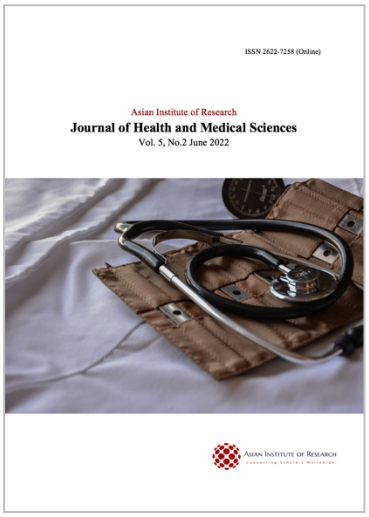

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An Evaluation of the Reflective Constructs Influencing Community Pharmacists' Decision-to-Procure from Pharmaceutical Suppliers: A Structural Equation Modeling Study

Theophilus Ehidiamen Oamen[1], Oamen Sophia Omorenuwa[2], Joshua Idiake[3], Emmanuel Olalekan Oladoja[4]

[1] Department of Clinical Pharmacy and Pharmacy Administration, Faculty of Pharmacy, Obafemi Awolowo University, Ife, Osun State, Nigeria. https://orcid.org/0000-0002-5114-064X
[2] Department of Clinical Pharmacy and Pharmacy Administration, Faculty of Pharmacy, University of Ibadan, Ibadan, Oyo State, Nigeria
[3] Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, University of Benin, Edo State, Nigeria
[4] Department of Microbiology, School of Life Science, Federal University of Technology, Minna, Niger State, Nigeria. https://orcid.org/0000-0002-01119-9088

Correspondence: Theophilus Ehidiamen Oamen. Department of Clinical Pharmacy and Pharmacy Administration, Faculty of Pharmacy, Obafemi Awolowo University. E-mail: oamentheo@yahoo.com

Abstract
In low-and middle-income countries, patients' access to affordable medicines is a perennial challenge at all levels of healthcare delivery. Community pharmacists are expected to bridge the supply and demand gap. Unlike the plethora of studies done at the hospital and government institutions level, there is a paucity of empirical evidence on the factors influencing medicine procurement decisions from supply channels at the community pharmacy level. The study aimed to investigate the influence of community pharmacists' professional and entrepreneurial considerations on their decision-to-procure from medicine suppliers. A cross-sectional survey which adopted a self-administered questionnaire approach to obtain primary data from randomly sampled respondents (**N**=398) from three purposively selected states in southwestern, Nigeria. Structural equation modeling (SEM) methodology was used to test the hypothesized model at $p<0.05$. The study revealed acceptable model fit and validity measures for measurement and structural models. Cost and profitability factors were significant predictors of decision-to-procure compared to service and product quality factors among respondents [$\beta=0.343$, $p=0.001$ *vs.* $\beta=0.044$, $p=0.606$]. Product selection had a positive moderating effect on cost and profitability factors [$t=1.980$, $p=0.048$] and a negative directional effect on service and product quality factors in the hypothesized model [$t=-2.960$, $p=0.003$]. Community pharmacists should balance financial considerations with a professional focus to ensure patients' access to quality and affordable medicines. Study outcomes suggest the development and implementation of universally acceptable guidelines on medicine procurement in community pharmacy settings in low-and middle-income countries. The study validated the SEM model for evaluating priorities influencing community pharmacists' buying decisions. To the best of the authors' knowledge, this is the first study to use the SEM framework to explore factors informing drug procurement decisions from the community pharmacists' perspective in low-and middle-income countries.

Keywords: Community Pharmacy, Cost Management, Low and Middle-Income Countries, Medicines, Pharmacoeconomics, Pharmaceutical Marketing, Procurement, Structural Equation Modelling

