discounts & promos=10	PC	0[b]		0	
10	Trade discounts & promos=1	LW	7.433	3.106	1	0.017
	Trade discounts & promos=10	LW	0[b]		0	
11	Value-added service=1	PC	24.614	1.701	1	<0.01
	Value-added service=10	PC	0[b]		0	
12	Value-added service=1	LW	26.812	0	1	
	Value-added service=10	LW	0[b]		0	

Note: p<0.05, p<0.01, β=beta coefficient, 1=lowest rank, 10= highest rank, OM=open markets, LW=local wholesalers, PC=pharmaceutical companies, reference category= OM, 95% CI

DISCUSSION

The results of the study showed that community pharmacists (CPs) placed a premium value on the factors which they consider most important to their practice concerning procurement decisions ('where to procure from?'). The application of Henry Garrett's method as well as multinomial logistic regression modeling to further explain the factors responsible for these decisions. In other words, the output of the Garret score sheet reflects in larger terms, the perception of relative value and importance placed on each determinant of procurement by the sample population.In (Table 3), Garrett's scoring method clearly showed that the most important consideration was based on 'quality assurance' with Ranked 1 with the highest score of 63.36; in terms of perceived or known efficacy, safety, awareness of manufacturing standards, the integrity of packaging, storage, in line with the core value of pharmaceutical care. This is by far the most important consideration expected from community pharmacists because the emphasis is on the safety and health of the patient consuming the pharmaceutical product[13,14,29]. Interestingly, 'Access to credit facility and 'Timeliness of delivery" which were ranked 2nd and 3rd respectively are indicative of the expectations of community pharmacists from the supply chain. In a developing country where the out-of-pocket payment account for the bulk of medication cost to patients, there is a backlash to the CPs as patients do not fill their prescriptions as prescribed due to high cost[6,30].This loss of revenue impacts the sustainability of local operations and cash flow. This is compensated for by the reliance on operational efficiency in timely delivery and credit facility to help improve turnaround time for practice owners[31,32]. Furthermore, the least ranked factor-'Value-added service by suppliers (ranked 10th) reflects another aspect of expectations by community pharmacists from their suppliers. Drug suppliers must adopt 'follow-through marketing strategies' in terms of stock monitoring, feedback, and information provision to theirdirect customers (community pharmacies) as a value-added service. This can be done in the form of updates on drugs, removal of short-dated or expired products, training for prescribers and pharmacists. For pharmaceutical marketing companies, it involves monitoring competition with a deliberate intention to enhance product and service quality.However, for LW, and OM channels, this is not the case.

In the study as shown in (Tables 4 and 5), the MNL model presents the odds likelihood or probability of the decision/s by CPs to procure from supply channels (OM, PC, and LW) based on their relative ranking of the respective decision factors. The relative importance of the individual factors was justified by the unique contribution to the Multinomial logit model. More, the model summary also showed that CPs who predominantly consider'interaction effects of competitivepricing and access to credit' in their choice of supplier, tend to make better decisions. This is supported by some studies which considered pricing innovation and business adaptation is critical to the growth of Community pharmacy practice[31,33].

The interpretation of the output of the MNL model as shown in (Table 5) implies that the likelihood or odds of choosing a particular channel to procure from is higher or lower based on the relative odds (odds ratio; OR) of the determinant/s involved (bearing in the mind their level of statistical significance). This provides another dimension to evaluating buying decisions in pharmacy practice research. Furthermore, the interpretation of the model as shown in (Table 5) revealedbetter significance valuesfor 'Quality assurance', 'Access to credit facility, 'good working relationship', 'range of products, 'potential to make a profit, 'trade discounts'and 'value-added service' associated with the preference of PC and LCchannels ($p<0.01$). Compared to 'flexible payment timelines, 'timeliness of supply' and 'competitive pricing' did not have significant effects in influencing supply preference in the MNL ($p>0.05$).

There are practice implications to be gleaned from the outcomes of this study for practitioners and researchers operating in LMICs; a) provide anempirical guide to quality decision-making in particular when there are key parameters to consider. Hence, there is the need to improve or enhance the quality of decisions taken during the procurement process using a ranking system or algorithm of key considerations. b) Improves the overall efficiency in supply chain mechanisms to ensure timely delivery and pricing to improve cost-containment and eventually lower costs to patients. c) In keeping with the expanded roles of community pharmacies in primary healthcare delivery, there is the need to focus on the role of continuous medical education (CME) to update and inform community pharmacists of current procurement trends and how to improve practice, e) information planning, f) Continuous improvement delivery; stakeholders involved in the supply chain of medicines, who should invest time and resource to on quality-of-service delivery to promote a shift in perception.

This study, however, had some limitations such as there is a need to expand the scope of the research work beyond the southwestern part of Nigeria to improve the generalizability of study outcomes. Secondly, there is a need to include other constructs in the list of buying factors to address other relevant factors in the model. This will enhance the interpretability of the results.

CONCLUSION

This study provided an understanding of the purchasing behavior of community pharmacists in addition to an idea into the priority considerations informing buying decisions from various channels of drug supply in a developing country. The study provided sufficient justification for the use of scoring and multinomial regression modeling to improve understanding of the relative odds involved in decision-making as it relates to preference.

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Conflicts of interest statement

The author declares that there is no conflict of interest associated with this work

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