RESEARCH ARTICLE

Path Analysis of Determinant Factors Influencing Purchasing Decisions among Community Pharmacists in Nigeria using Structural Equation Modeling

Theophilus Ehidiamen Oamen^{1,*}, Oamen Sophia Omorenuwa²

¹Department of Clinical Pharmacy and Pharmacy Administration, Faculty of Pharmacy, Obafemi Awolowo University, Osun State, NIGERIA.

²Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, University of Ibadan, Ibadan, Oyo State, NIGERIA.

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*Correspondence to:

Mr. Theophilus Ehidiamen Oamen. Department of Clinical Pharmacy and Pharmacy Administration, Faculty of Pharmacy, Obafemi Awolowo University, Ife, Osun State, NIGERIA.

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Abstract

Community pharmacists (CP) are custodians of medicines, and this raises the bar as far as ensuring the availability of affordable and quality medicines is concerned. Generally, convenience-of-supply process, favorable procurement costs associated with supply chain, optimum product-quality, service-quality from suppliers, and prospect-of-business profitability, are key considerations guiding procurement decisions. Albeit generic, there is the need to investigate how decision factors and specific demographic factors influence buying decisions of procurement pharmacists. A cross-sectional correlational study that used structured questionnaires administered to CP using mixed-sampling techniques in three metropolitan states in Southwest, Nigeria. Data was analyzed using SPSS-25 and AMOS-23. Descriptive statistics and inferential statistics were used at a *p*-value of ≤0.05. A response rate of 88.4% was achieved representing 398 respondents out of 450 questionnaires distributed. The majority were males (54.5%, 217) and females (45.5%, 181). Path analysis model revealed that.33% of the dependent variable (Purchasing decision) was explained by the independent variables (decision factors). Purchasing decision (outcome variable) is positively correlated with convenience, product-quality, and service-quality at p<0.01. But negatively correlated to competitivepricing and profitability at p<0.01. A causal relationship between decision factors and purchasing decisions showed that product-quality had the highest coefficient (0.300), followed by convenience (0.246), costadvantage (-0.231), profitability (-0.135), and the lowest, service-quality (0.036). Type of business model, gender, and ownership systems were differentiators in the path model. The study suggests more focus on quality-of-service provided by vendors. CP should ensure products are obtained at favorable prices to ensure lower costs for patients and improve business profitability.

Key words: Community Pharmacists, Purchasing Decisions, Procurement, Decision factors, Path analysis, Community Pharmacy, Structural Equation Modeling.

INTRODUCTION

In developing countries like Nigeria, there is a prevalence of erratic availability of medicines in public hospitals. As a consequence, Community pharmacies are often inundated by medication requests from patients: this raises the bar as far as ensuring the availability of affordable medicines of appropriate quality is concerned.^[1-7] Generally, the convenience of the supply process, low cost associated with supply costs, optimum product quality, service quality, and the prospect of business profitability, are key considerations guiding procurement decisions. Albeit generic, there is the need to investigate how these considerations influence buying decisions of the procurement pharmacist, and how some specific demographic factors of respondents influence their decisions. In the decision-making process in the area of procurement, decisions are not only made based on direct informative factors such as out-of-stock data, inventory management data but are influenced by demographic attributes as well. Invariably, it implies

that demographic characteristics such as age, gender, educational status, marital status, level of experience as business manager, level of practice experience, in addition to, other occupational-based/organizational attributes such as capital availability, available human resource, type of business model, number of employees, location of business and type of ownership play vital roles in the buying process.[8-11] In a fast-developing