1. Introduction

The ultimate objective of any procurement process in medicine supply is to ensure unrestricted availability and seamless access to medicines by end-users or patients. This is of paramount value in all spheres of medicine supply chain management [WHO, 2018]. According to the World Health Organization (WHO), there are at least six important criteria that characterize a good procurement process namely; cost-effectiveness of drugs, expected quality, properly estimated quantities, supplier reliability, timely supply, and manageable costs [WHO, 1999; 2002; 2018]. The focus of studies in academic literature has been placed on studying procurement in hospital and institutional settings, with less attention to community pharmacy settings [Njoki & Kimiti, 2018: Vogler *et al.*, 2013: Lima-Dellamora *et al.*, 2014; Muhia *et al.*, 2017]. In low and middle-income countries (LMICs) where expenditure on medicine is essentially out of pocket at the individual level, medicine affordability is still a challenge. [Ekmann, 2007; Adebiyi and Adeniji, 2021: Oamen and Osemene, 2021] In Nigeria, the government developed the National Health Insurance Scheme to minimize costs and improve access to healthcare. [NHIS, 2012; Adesokun *et al.*, 2020] However, this strategy has not sufficiently covered the vast majority of people as well as limited coverage of medicines under the scheme [Adesokun *et al.*, 2020; Adeniji, 2017]. Other challenges inherent in the scheme include operational problems [Adesokun *et al.*, 2020], limited funding [Adesokun *et al.*, 2020; Ekmann, 2007], corruption, and misappropriation of resources [Adesokun et *al.*, 2020], and underrepresentation of the population due to low coverage [Adeniji, 2017]. Hence, the majority of patients have no option but to access or procure prescribed medicines from community pharmacies [Oamen, 2021]. Unlike the case in institutions or hospital-based environments where procurement follows laid down processes and procedures, community-level pharmacies take a more direct-from-supplier, individual approach. Despite the speed and flexibility associated with this process at the community level; there is the need to unpack the factors influencing the decision to buy from supply channels. Evidence in this regard from LMICs has been mostly anecdotal, suggesting a gap exists in the literature. Community pharmacists are expected to maintain a practical balance between their commercial interests and the welfare of the patient [Hepler & Strand, 1990; Oamen *et al.*, 2021]. Therefore, procurement decisions should be guided by considerations such as cost, affordability, and business profitability [Mathews *et al.*, 2020: Lee *et al.*, 2021: Suh, 2011], service quality from suppliers [Njoki & Kimiti, 2018], and product quality [Njoki & Kimiti, 2018: Giralt *et al.*, 2020], the type of product selected whether generic or substitutes or branded medicines [Seeley & Singh, 2021: Dedrick and Eckel, 1984: You *et al.*, 2019: Perumal—Pillay and Suleman, 2020: Desai *et al.*, 2019] and quantity of products requested.[Dubois *et al*., 2019]. However, the absence of procurement guidelines for community pharmacy practice strengthens the need for further studies to validate the key elements. To the best of the authors' knowledge, the influence of the aforementioned factors on community pharmacists' decision-to-procure medicines from supply channels has not been fully explored in a low- and middle-income environment like Nigeria.

1.1 The novelty of the study

The uniqueness of this study stems from the fact that it evaluated the factors influencing the buying decisions of community pharmacists from supply channels in an LMIC setting using a structural equation modeling (SEM) framework. Furthermore, the study proposed a validated checklist to provide a foundation for the development of a universally agreed guideline or protocol on procurement by community pharmacists in developing countries. The perspective of analysis was the healthcare provider or community pharmacists' perspective and the prototype of the supply channel evaluated was pharmaceutical sales and marketing companies.

1.2 Conceptual Framework

Generally, the interaction between supply channels and community pharmacy practice has proven to have beneficial effects such as; ensuring drug supply, distribution, drug information, updates on drug development, and support services [Khan *et al.*, 2016: Oamen and Omorenuwa, 2021]. However, several pertinent concerns exist such as quality assurance of products supplied [WHO, 2018], price stability and affordability [Matthew *et al.*, 2020: Kho *et al.,* 2017; Dubois *et al.*, 2019], logistics and delivery [WHO, 2008], unethical drug promotion activities [Hall *et al.*, 2006; Lexchin, 1993; Brett *et al.*, 2003: Zaki, 2014: Khan *et al.*, 2016]. Although there is a plethora of studies focused on access to medicines in LMICs from the point of view of institutions and primary healthcare centers managed by governments [Njoki and Kimiti, 2018: Vogler *et al.*, 2013]. This is not the case in

community pharmacy practice. However, the reality is that lack of transparency and resources in government or publicly owned health institutions have shifted the burden of access and affordability of medicines to the private sector inclusive of community pharmacies. [Njoki & Kimiti, 2018: Adesokun *et al.*, 2020: Seeley & Singh, 2021] Supply channels to community pharmacists include wholesale, distributors, and pharmaceutical companies but for this study, a focus is placed on pharmaceutical companies due to their impact on prescribing and dispensing actions of community pharmacists [Khan *et al.*, 2016: Mukherjee, 2012: Bader, *et al.,* 2017)]. In the study, the structural equation modeling (SEM) technique was used to evaluate the relationships between variables as well as test the validity of the theoretical and empirical models. [Henseler *et al.,* 2015; Oamen, 2021]. The key constructs examined were cost & profitability factors, service and product quality factors, and their influence on the decision to procure medicines from suppliers. Each construct was elucidated by reflective indicator items to provide clarity about the possible causal relationships. The study unpacked the influence of these critical factors on community pharmacists' procurement decision-making behavior in an LMIC setting.

1.3 Study Hypotheses

***H1*:** There are dominant reflective indicators of the factors influencing the decision behavior of community pharmacists
H2: Cost and Profitability factors **(CP)** significantly influence the decision-to-procure of community pharmacists from supply channels
***H3*:** Service and product quality factors **(SP)** significantly influence the decision-to-procure of community pharmacists from supply channels
H4: The influence of **CP** and **SP** factors on decision-to-procure of community pharmacists is moderated by product selection **(PT)** and quantity demanded **(PQ)** from supply channels

2. Methods

2.1 Study Design

A cross-sectional study with structured questionnaires administered to randomly selected community pharmacists situated in three purposively selected states in southwest Nigeria. The study was conducted between the months of April to May 2021. The study applied structural equation modeling (SEM) techniques to evaluate the factors influencing medicine procurement decisions of community pharmacists. The study adopted a community pharmacist's perspective in the analysis.

