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Original Research Article

Knowledge and attitude of community pharmacists towards the practice of pharmaceutical public health in north-central Nigeria

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Abstract

Purpose: The knowledge and attitude of community pharmacists towards pharmaceutical public health (PPH) practice is critical to service outcomes and program effectiveness. However, there is limited evidence on the impact of knowledge and attitude of community pharmacists on the practice of public health in Nigeria. The aim of this study was to investigate the knowledge and attitude of community pharmacists towards the practice of pharmaceutical public health in Jos, North-Central Nigeria.

Methods: A cross-sectional descriptive study was conducted in Jos, North-Central, Nigeria.

A pre-tested 42-item questionnaire was self-administered to 105 community pharmacists selected using a cluster random sampling method. Ninety-seven questionnaires were returned giving a 92% response rate. Structural equation modelling was used to explore the association and causality amongst study variables.

Results: The study showed some evidence that: (a) community pharmacists are generally knowledgeable with positive attitude towards pharmaceutical public health (b) knowledge and attitude combined have a significant impact on the practice of public health ($r=1.627$; $p = 0.001$), but knowledge alone does not significantly impact practice; (c) notwithstanding, the practice of public health is not significantly affected by certain perceived constraints at $p=0.230$.

Conclusion: Knowledge about public health does not automatically translate to the practice of public health without some support or motivation like community pharmacists' positive attitude towards public health. For a more impactful PPH practice, professional and regulatory bodies would need to develop and implement national guidelines on pharmaceutical public health practice. This could significantly foster the practice of public health by community pharmacists.

Keywords: Community pharmacists, pharmaceutical public health

Introduction

Efforts to find innovative ways of tackling the growing challenges facing population health have led to the emergence of new areas of health specialisation, such as pharmaceutical public health (PPH). The idea of PPH first surfaced in the 1980s [1,2] and has continued to receive growing attention in research, policy, and academia [3]. Authors around the world have suggested that involving pharmacists, and especially community pharmacists in public health (PH) services is essential to improving population health outcomes [4]. Community pharmacists, with their professional experience and practice

environment, are well aligned for delivering public health services and programs [5]. These services, in the opinion of Ibrahim and colleagues [6], are an extension of the duties of community pharmacists. Ease of accessibility, perception of trustworthiness, wide geographic spread/distribution, and availability for extended work hours are some of the factors in favour of community pharmacists' involvement in public health services delivery [7].

Notwithstanding the central place occupied by community pharmacists in the practice of PPH [7,8], public health modules are conspicuously missing in the curricula of several pharmacy schools, particularly in developing countries [3,6,9]. The practice of public health, thus, appears to be out of the scope of the core traditional training which pharmacists undergo in many countries. Evidence, nonetheless, indicates that community pharmacists carry out a range of duties that encompass public health services including health education on drugs/diseases, drug abuse and substance use, blood glucose and pressure monitoring, screening for cardiovascular diseases, and so on [9,10]. With the emergence of a sub-specialty like the PPH, there is a growing expectation and increasing demand for public health-related services from pharmacists.

In Nigeria, the field of PPH is relatively unpopular, despite evidence that community pharmacists perform public health services as part of their daily routine [10,11]. The body saddled with the regulation of pharmacy practice in Nigeria, Pharmacists Council of Nigeria (PCN), has long recognised the need for pharmacists' involvement in public health services as part of the components of pharmaceutical care services [12]. Accordingly, practice standards on several public health services, including health promotional strategies targeted at rational drug use, family planning, control of sexually transmitted diseases, smoking cessation, drug use in pregnancy, control of substance abuse, chronic diseases screening, and immunisation campaigns have been stipulated by the body [13].

Moreover, as is the case in many countries, there is strong advocacy for pharmacists to be actively involved in the delivery of public health services/programs in Nigeria [10,14]. However, the knowledge and attitude of community pharmacists towards PPH practice is critical to service outcomes and program effectiveness. For example, an Ethiopia-based study found that lack of knowledge was a major factor hindering a more extensive practice of public health services by community pharmacists [15]. Furthermore, a systematic review by some authors revealed that community pharmacists perceived public health services as part of their practice [4], demonstrating that they had a positive attitude towards PPH practice.

A few studies have examined the attitudes and knowledge of community pharmacists towards involvement in health promotion, public health/certain components of public health activities, and primary healthcare services in some settings in Nigeria [14,16-18]. Nevertheless, evidence on this subject remains limited in the country. Also, to the best of our knowledge, no study has assessed the impact of knowledge and attitude of community pharmacists on the practice of public health in Northern Nigeria.

