A comparative model analysis of predictors of community pharmacists' collaborative practices in two southwestern states in Nigeria

ABSTRACT

Background
In community-based pharmacy practice, pharmacists are expected to engage in collaborative activities to deliver quality services to clients. However, due to the hybrid nature (social and commercial dimensions) of the practice, certain subjective behavioral norms-competitive and information-sharing behavior may have a potential influence on the collaborative behaviors of community pharmacists

Objectives
Based on the theory of planned behavior framework, the study tests the influence of subjective norms-competitive behavior and information-sharing practices on the collaborative behavior of community pharmacists; and, investigated possible differences in the perception of respondents in two southwestern states in Nigeria

Methods
A cross-sectional quantitative study with randomly administered questionnaires to 421 community pharmacists from two purposively selected states- Lagos (230) and Ogun (191) in southwest Nigeria. A structural equation model was developed using Analysis of Moment Structures software. Group differences were evaluated using the chi-square difference test.

Results
Competitive practice and information-sharing behavior are substantial predictors of collaborative behaviors among community pharmacists (R^2=0.97, p<0.001). Multigroup analysis revealed differences in perception between respondents in the densely populated and less densely populated settings. Model comparisons revealed insignificant group differences.

Conclusion
The study confirmed that information-sharing and competitive behavior have a positive and significant effect on collaborative behavior. The findings of the study imply that no link exists between the geographical placement of community pharmacists and their practice behavior. Professional associations and regulatory bodies should provide training and engage in participatory workshops to strengthen the right collaborative attitudes among community pharmacists. The study provides a theoretical framework for further studies in inter- and intra-professional relations among healthcare professionals

Keywords:

collaboration, information-sharing, structural equation model, multigroup analysis, competitive behavior, community pharmacist, healthcare professionals

INTRODUCTION

Globally, community pharmacists are the third largest healthcare providers and represent a critical resource in the delivery of pharmaceutical care services in the healthcare system [**1-2].** Community pharmacies are acknowledged to be social, and business entities catering to the medication needs of the communities they serve [**3-4].** The business dimension presents intraprofessional challenges regarding collaboration, hence making subjective norms such as information sharing and competitive behaviors potential predictors [**3,5].** However, there is a paucity of empirical evidence to affirm if community pharmacists' behavior and subjective norms are impacted by geographical practice settings. In the literature, it is established that differences in perception occur between pharmacists practicing in the hospital, industrial, manufacturing, academic, and community sectors. Studies by Iheanacho & Odili (2021) observed that perception of practice quality and satisfaction tends to vary among hospital, academic, industrial, and community pharmacists [**6-7].** However, to the best of the authors' knowledge, the influence of information sharing and competitive behavior on collaboration among community pharmacists in the context of different geographical settings of practice has not been exhaustively explored. Howarth *et al* (2020) in a systematic review identified the need for more empirical research to identify whether pharmacists in rural and urban settings may have significant differences in behavior and attitude to practice [**8].** This assertion was corroborated by a study situated in densely populated China which showed that consumers in low and highly-populated areas tend to have a behavioral effect on consumers' attitudes and perceptions of luxury goods [**9].**

The theory of planned behavior developed by Ajzen and Fischbein; has been used to explore how behavioral intentions are influenced by an individual's perceived control, attitude, and social norms which in turn may be influenced by environmental factors [**10-11].** The theory of planned behavior provided the theoretical framework which presumes that the behavioral outcome of collaborative behavior is influenced by the subjective norms and attitudes of competitive and information-sharing behaviors exhibited among community pharmacists [**10].** These subjective norms are perhaps influenced by the business or geographical environment where they are expressed. Invariably, this assertion presupposes that community pharmacists practicing in more populated areas tend to exhibit more competitive, less collaborative, and information-sharing behaviors compared to the less densely populated environment [**3,5].** This study has potential theoretical and practical implications for community pharmacy practice. This research paper seeks to; 1) explore the influence of competitive and information-sharing behavior on the collaborative behavior of community pharmacists, and, 2) uncover potential differences in information-sharing and competitive practice behaviors between two southwestern states.