2.2 Study Population and setting

The study population consisted of all registered community pharmacists in Ogun, Oyo, and Lagos states situated in South Western, Nigeria. Based on statistics from the apex regulatory body in Nigeria, the Pharmacists' Council of Nigeria (PCN) there are about 2000 registered community pharmacists in Southwest, Nigeria. [PCN, 2020: Ihekoronye *et al*., 2020]. The study purposively selected Lagos, Ogun, and Oyo states respectively because they represent approximately 70% of the population of community pharmacies (1400) in the geographical zone [Ihekoronye *et al.*, 2021; PCN, 2020]

2.3 Selection Criteria

Community pharmacists with a minimum of one-year post-graduation practice experience and with procurement roles were selected. They could be pharmacist-owners or employed as pharmacist managers. Respondents could be in retail, wholesale, and/or a combination of retail and wholesale business models.

2.4 Ethical Approval and Consent to Participate

Ethical approval was obtained from the Department of Health Planning, Research and Statistics, Ministry of Health, Ogun State, Nigeria; with approval ID Number- HPRS/381/371/2021. Informed consent was obtained from respondents.

2.5 Questionnaire design and data collection

The 25-item research instrument was developed based on information obtained from extant literature and industry experts and was administered using a random sampling method to 500 community pharmacists distributed across the three states in southwest, Nigeria. Responses used to rate perception were based on a 5-point scale which ranged from strongly agree (5) to strongly disagree (1). For ease and focus of the questions, they were divided into 2 main parts; Part 1 contained the demographic details of respondents while Part 2 had 5 subdivisions representing the proposed constructs namely- 1) 9 questions on cost and profitability criteria, 2) 11 questions on service and product quality criteria, 3) 2 questions on product type purchased, 4) 2 questions on product quantity criteria, and 5) purchase decision was determined by a single item (mean response score)

2.6 Reliability and Validity of Research Instrument

The internal reliability of the 25-item questionnaire was evaluated using the Cronbach alpha statistic. The overall alpha score was 0.865, hence establishing the reliability of the instrument. Face validity of the instrument was confirmed for relevance and applicability. by a focal group of experienced community pharmacists.

2.7 Sample size determination and sampling

Since the study is essentially a structural equation modeling study (SEM), the inverse square root method as advocated by Knock & Hadaya (2018) was used to determine the sample size. It is based on the probability that the ratio of the path coefficient and standard error is greater than the critical value of a test statistic for a given significance level [Kock and Hadaya, 2018; Hair *et al.*, 2021]. Therefore, assuming a statistical power of 0.8 [80%], a p-value of 0.05, and a minimum path coefficient of 0.2 denoted by Pmin, the sample size [S] is given by;

$$\mathbf{S} > \left[\frac{\mathbf{2.486}}{\mathbf{Pmin}}\right]^2$$

The computed sample size was approximately 155 as the minimum requirement to obtain statistically valid and reliable SEM results. However, a definite final sample size of 398 spread across three states [Lagos-117, Ogun-193, and Oyo-88] was obtained using a simple random sampling method.

2.8 Common Method Bias (CMB)

Common Method Bias (CMB) was adequately addressed by varying the phrasing of questions and ordering of questions sequence. This was done to avoid bias from respondents [Peter and Troth, 2020: Chin *et al.*, 2012]. Harman's single factor method was used to determine the absence or presence of CMB in the dataset. It showed that the variance due to a single factor was 20.835% which is less than the benchmark value of 60% [Peter and Troth, 2020: Chin *et al.*, 2012].

2.9 Data analysis

Data analysis was done using the statistical package for social sciences (SPSS version 25) and open-source online software JAMOVI [The Jamovi Project, 2021]. Analysis was in four unique stages- 1) dataset was assessed for collinearity, reliability, convergent and divergent validity. 2) Exploratory factor analysis (EFA) was used to identify the factor structure of the dataset, to determine if it fits with the theoretical framework of the study. Indicators or items which failed to load above 0.4 cutoffs were eliminated from the dataset. Constructs or factors which did not fit with the theoretical base of the study were also excluded. 3) Confirmatory factor analysis (CFA) was used to confirm or validate the constructs obtained from EFA as well as model fit characteristics. 4) Structural equation modeling (SEM) analysis was used to examine the hypothesized structural relationship between the identified factors or constructs. 5) Moderation analysis using Product selection (PT) and Product quantity (PQ) variables as moderators

2.9.1 Model specification

The hypothesized structural model was based on the contribution of three constructs; two exogenous or independent variables- cost & profitability factors [**CP]** with 7 indicators, service & product quality factors **[SP]** with 10 indicators, and the endogenous or dependent variable Decision-to-procure **[D]** with a single item indicator **[P9].** The perspective of the analysis was that of the healthcare professional (community pharmacist). Product-type selection **(PT)** and Product quantity **(PQ)** (with two indicator items each) were not included in the initial structural model but were included as moderators in the path model. The exploratory factor analysis was performed using parallel analysis with oblimin (oblique) rotation) and the baseline for factors included in the model was set at 0.4 and above. CFA was executed using the factor structure obtained from the exploratory factor analysis. The maximum likelihood method was adopted for the computation of the structural model parameters.