Oamen and Omorenuwa.: Path Analysis of Determinant Factors

economy like Nigeria, examining the impact of changing demographics on decision-making is essential; studies have revealed that individual-based demographic data such as Age and Gender have shown relative disparities in effects on customer buying motivation, for example, females tend to exhibit more buying tendencies compared to males^[12-15] In the same vein, level of experience has been found to play a role in influencing decision making as more experienced staff tended to have better situation-handling competencies compared to less experienced colleagues.^[16] Furthermore, in developing countries, the location of a business has been found to influence access and availability of healthcare resources; be it rural, suburban, and Urban.^[17] This is crucial considering the expanded roles of the community pharmacist (CP) as a first-line healthcare workforce in primary healthcare delivery.^[18] In this study, educational qualifications have been shown to have minimal impact on buying decisions.^[12,16,19] The study utilized structural equation modeling techniques to examine the impact of gender, location of the business, and type of business model on decision-making on CP in selected cities in South West, Nigeria. Therefore, it is expected that the outcomes of the study will provide a theoretical basis for applying knowledge of how demographic information affects decision-making in community pharmacy practice settings. However, there is limited use of structural equation modeling (SEM) in social and administrative pharmacy. To the best of the researcher's knowledge, the causal relationship between decision factors and decision-making has not been investigated using SEM techniques

The main objective of the study was to examine the relationship and impact of profitability, convenience, price/cost advantage, product quality, and service quality on the decision to purchase by community pharmacists in Southwest, Nigeria using SEM techniques. Secondly, to investigate how demographic characteristics such as gender, business models, and type of ownership influence buying decisions of community pharmacists (CP) using path analysis.

MATERIALS AND METHODS Study design

A cross-sectional correlational study that used literature-guided questionnaires administered to a cohort of community pharmacists using mixed-sampling techniques in three highly populated metropolitan states in South West, Nigeria.^[20]

Inclusion and exclusion criteria

Only Community pharmacists (CP) 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 recruited for the study.

Questionnaire Design

The questionnaire was developed through an extensive literature search and validated by experts knowledgeable in the subject area. Part one consists of socio-demographic variables. Part two consists of discrete choice questions to obtain information from respondents.

Ethical Considerations

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.

Sample frame

All registered CP in major cities in Lagos, Ogun, and Oyo states. They are the three (3) most populated metropolitan states in Southwestern, Nigeria.^[20]

Sample Population and Sample size determination

Raosoft sample size calculator was used^[21] Sample size computation was set at a 5% margin of error and 95% confidence level with a 50% response distribution which gave 315 as an expected sample from a sample population of 1,732 for CP domiciled in Lagos, Ogun, and Oyo states.^[22]

Sampling technique and Data Collection

Mixed-method sampling was used in the study. Firstly, purposive sampling was used with set criteria for only CP with supervisory roles in procurement. Thereafter, a random sampling method was used for the purposively selected group. This was done to minimize researcher bias inherent in purposive sampling.

Reliability and Validity of Research Instrument

Face validity of the questionnaire was determined by an expert panel while the internal validity of study variables was 0.774 using Cronbach Alpha measure of Internal validity.

Data Analysis

Data were analyzed using SPSS version 25 with SPSS Analysis of Moment Structures (AMOS) version 23 software. Descriptive statistics were used such as mean, standard deviation, median, and inferential statistics such as Pearson's Chi-square for the test of association. The significance level was set at a *p*-value of 0.05.

Path Analysis of study variables using SPSS AMOS



Figure 1: Path model diagram depicting causal relationship between decision factors and purchasing decision.

Figure 1 above shows the causal relationship between determinant factors and purchasing decision with an error term (e1).

RESULTS

Demographic Characteristics of respondents

From a total of 450 questionnaires distributed, a response rate of 88.4%

Oamen and Omorenuwa .: Path Analysis of Determinant Factors

was achieved representing 398 respondents. The majority of respondents were males (54.5%, 217) and females (45.5%, 181). Participants in the study comprised 117 (29.4%) from Lagos, 193 (48.5%) from Ogun, and 88 (22.1%) from Oyo state. Business models adopted were retail practice (235, 59.8%), Wholesaling (59, 14.8%), and a mix of both retail and wholesale (101, 25.4%). The majority of respondents had 1 to 10 years of experience as pharmacists (294, 73.9%), and 1 to 10 years as a business owner (287, 72.1%). Business models were mostly retail (238, 59.8%) compared to wholesale (59, 14.8%), and a combination of both models (101, 25.4%). Ownership status was essentially sole ownership (213, 53.5%), Partnership (62, 15.6%), and Pharmacist-Manager (123, 30.9%). Finally, the community pharmacy practices were situated predominantly in Urban locations (218, 54.8%), Suburban (127, 31.9%), and Rural locations (53, 13.3%) respectively.