Literature review and Hypotheses development

Competitive behavior

Community pharmacists are in constant competition with their peers and as such competitive behavior is bound to exist [**12-13].** Competitive behavior depicts the intentional actions or attitudes taken by a person in a business environment to have more success or outperform perceived competitors [**13].** Competitive behavior is considered an aspect of human nature that is expressed in competition between business entities in the business environment which has been the subject of management research [**14].** A study situated in Sweden identified high levels of competition among community pharmacists as a major barrier to collaborative focus on the patients' or customers' satisfaction [**15].** A common form of competition among community pharmacists is price wars and discounting, a practice prevalent in developing countries. This behavior is majorly aimed or targeted at attracting more customers and increasing patronage as a consequence [**5,16].** This behavior has been shown to distract community pharmacists from their core responsibility of providing pharmaceutical care services [**5].**

Collaborative behavior among community pharmacists

Collaboration refers to the existence of mutually beneficial cooperation and coordination between persons from two or more professions working together for a common purpose [**17-18].** Among healthcare professionals, it is important to consider the sharing of resources and cognitive skills to the benefit of the final consumer or customer [**19].** Collaborative practices support quality service delivery and improve customer or patient engagement, and innovativeness [**20].** A study of community pharmacists' services

and collaboration in Sweden reveals low levels of collaborative behavior as a barrier to patient-centered pharmaceutical care [**15,21].**

Information sharing behavior

Knowledge sharing essentially refers to the willingness of an individual or professional to share his or her knowledge or expertise with another colleague [**22].** The positive impact of knowledge sharing is shown in enhanced individual and organizational learning, shared understanding, improved problem-solving, and enhanced work systems [**23].** A study by Supar (2012**)** advocated the incorporation of information-sharing initiatives as a part of practice among professionals as evidenced by improved professional output among teachers adopting technology tools in a university setting in Malaysia [**24].** Therefore, the management of knowledge or information is crucial in healthcare organizations and is the advocated collaborative approach among professionals in the healthcare sector. However, information sharing is limited particularly in competitive environments like community pharmacy practice. A study situated in Malaysia focused on the role of technology and knowledge-sharing among micro-enterprises and advocated community-based networking among firms to cultivate knowledge-sharing culture [**5,23].**

Hence, the following hypotheses were developed

Hypothesis 1: Information-sharing practices and competitive behaviors are highly predictive of collaborative practices

Hypothesis 2: Information-sharing practices positively influence collaborative practices

Hypothesis 3: Competitive behaviors positively influence collaborative practices

Model comparison between Lagos and Ogun state groups

There is, therefore, a need to investigate if there are significant statistical differences between community pharmacists in Lagos and Ogun states by comparing path coefficients or estimates using the chi-square difference test between groups. In other words, do community pharmacists in Lagos state exhibit a stronger effect of information-sharing practices on collaborative behavior compared to those in Ogun state; and does the same to competitive behaviors using multigroup analysis?

Hypothesis 4: **Multigroup Analysis comparing Lagos and Ogun state**

Hypothesis 4 was subdivided into Hypotheses 4a and 4b

H4a: There is a statistical difference in the influence of competitive behavior on collaborative behavior between the Lagos and Ogun group models

H4b: There is a statistical difference in the influence of information hiding on collaborative behavior between the Lagos and Ogun group models

Research Method
Study design

The study was a descriptive, comparative cross-sectional study involving 432 community pharmacists from Lagos and Ogun respectively.

Study setting

Lagos and Ogun states are two of the closely situated states in southwest Nigeria. Lagos with a population of approximately 15 million people accounts for over 60% of the population and is the economic nerve center of Nigeria, hence a mega city [**25].** The proximity of Lagos to Ogun state with a population of fewer than 4 million people may inform the basis of the comparison of both states. The comparison suggests a megacity versus a minor city. However, the highly or densely populated nature of Lagos suggests a higher level of transfer of human, and material resources, information, and competitiveness compared to less populated states like Ogun [**26].** The total population size of community pharmacists in southwest Nigeria stands at between 2,300 to 3,000 distributed across the six

states in the geopolitical zone with Lagos state having the largest number of over 1100, while Ogun, Oyo, Osun, Ekiti, and Ondo states have between 1,200 to 1,900 community pharmacists [**27].**

Sample size determination and sampling

The sample size of the study was based on the original number of indicators and constructs which were 20 indicators and 3 constructs: Daniel Soper online calculator was adopted since it is adequate for structural equation modeling studies [**28].** The calculated size was 400 and was obtained from both states using a purposive random sampling method [Lagos-232. Ogun-178]. Data collection took place over 3 months (July to August 2022).

Measurement of Variables

Latent variables (CB (competitive behavior), CTB (collaborative behavior), and IHB (information sharing behavior)) were measured with indicator items (observed variables) using a 5-point Likert scale ranging from never (1), seldom (2), sometimes (3), often (4), and always (5) as shown in table 1.