3. Results

3.1 Response rate and Demographic characteristics of Sample

A total of 398 out of 500 administered questionnaires were valid representing a response rate of 79.6%. A significant number of respondents 218 (55%) were male and 181 (45%) were female. The average age of respondents was 35 (SD=1.50) and the mean years of practice experience was 11 (SD=2.04). Respondents who practiced in wholesale settings were 60 (14.8%), 238 (60%) who practiced in the retail setting, and 100 (25.2%) who practiced in a mix of retail and wholesale settings. Respondents were distributed in three major states in the southwest, Nigeria as follows: Lagos (117, 29%), Ogun (193, 49%), and Oyo (88, 22%).

Table 1: Factor Loadings, collinearity, and reliability measures of study constructs

Constructs	Indicators	Description	[a] Factor loading	[b]Cronbach	[c]VIF
Service & Product focus (SP)	**s16**	product quality	0.766		1.975
	s3	reduced cost of logistics	0.730		1.667
	s13	saves administrative time	0.702		1.945
	s7	provide product information	0.689		1.898
	s11	replace defective products	0.653		1.805
	s12	give trade discounts/promos	0.583		1.661
	s20	high supplier accessibility	0.533		1.765
	s1	ease/convenience of business	0.490		1.386
	s19	provide credit facility	0.469		1.462
	s22	satisfactory customer service	0.469	0.885	1.507
Cost & Profitability system (CP)	**s2**	give favorable supply prices	0.587		1.389
	s24	give contractual business	0.532		1.207
	s23	high profitability	0.504		1.522
	s4	provide variety/range	0.490		1.278
	s10	negotiable pricing	0.455		1.32
	s15	provide price updates	0.443		1.393
	s25	increase business during COVID	0.427	0.753	1.242
Product type selection (PT)	**s9**	buy brand products	0.598		1.115
	s8	buy generic products	0.509	0.686	1.115
Product Quantity (PQ)	**s18**	buy small quantities per order	-0.644		1.137
	s17	buy large quantities per order	0.601	0.614	1.137

Note: s5, s14, and s21 were excluded due to low factor loadings <0.4, VIF=Variance Inflation Factor

Threshold values for; **a=**Factor loading> 0.4; **b**=Cronbach alpha set at> 0.6 to 0.7; VIF=Variance Inflation Factor set at <5.0. [Hu and Bentler, 1999: Henseler *et al.*, 2012; Taber, 2018]

Table 1 shows the output of the exploratory factor analysis with factor loadings of the indicators of each reflective construct. The VIF of the indicators showed acceptable values; hence multicollinearity concerns have been eliminated.

Table 2: Divergent Validity Measure of Constructs (Heterotrait Monotrait)

Constructs	PQ	CP	PT	D	SP
Product quantity (PQ)					
Cost and Profitability focus (CP)	0.521				
Product selection (PT)	0.434	0.539			
Purchase Decision (D)	0.176	0.360	0.254		
Service and Product quality (SP)	0.399	0.676	0.572	0.302	

Table 2 showed that the key constructs of the proposed structural model are different from each other as they fall below the 0.85 cutoff values. [Henseler *et al.*,2015]. This validates the constructs

Table 3: Measurement Model showing relations between CP, SP, and DECISION Constructs

			95% C. I			
Construct	**Indicators**	**β**	**Lower**	**Upper**	**t-value**	**p-value**
DECISION	**P9**	1.000	1.000	1.000		
SP	**s16**	0.725**	1.000	1.000		
	s3	0.646	0.759	1.046	12.32	0 .001
	s13	0.722	0.858	1.143	13.78	0 .001
	s7	0.700	0.854	1.148	13.35	0 .001
	s11	0.702	0.882	1.184	13.40	0 .001
	s12	0.664	0.766	1.047	12.66	0 .001
	s20	0.693	0.873	1.177	13.23	0 .001
	s1	0.552	0.580	0.847	10.50	0 .001
	s19	0.582	0.718	1.027	11.09	0 .001
	s22	0.614	0.630	0.883	11.70	0 .001
CP	**s2**	0.569	1.000	1.000		
	s24	0.369	0.554	1.074	6.14	0 .001
	s23	0.695**	1.018	1.527	9.79	0 .001
	s4	0.492	0.702	1.177	7.75	0 .001
	s10	0.576	0.862	1.363	8.69	0 .001
	s15	0.683	1.037	1.563	9.69	0 .001
	s25	0.443	0.677	1.189	7.14	0 .001

Note: β=standard regression coefficient, p<0.05 (significant at t-value >1.96), **highest beta values

In table 3, the measurement model reveals significant values of all the indicators/ items, hence validating the model. The results revealed that items **s16**- 'product quality' with *β= 0.725* and **s23**- 'high profitability' with *β=0.695* were the dominant items under **CP** and **SP** constructs respectively at p<0.01, in the measurement model.