Given the importance and potential impact of knowledge and attitude on any professional practice [19], this study was conducted with the objective to assess the knowledge and attitude of community pharmacists towards PPH and how these affect the practice of PPH in Jos, North-Central, Nigeria. Factors that constrain PPH practice were also studied.

Methods

Study design and setting

This is a cross-sectional survey and the research instrument, structured questionnaires, were self-administered to community pharmacists in Jos. Jos is the capital city of Plateau state, situated in the North-Central region of Nigeria. The city sits at an altitude of 1,217m above sea level with about 900,000 inhabitants according to the 2006 national population census. Historically, Jos is

populated by migrants from different parts of Nigeria, making it one of the most diverse cities in the country in terms of ethnicity, religious orientations, and social as well as political inclinations [20]. Indeed, Jos is one cosmopolitan city that offers a window for researchers to peer into the Nigerian landscape. Presently, Jos metropolis encompasses Jos East, Jos South, parts of Bassa and Barkin Ladi Local Governments, with Jos North as its centre.

Ethics approval

Appropriate ethical clearance was sought and obtained for this study from the Jos University Teaching Hospital research ethics committee (JUTH/DCS/ADM/127/XIX/6590). As part of ethical compliance, a consent letter was given to all participants with the option of voluntary participation in the survey. All the study participants signed the consent form. Furthermore, all information obtained was treated with the utmost confidentiality with no suggestive identity of any participant disclosed to any third party. All information obtained was used only for this research.

Sample size determination

An application letter to access the lists of pharmacies in Plateau State was written to the PCN (Plateau State office) by the lead researcher. This allowed access to the internal records of the council on 5th May 2016, which showed a record of a hundred and five (105) registered community pharmacies managed by the superintendent and/or locum pharmacists across Jos metropolis as at 31st December 2015. The number of community pharmacists (locum, superintendents, owner-manager) in the 105 registered community pharmacies was estimated at 140, and they were all included as eligible participants in our study.

Sampling method

The community pharmacies in Jos metropolis are in clusters, with the heaviest clusters found around the city centre and densely-populated areas. This study, therefore, used the cluster random technique to form the sample for the study. A sample size of 105 at 95% confidence interval was obtained using the formula sourced from Krejcie and Morgan [21].

Study tool

Based on the evidence available in the literature, a 42-item questionnaire was adapted from previous studies [11,16] for this study titled: Community Pharmacists and Public Healthcare Questionnaire (CPPHQ). Organized into six (6) parts as described below, these 42 items were drawn on a 6-point Likert scale, with "0" indicating non-positive, no practice or no knowledge. Following are some of the information/variables covered in the questionnaire.

Part 1: Research consent form
A consent letter was given to each participant to sign, stating the option of voluntary participation and confidential treatment of all information obtained therefrom.

Part 2: Socio-demographic data
This part seeks to extract basic demographic information from respondents to serve as a descriptive background to data analyses and results obtained. These data include sex, qualifications/training with respect to public health, age bracket, monthly income, years of post-graduation, marital status, years in community pharmacy practice and pharmacist's status in terms of employment in community pharmacy.

Part 3: Knowledge about pharmaceutical public health
According to some authors, knowledge is a function of training, whether structured or unstructured, formal or informal, academic or professional [22]. This section of the questionnaire includes items to capture the respondents' level of training in PPH at undergraduate and/or postgraduate levels, paying attention to specific components of public health such as disease prevention knowledge (kPPH5); prolonging life (kPPH6); health promotion (kPPH7) and health promotion campaigns (kPPH10); In all, there were 11 items in this part.

Part 4: Attitude towards pharmaceutical public health
The attitude construct was built from previous studies [16,23] and this is a function of willingness to participate in public health, interest in public health and perception about public health. There were 10 items in this part.

Part 5: Pharmaceutical public health-related practices
This part of the questionnaire comprised PPH practices as carried out by community pharmacists. These include health advisory services, diagnosis, and management of chronic illnesses.

Part 6: Constraints in delivering pharmaceutical public health services
This is the last part of the questionnaire that highlights from literature [16] some cogent factors that generally inhibit the practice of public health by community pharmacists.