Table 1. List of measurement variables

LATENT VARIABLES	**MEASUREMENT ITEMS**	**REFERENCES**
COMPETITIVE BEHAVIOR (CB)	**OBSERVED VARIABLES**	**REFERENCES**
CB1	1. I share information about my pricing strategies with my colleagues	**[5,13-14,16**]
CB2	2. I readily disclose my product sourcing channels to/with colleagues	
CB3	3. I pool financial resources with colleagues to purchase products at a lower price or trade discount	
CB4	4. I share new treatments and dispensing guidelines or updates with colleagues	
CB5	5. There is price competition in community practice	
CB6	6. I readily share my experiences & knowledge with colleagues, if relevant to customers' welfare	
CB7	7. Selling at a cheaper price than my competitors give me an advantage	
COLLABORATIVE BEHAVIOR (CTB)	**OBSERVED VARIABLES**	**REFERENCES**
CTB1	1. I buy or refill my stock from pharmacies farther from my location	**[15,17-18,21]**
CTB2	2. I refer patients or customers to colleagues with specialist knowledge in therapy areas	
CTB3	3. My colleagues sell to me at a discounted rate	
CTB4	4. I share and discuss my business growth statistics and ideas with my colleagues	
CTB5	5. I am willing to mentor new entrants to community pharmacists	
CTB6	6. I give support to colleagues to help deplete their short-dated inventory	
CTB7	7. I suggest training opportunities to my colleagues	
CTB8	8. I engage in resource pooling with colleagues to enable me to buy products at discounted rates	
INFORMATION-SHARING BEHAVIOUR (KSB)	**OBSERVED VARIABLES**	**REFERENCES**
IHB1	1. I willingly share information about my practice that may benefit my colleagues in community practice	**[22-23]**
IHB2	2. I keep to myself information that may be beneficial to my	

	colleagues
IHB3	3. I provide information to colleagues only when asked for
IHB4	4. I readily give information to colleagues
IHB5	5. I am willing to share my knowledge that may be beneficial with other pharmacists close to my pharmacy location
IHB6	6. I am willing to share useful insights through training opportunities for my colleagues

Data Analysis

Statistical package for the social sciences was used for data processing and computing demographic attributes of respondents. Path analysis of latent variables or constructs was executed using AMOS software version 24. The key analysis steps were: 1] confirmatory factor analysis (CFA) model was used to ascertain model fit characteristics and construct validity of indicators of the constructs; 2] the factor scores for each construct were computed from the indicators of each construct to give composite values; 3] structural model was developed using factor scores of each construct (exogenous variables-Information sharing and competitive practices on endogenous variable-collaborative practice); and 4] compute multigroup analysis using the framework of the structural model.

Results

A total of 421 valid questionnaires were retrieved out of a total of 500 randomly administered to community pharmacists in Lagos and Ogun states, in southwestern Nigeria. This represents a response rate of 84.2%.

Table 2. Demographic Characteristics of Respondents

VARIABLES	**NUMBER (n [%])**	
GEOGRAPHIC LOCATION	**Lagos state**	**Ogun state**
GENDER		
Male	124 (53.9)	100 (52.4)
Female	106 (46.1)	91 (47.6)
AGE (years)		
20-30	53 (23.0)	57 (29.8)
31-40	98 (42.6)	77 (40.3)
41-50	36 (15.7)	41 (21.5)
greater than 50	43 (18.7)	16 (8.4)
MARITAL STATUS		
single	77 (33.5)	59 (30.9)
married	143 (62.2)	128 (67.0)
divorced	2 (0.9)	2 (1.05)
widowed	8 (3.5)	2 (1.05)
POSTGRADUATE QUALIFICATION		
Diploma	27 (11.7)	44 (23.0)
Masters'	85 (37.0)	60 (31.4)
Fellowship	18 (7.8)	13 (6.8)
PhD	8 (3.5)	4 (2.1)
None	92 (40.0)	70 (36.6)
OWNERSHIP STATUS		