3.2 Model fit Measures

The dataset was assessed using the following parameters: Kaiser Meyer Olkin (KMO) =0.907; Bartlett's test $\chi 2$ [*DF=300, p<0.001] =3320.801*. Chi square test $\chi 2$ *[DF=206, p<0.001*] *=357.468*. Furthermore, the structural model showed acceptable measures of fit for the model; comparative fit index *CFI-0.914*, Tucker Lewis Index *TLI=0.901*, non-normed fit index *NNFI=0.901*, and Goodness of fit index *GFI=0.967*. [Hu and Bentler, 1998; 1999]. The effect size as measured by the coefficient of determination R2 of the endogenous variable-Buying decision was 14.1% (0.141). This implies that 14.1% of the variance in the dependent variable is explained by the independent or predictor variables-CP and SP [Hair *et al*., 2014] *SRMR was 0.057 and RMSEA was 0.062* (*Lower limit=0.053, Upper limit=0.07*). [Hu and Bentler,1998; 1999].

Table 4: Parameter estimates of structural equation model

Dependent	Predictors	Estimate	SE	95% C. I		β	t-value	p-value
				Lower	Upper			
Buying Decision	**SP**	0.0575	0.111	-0.161	0.276	0.0438	0.516	0.606
Buying Decision	**CP**	0.5855	0.159	0.273	0.898	0.3427	3.676	0 .001

The structural model showed the relationship between the independent (predictor) variables- service and product quality factors (**SP**) & cost and profitability factors (**CP**) and the dependent (outcome) variable, Buying decision **(D)**. Table 4 showed that **CP** *[β=0.343, p=0.001]* significantly predicts **D** compared to **SP** which did not *[β=0.044, p=0.606].*

Table 5: The Moderating effect of Product selection (PT) and Product Quantity (PQ) on Hypothesized Model

Variables	Estimate	SE	95% C. I		t-value	p-value
			Lower	Upper		
PT	0.0989	0.0519	-0.0029	0.201	1.900	0.057
CP * PT	0.1315	0.0664	0.00133	0.262	1.980	0.048
PT	0.0645	0.0521	-0.0376	0.1666	1.240	0.216
SP *PT	-0.2003	0.0677	-0.3329	-0.0676	- 2.960	0.003

Note: * =interaction, PQ has no moderating effect on the relationship

Table 5 showed that product selection factors **(PT)** positively improved *[t=1.980, p=0.048]* the impact of cost and profitability **(CP)** factor of respondents in decision making **(D)** compared to an inverse moderating effect on service and product quality factor **(SP)** ***[****t=-2.960, p=0.003].*

4. Discussion

This structural equating modeling study investigated the factors influencing the buying decisions of community pharmacists from pharmaceutical supply channels in selected states in southwest, Nigeria. The objective of the study was to empirically evaluate the influence of community pharmacists' considerations on medicine procurement decisions. Figure 1 showed the structural relationships between independent (SP and CP) and dependent (decision-to-procure) variables used to test study hypotheses. The implications on pharmaceutical service delivery by community pharmacists and pharmaceutical suppliers were discussed. The validity of the measurement and structural models showing the hypothesized relationship exhibited acceptable model fit. The initial measurement model revealed that 'product quality [*β=0.725, p<0.01*] and 'high profitability' [*β=0.695, p<0.01*] were the dominant items under cost & profitability factors (**CP)** and service & product quality factors (**SP)** constructs respectively, in the model. Hence, the hypothesis ***(H1)*** was supported by the study results. This feedback from respondents theoretically aligns with the premise that obtaining a product of the best quality as well as overall business profitability should be the focus of any procurement entity [WHO, 2018; Cavicchi and Vagnoni, 2020].