Table 1 shows the correlation between the study variables. It revealed that purchasing decision (outcome variable) is significantly positively correlated with convenience, product quality, and service quality at p<0.01. However, it is negatively correlated to competitive pricing and profitability at p<0.01.

Table 2 shows the outcome of prediction of the dependent variable (purchasing decision) by the various predictor variables using statistical techniques;^[23] showing significant prediction for convenience, cost, profitability, and product quality. However, service quality from suppliers did not show any causal relationship with purchasing decisions. 33% of the dependent variable (Purchasing decision) is explained by the independent variable (decision factors)

Relative Importance of Decision Factors

Table 3 showed that the causal relationship between decision parameters and purchasing decisions with product quality had the highest coefficient (0.300), followed by convenience (0.246), low cost (-0.231), profitability (-0.135), and the lowest being service quality with 0.036 regression value. The regression parameter estimates of each variable are shown pictorially in Figure 2 (see Appendix).

Table 4 showed the difference in outcome based on the differences in demographics. For gender, all variables had similar output apart from 'profitability' in which the males considered profitability had an important factor before making buying decisions compared to females (p<0.01). Similarly, pharmacists in Retail practice placed a higher premium on product quality, cost, and profitability compared to those in wholesale practice. Sole proprietors also placed a higher value on cost, product quality, and profitability compared to that using the partnership model of business (p<0.05).

DISCUSSION

Findings as shown in Table 1 showed the correlational relationships between the study variables the import of this is that purchasing decisions tend to be made as convenience of access to the stock of requisite quality with adequate customer service from the supplier. In the same vein, the less competitive pricing is, the higher the tendency of procurement managers to defer purchase. In the same way, Table 3 highlighted the relative significance of each factor among community pharmacists. The negative values show that as the independent or predictor variable increases in value, there is a corresponding reduction in the dependent or outcome variable and viceversa. This implies that in the study, the lower the cost of products, the higher and the likelihood of making a purchase decision. This outcome is supported by studies that showed that pricing considerations play a crucial role in making buying decisions.^[24] In the same vein, when CP obtain products are favorable rates, it improves selling prices to more affordable rates and invariably impacts the profitability of the practice as a business entity.^[5, 25] This invariably implies that males tend to base their purchasing judgment more on how it impacts profitability compared to females who tend not to. This finding is in contrast to a study that found out that females tend to make more informed decisions than females.^[9,14] Similarly, pharmacists who operate the retail model of business place more emphasis on cost, product quality and profitability compared to those who operate the wholesaling model of business. This difference in

Table 1: Correlational Analysis of Decision Factors and Purchasing Decision for Procurement Channels.								
Variables	Mean	SD	Purchasing decision	convenience	competitive pricing	product quality	service quality	profitability
Purchasing decision	1.62	0.797	1					
Convenience	1.44	0.496	0.366**	1				
Cost advantage	1.52	0.500	-0.379**	-0.146**	1			
Product quality	1.47	0.500	0.423**	0.252**	-0.179**	1		
Service quality	1.74	0.440	0.214**	0.266**	-0.131 ^{**}	0.307**	1	
Profitability	1.64	0.481	-0.177**	0.008	0.287**	0.051	0.082	1

Note; p-value is considered significant if less than 0.05. *p<0.05, **p<0.01, 95% CI

Table 2: Path Analysis of causal relationship between Decision factors and Purchasing decision (dependent variable).							
Decision	Relations	Decision factors	Estimate(β)	S.E.	C.R.	<i>p</i> -value	Inference
Purchasing decisions	<	Convenience	0.395	0.07	5.659	0.001**	significant impact
Purchasing decisions	<	Cost advantage	-0.367	0.07	-5.217	0.001**	significant impact
Purchasing decisions	<	Product quality	0.478	0.071	6.746	0.001**	significant impact
Purchasing decisions	<	Profitability	-0.223	0.071	-3.118	0.002*	significant impact
Purchasing decisions	<	Service quality	0.065	0.081	0.812	0.417	not significant