Sole Owner	102 (44.3)	107 (56.0)
Partnership	36 (15.7)	19 (9.9)
Pharmacists Manager	92 (40.0)	65 (34.0)
YEARS IN COMMUNITY PHARMACY		
1-5 yrs.	74 (32.2)	73 (38.2)
6-10 yrs.	82 (35.7)	57 (29.8)
11-15 yrs	31 (13.5)	36 (18.8)
15-19 yrs	10 (4.3)	15 (7.9)
greater than 20 yrs	33 (14.3)	10 (5.2)
YEARS OF PRACTICE AS A PHARMACIST		
1-5 yrs	55 (23.9)	57 (29.8)
6-10 yrs	77 (33.5)	59 (30.9)
11-15 yrs	42 (18.3)	41 (21.5)
15-19 yrs	14 (6.1)	18 (9.4)
greater than 20 yrs	42 (18.3)	16 (8.4)
BUSINESS MODEL		
Retail	165 (71.7)	132 (69.1)
Wholesale	24 (10.4)	7 (3.7)
Both retail and wholesale	41 (17.8)	52 (27.2)
BUSINESS LOCATION		
Urban	160 (69.6)	119 (62.3)
Suburban	59 (25.7)	65 (34.0)
Rural	11 (4.8)	7 (3.7)
Total (N)	**230**	**191**

Table 2, shows the demographic attributes of respondents in both locations, the majority of respondents were male (124) in Lagos and 100 in Ogun state respectively.

Assessment of Common method bias, and coefficient of determination (R^2)

The Harman single factor criterium was used to determine the presence or absence of CMB which introduces research instrument bias because the same Likert scale measure was applied to all the research questions [**29].** The CMB value of 42.86% was computed and represents less than the cutoff threshold of 50%. The coefficient of determination (R^2) is 97% which means that 97% of the variance in the dependent variable-Collaborative behavior, is explained by the independent variables-information-hiding behavior and competitive behavior [**30].** Therefore, hypothesis **H1** was supported due to the significant explanatory and predictive power of the model.

Assessment of Model fit

Confirmatory factor analysis provided several indicators of fit after modification of the initial measurement model. The model fit estimates showed the ratio of chi-square test/degree of freedom; □2/df=4.899 which is less than the benchmark of 5: root mean square error of approximation (RMSEA)=0.096 which is lower than the absolute cutoff value of 0.1, hence acceptable [**31].** The square root means error (SRMR) value of 0.061 was acceptable (cutoff value of 0.08). The goodness of fit indices was the comparative fit index (CFI) of 0.90, which is considered acceptable with a less strict benchmark value of 0.90 [**32].**

Table 3: Assessment of measurement model (Reliability Coefficients)

Constructs	Initial Loadings	Final Loadings	Cronbach	CR	AVE
IHB			**0.813**	**0.815**	**0.53**
IHB1	0.802	0.800			
IHB2	-0.068	***			
IHB3	0.129	***			
IHB4	0.631	0.628			
IHB5	0.695	0.694			
IHB6	0.765	0.768			
CB			**0.809**	**0.796**	**0.44**
CB1	0.752	0.738			
CB2	0.675	0.633			
CB3	0.602	0.614			
CB4	0.723	0.694			
CB5	0.104	***			
CB6	0.665	0.629			
CB7	0.084	***			
CTB					
CTB1	0.103	***			
CTB2	0.549	0.549	**0.809**	**0.809**	**0.38**
CTB3	0.585	0.585			
CTB4	0.671	0.692			
CTB5	0.540	0.561			
CTB6	0.673	0.644			
CTB7	0.655	0.624			
CTB8	0.656	0.638			

***CR=composite reliability, AVE=average variance explained, ***factor loadings below 0.5**

As shown in table 3, the following indicators with factor loadings-IHB2 (-0.068), IHB3 (0.129), CB5 (0.104), CB7 (0.084), and CTB1 (0.103) were removed from the initial measurement model because they had factor loadings below 0.5 [**33].** the reliability coefficients of the measurement model showed that composite reliability values were above the cutoff of 0.7 while the internal reliability measure of Cronbach alpha of the research instrument was above the 0.6 benchmarks. However, the average variance extracted (AVE) was only acceptable for IHB with CB and CTB with lower values of 0.440 and 0.380 respectively. However, Malhotra & Dash (2011) argued that CR is a sufficient measure of internal reliability even when AVE measures are violated [**34].**

Table 4. Discriminant validity of Constructs (Heterotrait Monotrait)

CONSTRUCT	CTB	CB	IHB
CTB			
CB	0.840		
IHB	0.900	0.732	

In table 4, the discriminant validity of the constructs (IHB, CB, and CTB) was measured using the Heterotrait Monotrait (HTMT) ratio in which case discriminant validity is established all ratios were less than the strict threshold of 0.85 or the relaxed level of 0.90 [**35].** This establishes that each construct is independent of the other.