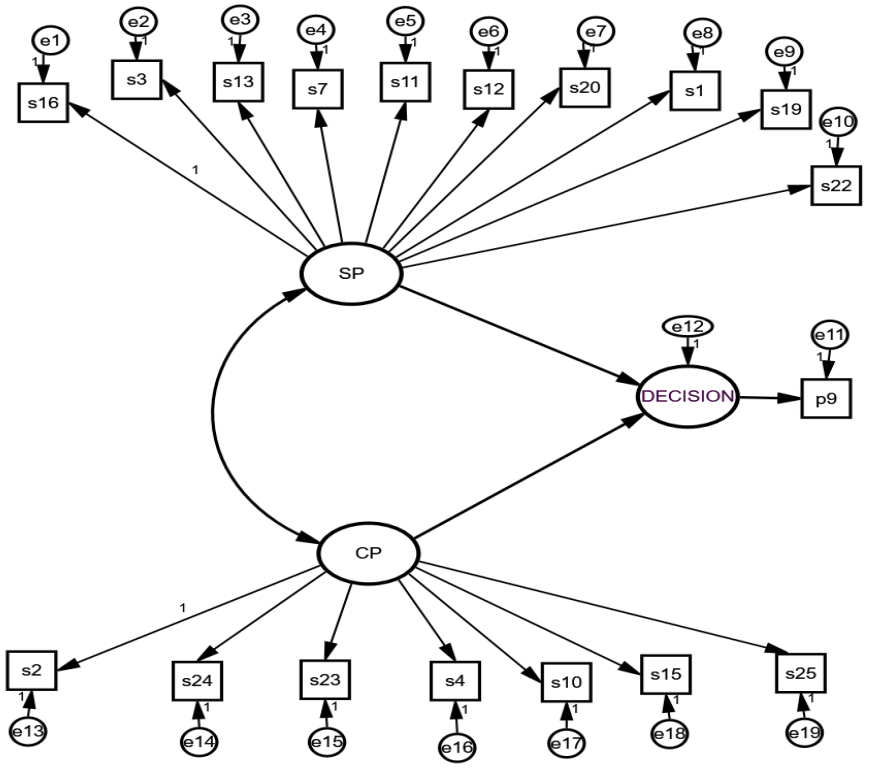

Figure 1: Structural diagram showing the relationship between **CP** and **SP** constructs on decision-to-procure [observed reflective indicators and error terms indicated]

The findings from the study model revealed that respondents showed more propensity to cost and profitability considerations compared to service and quality considerations. [*β=0.343, p=0.001 vs. β=0.044, p=0.606*] as shown in Table 4. Hence, hypothesis ***H2*** is supported and ***H3*** rejected. The issue of cost management is even more pertinent as an essential entrepreneurial trait for community pharmacists considering the competitiveness of the community pharmacy landscape at the level of price. This has necessitated the focus on the cost of procuring medication as revealed by the significant influence of cost and profitability factors on procurement decisions in the study. [Seeley and Singh, 2021: Cavicchi and Vagnoni, 2020]. Cost savings achieved as a result of better pricing as a consequence of adequate cost control measures in direct purchases from pharmaceutical companies should translate to cost reduction for the consumer. This assertion aligns with the pharmaceutical care model advanced by Hepler and Strand (1990) [Hepler and Strand, 1990]. On the other hand, the non-significant impact of the construct- service and quality factors (**SP**), on the decision behavior of community pharmacists suggests low prioritization on issues of quality and service delivery of suppliers compared to disproportionately higher emphasis on cost-based considerations. Therefore, the study suggests that community pharmacists go beyond just cost management and apply pharmacoeconomic tools such as cost-minimization analysis, cost-benefit analysis, and cost-effectiveness analysis in their practice. Therefore, at the community pharmacy practice level, community pharmacists must play the role of both the health professional and business decision-maker [Cavicchi and Vagnoni, 2020: Chappell and Barnes, 1984: Bader *et al.*, 2017: Kho *et al.*, 2017]. They should blend both cost and patient outcomes optimally; hence training and deliberate application of these tools in community pharmacy practice is advocated [Oamen *et al.*, 2021]. Moreover, from the consumer or end-user perspective, due to the high out-of-pocket cost of obtaining medicines, patients or consumers have become more price-sensitive and comparative in attitude. Hence, availability and competitive pricing are key expectations by the general public when visiting a community pharmacy [Iffat *et al.*, 2015: Suh, 2011]. Some studies suggest that increased competition among community pharmacies and the price sensitivity of customers also account for the focus on the issues of price [Mathews *et al.*, 2020: Cavicchi and Vagnoni, 2020]. This may be partly or wholly responsible for high levels of price competition among pharmacies which may have stimulated a paradigm shift preferentially to cost and profit

maximization strategies [Mathews *et al.*, 2020: Hassali *et al.*, 2010; Cavicchi and Vagnoni, 2020]. As a guiding principle, pricing systems or mark-up mechanisms should be such that the final cost should not be inhibitive to the end-user who is paying essentially out of pocket [Lee *et al.*, 2021]. The balancing act between service provision as pharmaceutical care providers and profitability should be targeted at the ultimate welfare of the patient. This finding is in support of the assertion of Giralt *et al.* (2020) which revealed a low emphasis on quality-assured medications from the supply channel in low and medium-income countries [Giralt *et al.*, 2020]

4.1 Moderation effect of Product-type selection and Product quantity on the relationship between CP and SP on buying Decision (D)