**p<0.01, *p<0.05, MSC (multiple squared correlation) =0.33, SE=standard error, C.R=critical ratio, beta=β

Oamen and Omorenuwa .: Path Analysis of Determinant Factors

perspective is possibly founded on the fact that retail pharmacies interface mostly with the patient directly and hence are mindful of the limitations of high pricing, quality of product dispensed to patients, and conscious of the overall profitability of the business. Furthermore, this is empirically indicative of the tendency to keep with the ideals of pharmaceutical care,^[3] which is centered on achieving the best possible outcome for patients in a cost-efficient manner.^[7] On the other hand, wholesaling outfits are not designed to interact with patients but provide the supply chain linkage necessary to ensure the availability of medicines to retail pharmacy outlets. This study suggests that both models of business- retail and wholesale carry valuable merits that support operating a hybrid model of business.^[26]

CONCLUSION

The study adds to the literature by providing more information on the impact level of decision factors on the quality of decisions taken during

Table 3: Standardized Regression Coefficients of Decision Factors and Relative Importance.						
Decision	Relations	Decision Factors	Estimate	Relative Importance		
Purchasing Decision	<	Convenience	0.246	2		
Purchasing Decision	<	Cost advantage	-0.231	3		
Purchasing Decision	<	Product quality	0.300	1		
Purchasing Decision	<	Profitability	-0.135	4		
Purchasing Decision	<	Service quality	0.036	5		

procurement. The study highlighted the relative importance of cost, convenience, profitability, service quality, and cost advantage on how these decisions are made. It showed that service quality from suppliers did not impact the process and thus is room for improvement from vendors in the pharmaceutical distribution industry. In terms of demographic comparison, gender, type of business model, and location of business were points of differentiation among CPs. Finally, to examine the hypothesized category difference in decision-making based on gender (male and female), and ownership models (sole ownership, and partnership), and business models using path analysis.

Limitations of the study

Several limitations were evident in the study; firstly, the scope of respondents should be expanded to include other geographical areas in Nigeria. This will improve the extrapolation of study outcomes. The sample size of 398 can also be increased thereby enhancing the representativeness of study results.

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ABBREVIATIONS

CP: Community Pharmacist; SEM: Structural Equation Modeling.

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Table 4: Comparative analysis of effects of demographic attributes on path variables.							
Path Variables		Male		Female			
Dependent Variable	Relations	Predictor Variables	Estimate	<i>p</i> -value	Estimate	<i>p</i> -value	Z-score
Purchasing decision	<	Convenience	0.475	0.001	0.291	0.005	-1.321
Purchasing decision	<	Cost advantage	-0.387	0.001	-0.37	0.001	0.119
Purchasing decision	<	Product quality	0.398	0.001	0.548	0.001	1.067
Purchasing decision	<	profitability	-0.382	0.001	-0.006	0.959	2.640**
Purchasing decision	<	Service quality	0.066	0.523	0.091	0.464	0.154
Path Analysis	Path Analysis		Retail		wholesale		
Dependent Variable	Relations	Predictor Variable	Estimate	<i>p</i> -value	Estimate	<i>p</i> -value	Z-score
Purchase Decision	<	Convenience	0.273	0.001	0.275	0.024	0.012
Purchase Decision	<	Cost advantage	-0.227	0.001	-0.238	0.056	-0.083
Purchase Decision	<	product quality	0.335	0.001	0.223	0.095	-0.773
Purchase Decision	<	service quality	0.024	0.626	0.053	0.796	0.134
Purchase Decision	<	profitability	-0.15	0.004	-0.159	0.182	-0.064
Path Analysis		sole ownership		partnership			
Dependent Variable	Relations	Independent Variable	Estimate	<i>p</i> -value	Estimate	<i>p</i> -value	Z-score
Purchase Decision	<	Convenience	0.224	0.001	0.275	0.024	0.367
Purchase Decision	<	Cost advantage	-0.157	0.014	-0.238	0.056	-0.581
Purchase Decision	<	Product Quality	0.32	0.001	0.223	0.095	-0.646
Purchase Decision	<	Service Quality	0.056	0.359	0.053	0.796	-0.014
Purchase Decision	<	Profitability	-0.135	0.026	-0.159	0.182	-0.18

Notes: ** *p*-value < 0.01; ** *p*-value < 0.05; , beta=β

Oamen and Omorenuwa .: Path Analysis of Determinant Factors

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APPENDIX



Figure 2. Parameter estimates of Path model.

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