Pretesting of the questionnaire

The first phase of data collection was the pilot study which tested for the validity and reliability of the adapted questionnaire. A randomly selected group of 16 community pharmacists were sampled at this stage using the initial 44-item questionnaire. The results required that two items be deleted while some others modified for better understanding by the respondents. With this, a new instrument of 42 items emerged for the main study.

Data collection

A face-to-face method was adopted in administering questionnaires. First, the researcher secured an appointment with the pharmacist, during which the survey was briefly explained and informed consent to participate in the survey obtained. Then the participant collected a copy of the questionnaire to be filled at his/her convenience without the researcher being present. This again was to avoid influencing the responses as well as avoid putting them under undue pressure which would bias their responses. The researcher returned on a date jointly agreed upon to pick up the completed questionnaire. Questionnaires with missing data were excluded from the analysis. Data collection period lasted for a period of about two months (May - June 2016).

Statistical analysis

Data collected were coded and entered into Statistical Package for Social Sciences (SPSS) version 24. Descriptive statistics such as frequencies, simple percentages, mean, and standard deviation were used to generate vital information that provide background information about the study sample. However, for an analytical investigation into the research problem, the structural equation model was used as an inferential tool. Amos (version 24) was also used in conducting structural equation model analyses.

Results

Characteristics of the participants

Out of 105 questionnaires administered, 97 were returned (yielding a response rate of about 92%). There were more males (60%) than females (27%) among the respondents. Other demographics of the respondents are as shown in Table 1. More details about the respondents' responses on the 6-point Likert scale, showing the mean ± SD are found in Tables 2,3,4 and 5 respectively.

The regression weight estimate of 0.885 in Table 6 shows that the impact of knowledge on attitude is statistically significant at $p < 0.001$. For every increase in knowledge by 1 standard deviation, Attitude improves by 0.885 standard deviation. This represents an 89% variation in attitude because of a 100% variation in knowledge. However, based on the regression weight estimate of -1253, and $p = 0.211$, knowledge did not affect the practice of PPH.

Attitude significantly mediated the impact of knowledge on practice, as the impact of knowledge (regression weight = 0.89) and attitude (regression weight = 1.84) are multiplied to obtain the mediated effect of knowledge on the practice of PPH (regression weight = 1.627) statistically significant at $p = 0.001$. This result shows that the practice of PPH will increase by 1.627 whenever knowledge (as mediated by attitude) increases by 1 standard deviation.

Table 1: Demographic characteristics of respondents

Variable	Frequency	Percentage (%)
Sex		
Male	58	60
Female	26	27
Missing	13	13
Age (Years)		
40 years or below	67	70
41 years or above	29	30
Marital status		
Married	67	72
Single	26	28
Post-graduation		
10 years or below	60	67
11 years or above	30	33
Qualification in public health		
Nil	33	46
Yes	39	54
Monthly income (Naira)		
Below 100,000	56	66
100,000 or above	29	34
Years in community practice		
10 years or less	69	74
11 years or more	24	26
Pharmacists' status		
Locum/Superintendent pharmacist	46	49
Others**	47	51

Table 2: Respondents' responses on pharmaceutical public health knowledge

Variables	No knowledge N(%)	Poor knowledge N(%)	Fair knowledge N(%)	Moderate knowledge N(%)	Good knowledge N(%)	Very Good knowledge N(%)	Excellent knowledge N(%)	Total	Mean	Standard deviation
Public health was extensively taught at my undergraduate level.	16(16%)	12(12%)	18(19%)	18(19%)	13(13%)	12(12%)	8(8%)	97	2.70	1.866
I've had a comprehensive postgraduate training in public health.	28(29%)	14(14%)	9(9%)	15(15%)	16(16%)	8(8%)	7(7%)	97	2.30	1.990
I need more formal/specialized training in public health as a pharmacist in order to adapt to changing trend in pharmaceutical public health.	2(2%)	1(1%)	5(5%)	10(10%)	13(13%)	25(26%)	41(42%)	97	4.78	1.445
Public health is both science and art.	2(2%)	0(0%)	1(1%)	4(4%)	15(15%)	36(37%)	39(40%)	97	5.03	1.159
Preventing disease is a core aspect of public health.	0(0%)	0(0%)	0(0%)	4(4%)	11(11%)	29(30%)	53(55%)	97	5.35	0.842
Prolonging life is a core aspect of public health.	0(0%)	0(0%)	0(0%)	4(4%)	10(10%)	33(34%)	50(52%)	97	5.33	0.826
Health promotion involves enabling people to increase control over and improving their health.	0(0%)	0(0%)	0(0%)	1(1%)	8(8%)	39(40%)	49(51%)	97	5.40	0.687
Pharmaceutical public health is the application of pharmaceutical knowledge, skills and resources to public health.	0(0%)	0(0%)	0(0%)	3(3%)	10(10%)	26(27%)	58(60%)	97	5.43	0.802
I have a good knowledge of public health.	4(4%)	5(5%)	9(9%)	23(24%)	25(26%)	15(15%)	16(16%)	97	3.74	1.583
A health promotion campaign is a public health initiative.	0(0%)	0(0%)	2(2%)	4(4%)	14(14%)	32(33%)	45(46%)	97	5.18	0.968
Public health training is necessary for Quality Pharmaceutical public health Services.	0(0%)	0(0%)	0(0%)	4(4%)	9(9%)	23(24%)	61(63%)	97	5.45	0.829