The study further investigated the impact of two constructs- product-type selection (PT) and product quantity (PQ) on the hypothesized relationship between cost & profitability factors (CP), and service & product factors (SP) on the dependent variable- buying Decision (D). The study revealed that PT significantly enhanced or improved the capability of community pharmacists to make better procurement decisions. On the other hand, PQ did not affect the relationship. (Table 5) These moderation effects are shown in Figures 2a & 2b. Therefore, hypothesis ***H4*** was supported for only the PT moderator for both factors-CP and SP respectively (*t=1.980, p=0.048 & t=-2.960, p=0.003)*. This perception of respondents is probably because generic medicines or substitutes tend to cost less than branded or more established brands. [Seeley and Singh, 2021: You *et al.*, 2019: Oamen and Osemene, 2021] However, it is expected that before the brand switch, consultation with the prescriber, patient awareness of the reason for the switch, and quality assurance of generic are holistically considered [Seeley & Singh, 2021]. Therefore, applying basic pharmacoeconomic tools such as cost-minimization and cost-effectiveness tools would enable the pharmacist manager to make more optimal buying decisions [Oamen *et al.*, 2021].

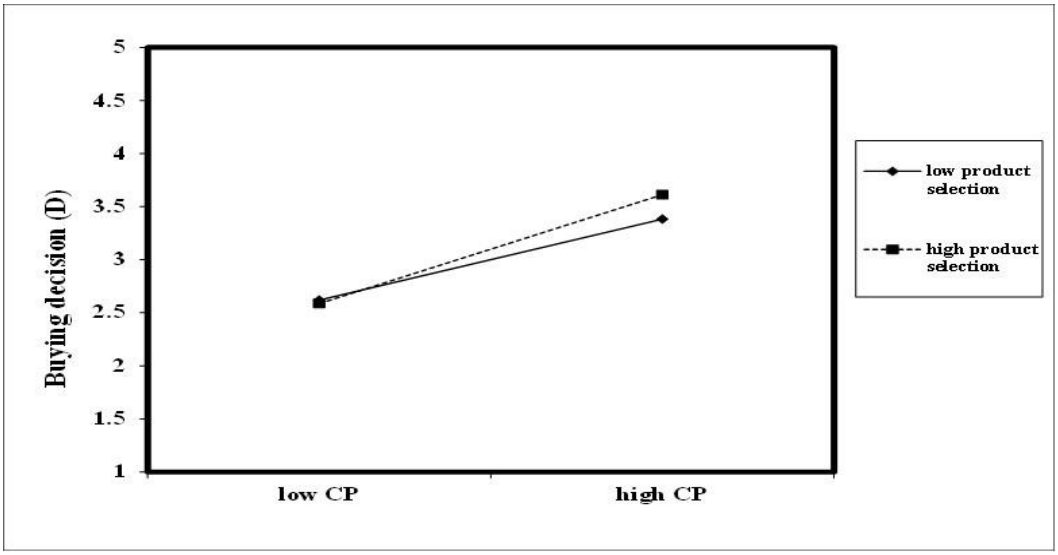

Figure 2a: The Moderating Effect of Product type (PT) on the influence of CP on Procurement decision (D)

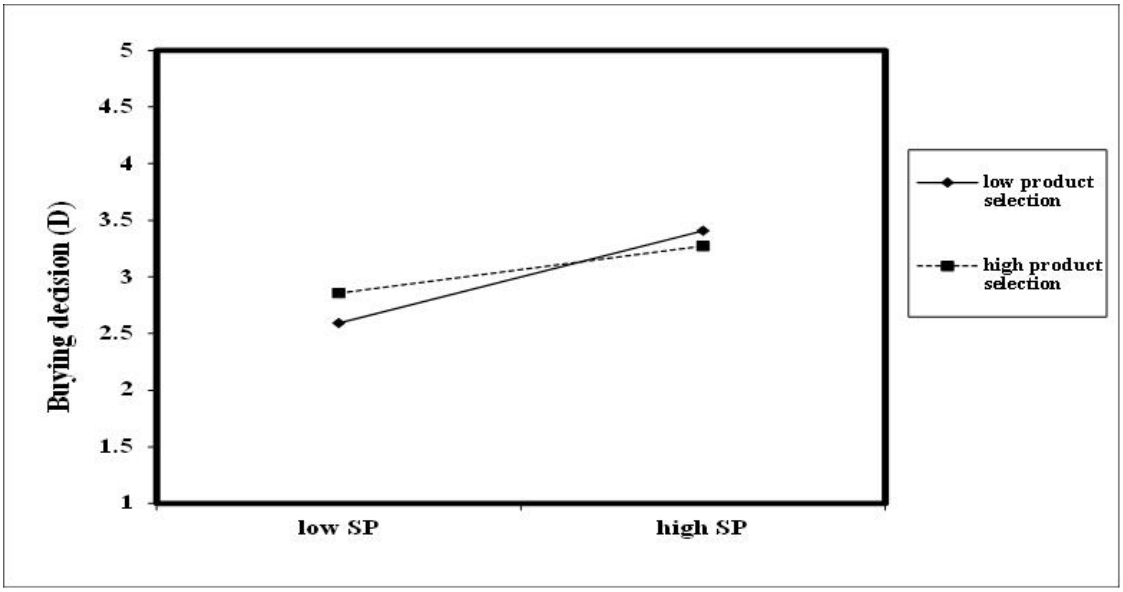

Figure 2b: The Moderating effect of Product type (PT) on the influence of SP on Procurement decision (D)