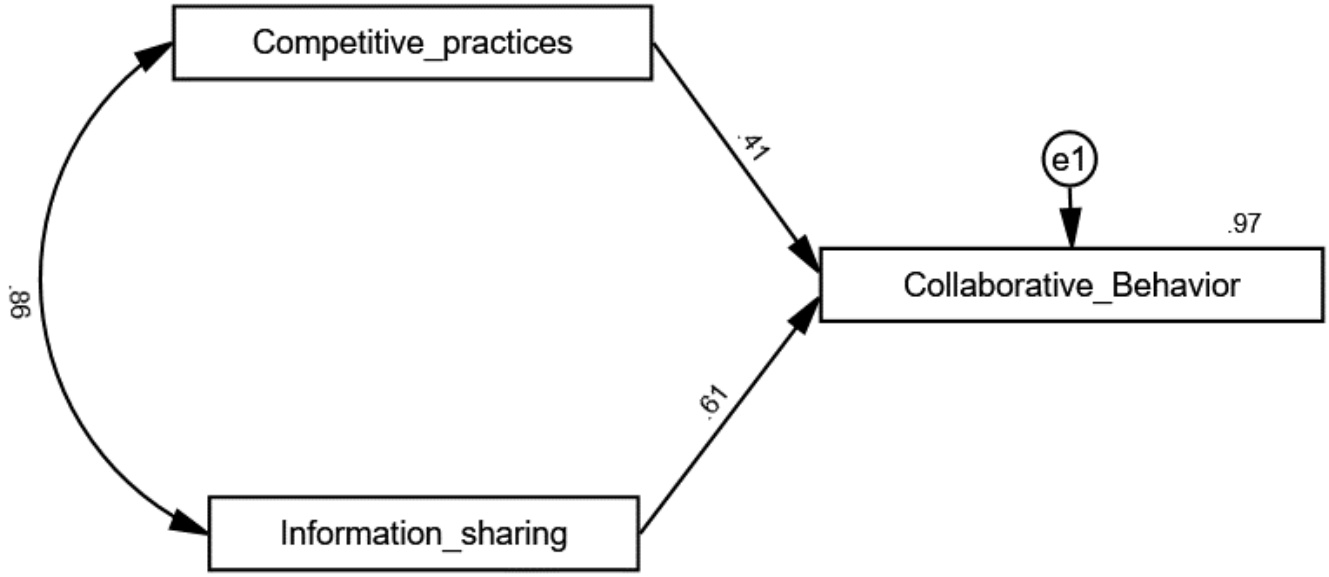

Figure 1. Structural model diagram

Table 5. Path Analysis of structural models (Lagos vs. Ogun states)

Path	β coefficient	t-value	*p*-value	Hypothesis
CB----->CTB	**0.410**	**23.298**	**0.001**	**H2: supported**
IHB---->CTB	**0.610**	**34.544**	**0.001**	**H3: supported**

***Significance at p<0.01**

As depicted in Figure 1, the relationship between the independent and dependent variables showed that CB and IHB are positive and significant predictors of CTB at p<0.001. CB bad a regression coefficient of 0.410 which is stronger than the effect of IHB (regression coefficient of 0.610) on CTB as shown in table 5.

Table 6. A multigroup analysis of the Model (Lagos versus Ogun)

Path	Lagos β	Ogun β	path diff.	*p*-value	Hypothesis(H4)
CB----->CTB	**0.410***	**0.404**	**0.06**	**0.817**	**H4a: not supported**
IHB---->CTB	**0.615***	**0.607**	**0.08**	**0.880**	**H4b: not supported**

***Indicates stronger relationship**

Although community pharmacists in Lagos state showed a higher tendency for competitive behavior and information-sharing, the multigroup comparison between the specific relationships using the chi-square difference test at one degree of freedom ($\Delta\times^2$=3.84) was applied [**36-38].** The model comparison showed that these differences are not statistically significant with chi-square difference values below the threshold. of 3.84 as shown in Table 6.