4.2 Interpretation of moderating effect of Product type (PT) on Model

In figures IIa and IIb, the study revealed that at low CP, when community pharmacists do not primarily consider cost and profitability factors in their decision-making, there is a lower influence of product selection on their buying decisions. Conversely, at high CP, product selection is a priority consideration in procurement decision-making. This finding aligns with the basic principle underlying cost-minimization analysis, in which case the lowest-priced generic is preferred, provided therapeutic equivalence is established [Oamen and Osemene, 2021] However when service and product quality are not primary considerations (low SP), community pharmacists tend to make their decisions based on product selection. This is supported by the focus on purchasing low priced generic products without a necessary focus on the quality of the product or integrity of the supplier [Khan *et al.*, 2016: Giralt *et al.*, 2020: Seeley & Singh, 2021] In contrast, at high levels of SP consideration (high SP) their buying decisions are not primarily defined by product selection. This means when service and product quality is a priority, the choice to procure medicines whether generic or branded drugs, is not a major concern or consideration compared to low SP considerations. This finding may be due to increased awareness about the comparable efficacy of generic and branded medicines [Desai *et al.*, 2019] However, there is a need for a medicine quality assurance system to support the decisions of the community pharmacist. [Ozawa *et al.*, 2020]. Therefore, study outcomes showed that product type had a significant effect on the relationship between key constructs (CP & SP) thereby supporting the hypothesis of moderation effect (***H4)***

4.3 Implications of study to community pharmacy practice and pharmaceutical marketing companies in LMICs

From the study outcomes, it is pertinent for community pharmacists in LMICs to improve their focus on holistic quality and cost factors from supply channels. Thus, it is necessary for a paradigm shift from basing procurement decisions primarily on obtaining low-cost medicines to a more balanced evaluation of medicines purchased from suppliers. To safeguard the quality assurance of drugs purchased, it is recommended that regulatory bodies supervising community pharmacists should enforce and monitor the adherence of community pharmacists to good procurement practices. The development and implementation of guidelines is a necessary step to actualizing the goal of standardizing procurement practices among community pharmacists in LMIC settings like Nigeria. The pooling purchasing strategy adopted in public procurement should also be applied in community pharmacy practice to facilitate or achieve a reduction in the costs of medicines purchased from suppliers [Dubois *et al.*, 2019; Nguyen *et al.*, 2013]. However, a policy framework to ensure that the price discounts enjoyed through the pooling system percolate or are cascaded down the supply chain to enhance affordability by the end-user. Thus, enforcement of some form of price uniformity may be enhanced by this approach compared to the negative effects of price wars due to inappropriate competitive behaviors among community pharmacies [Hassali *et al.*, 2010; Matthews *et al.,* 2020; Cavicchi & Vagnoni, 2020]. Therefore, to achieve this, a focus by healthcare professionals

on the quality of products and services (offered by suppliers) at price-friendly rates is advocated. There is a need for investments in capacity building of community pharmacists to embrace an overall focus on delivering cost-effective healthcare services to patients. This assertion is in sync with study outcomes, which support a paradigm shift from an uneven focus on cost and supply factors to health-centered activities. Pharmaceutical companies should adapt their marketing and sales strategies to the needs of community pharmacists, and not merely on achieving sales target and/or sales volume. Furthermore, there is a need for clear communications between representatives of pharmaceutical companies/suppliers and community pharmacists to ensure that issues of quality assurance and cost-minimization are common grounds for transactional relationships [Mukherjee, 2015]

4.4 Limitations of the study

The study adopted a cross-sectional study design and therefore there is a need for a longitudinal study design to examine if the constructs studied vary over time. Also, more constructs should be included in future studies to improve the robustness of findings.

4.5 Conclusion

The study adopted a structural equation modeling (SEM) framework to investigate the influence of community pharmacists' entrepreneurial and professional considerations on procurement decision-making from supply channels. The study validated a model for evaluating priorities influencing community pharmacists' buying decisions. Community pharmacists should adopt a balance between entrepreneurship considerations and patients' cost of accessing medicines. Pharmaceutical companies should adapt sales strategies to the patient-centered considerations of community pharmacists. The development and implementation of community pharmacy specific guidelines is a necessary step to actualizing the goal of standardizing procurement practices among community pharmacists in LMIC settings

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