DISCUSSION

To address the study hypotheses, covariance-based structural equation modeling was used to provide a robust and statistically proficient means of examining relationships between variables or constructs [**37].**

The study's large coefficient of determination (R^2=0.97) suggests that 97% of the variance in the endogenous or outcome variable-collaborative behavior was accounted for by information sharing and competitive behaviors. This implies that these exogenous variables are critical or principal factors that explain their relevance in collaboration among community pharmacists. This strengthens the validity of independent variables in the study model for explaining collaborative behavior [**30].** Hence, hypothesis (**H1**) was supported. This suggests that competitiveness and sharing of information are integral to defining how much collaboration that may exist between healthcare professionals. Thus, lower competitive tendencies and higher levels of sharing of relevant information would enhance practice outcomes. It is therefore imperative to incorporate these elements into the culture and practice of community pharmacists. This submission was supported by studies that showed that the level of competition and knowledge sharing among physicians and pharmacists improved teamwork and intraprofessional relations [13,17,18]. Furthermore, the findings showed the positive effects of competitive practices and information sharing on the collaborative behavior of community pharmacists (**H2** and **H3** supported). The positive impact of competitive behaviors on collaboration draws on the fact that individual competitiveness tends to enhance performance. Hence, interestingly this suggests that highly competitive community pharmacists may have a high tendency to adopt collaboration in their interactions and engagement with fellow professional colleagues. This presupposes that collaborative behaviors may serve as a mediating variable that links competitive practices to practice performance among community pharmacists [13,18,23].

Similarly, the positive and significant impact of information-sharing behavior on collaborative behavior is in harmony with studies that asserted its substantial contribution to the improved work relations among teams and professionals [22,24] The finding aligns with the recommendation of Akosile & Olatokun (2020) that suggests a universal practice system among professionals that supports information and knowledge sharing thereby positively aligning competitive behavior [**39].** This is particularly relevant because regulatory bodies via policy on practice can have a potentially substantial impact on professional practice behavior [**40].** Also, although competitive practices by nature exist in community pharmacies [**2,4]**, a well-positioned healthy information-sharing culture would support positive collaborative performance as shown by significant correlations existing between competitive practices and information-sharing behavior (correlation coefficient r=0.86, p<0.001) depicted in figure 1.

Finally, the comparative analysis of constructs in the two southwestern states presents a basis for exploring the relative strength of relationships across locations. The study findings showed that pharmacists in Lagos had stronger relationships of both independent variables on the dependent variable compared to Ogun state as shown in the multigroup analysis in Table 6. However, it was not statistically significant to warrant a conclusive difference between both geographic locations (**H4** was not supported). This finding provides clarity to the research question raised as regards the possibility of differences in perception for community pharmacists from rural and urban settings according to Howarth *et al* (2020) [8]. This invariance (equivalence in response validated by no statistical difference between the two states) suggests that respondents in both locations clearly understood the research questions contained in the questionnaire. This aligns with the assertion of Oamen *et al* (2022) that measurement invariance is a requirement when evaluating group-specific differences [**41].** Therefore, this strengthens the replicability or usability of the validated instrument among groups and thus can be confidently used for further studies [**38,41].** Hence, applying multigroup analysis provides some value for management research among healthcare professionals.

Study Implications

There are implications for researchers in pharmacy management to be derived from the study. Firstly, the use of a multigroup analysis approach suggests that the conventional use of a one-size-fits-all approach for evaluating studies for different groups within a target population is not optimal. This is evidenced by the difference in the strength of perception between community pharmacists in Lagos and Ogun, although insignificant. Secondly, training and developmental workshops by regulators and professional associations should address the nuanced differences accounted for by varied business environments faced by community pharmacists.

CONCLUSION

The study confirmed information sharing and competitive behavior have a positive and significant effect on collaborative behavior. However, no link exists between the geographical placement of community pharmacists and their practice behavior. The similarity in perception between respondents in both locations is suggestive of measurement invariance implying equivalence of understanding of the behavioral concepts by respondents. Supportive services in training and workshops to strengthen the right collaborative attitudes among community pharmacists are advocated. Further research is required in the area of comparisons between geographical regions as well as countries.

Consent

Consent was obtained from respondents before the administration of the questionnaire.

Study recommendations

They include:

1. The exchange of information essential for practice improvement for the ultimate benefit of patients or clients' welfare should be encouraged among community pharmacists

2. The methodology adopted in the study provides an improvement in research methods to evaluate behavioral research among health professionals

3. Policymakers and curriculum developers should incorporate critical thinking, context, and analysis for comparing group or environment-specific requirements. This provides a framework to support policy-making as well as curriculum content in schools. This would increase the diversity and capacity of practitioners to adapt quickly to changes in the task environment.

Limitations of the study

The study was limited to two states in the southwestern region of Nigeria; hence generalization of study outcomes or results should be done with caution. Also, more independent variables or constructs can be added with a more theoretical basis to enrich the predictors of collaborative behavior. The study assumed demographic variables as constant in the estimation of the parameters.

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