Table 3: Respondents' responses on attitude towards pharmaceutical public health

Variables	Non positive N(%)	Poor attitude N(%)	Fairly positive N(%)	Moderately positive N(%)	Very positive N(%)	Highly positive N(%)	Extremely positive N(%)	Total	Mean	Standard deviation
I am willing to practice pharmaceutical public health.	0(0%)	0(0%)	3(3%)	4(4%)	9(9%)	26(27%)	55(57%)	97	5.30	1.012
It is okay for pharmacists to be involved in public health.	0(0%)	0(0%)	1(1%)	7(7%)	26(27%)	63(65%)	0(0%)	97	5.55	0.722
Pharmaceutical public health is an essential part of my Practice as a community pharmacist.	0(0%)	1(1%)	3(3%)	12(12%)	13(13%)	26(27%)	42(44%)	97	4.88	1.348
I am interested in public health activities.	0(0%)	0(0%)	3(3%)	4(4%)	15(15%)	31(32%)	44(46%)	97	5.12	1.023
Community pharmacists are competent to carry out public health activities.	0(0%)	0(0%)	2(2%)	12(12%)	22(23%)	32(33%)	29(30%)	97	4.76	1.078
I have time to engage in public health activities.	3(3%)	2(2%)	5(5%)	16(16%)	33(34%)	19(20%)	19(20%)	97	4.13	1.426
Public health activities are for doctors, nurses and community health extension workers only.	70(73%)	8(8%)	4(4%)	3(3%)	3(3%)	7(7%)	2(2%)	97	0.87	1.687
Pharmacists should be actively involved in public health activities.	1(1%)	0(0%)	1(1%)	4(4%)	10(10%)	29(30%)	52(54%)	97	5.27	1.046
Health education by pharmacists should focus on drug related information.	3(3%)	3(3%)	1(1%)	18(19%)	13(13%)	35(36%)	24(25%)	97	4.43	1.478
Health education by community pharmacists should be focused both on group of individuals and individual clients.	0(0%)	0(0%)	1(1%)	6(6%)	16(16%)	36(37%)	38(40%)	97	5.07	0.949

Table 4: Respondents' responses on pharmaceutical public health practice

Variables	No practice N(%)	Very rare practice N(%)	Occasional practice N(%)	Less frequent N(%)	Frequent practice N(%)	More frequent N(%)	Always N(%)	Total	Mean	Standard deviation
I administer vaccines in my Pharmacy	17(18%)	7(7%)	5(5%)	5(5%)	11(11%)	23(24%)	29(30%)	97	3.76	2.267
I offer nutrition advice.	0(0%)	1(1%)	0(0%)	5(5%)	21(22%)	28(29%)	42(43%)	97	5.07	1.013
I counsel on physical activities.	1(1%)	1(1%)	0(0%)	2(2%)	11(11%)	26(27%)	56(58%)	97	5.33	1.048
I counsel on smoking cessation.	2(2%)	1(1%)	3(3%)	3(3%)	14(14%)	24(25%)	50(52%)	97	5.07	1.325
I screen patients for chronic diseases.	13(13%)	3(3%)	11(11%)	11(11%)	12(12%)	24(26%)	23(24%)	97	3.75	2.041
Counselling on sexual health/contraceptives.	0(0%)	0(0%)	3(3%)	2(2%)	18(19%)	31(32%)	43(44%)	97	5.12	0.992
Management of Chronic diseases is a key aspect of my community pharmacy practice.	2(2%)	2(2%)	7(7%)	19(20%)	16(16%)	29(30%)	22(23%)	97	4.27	1.469
I give health advice on self-care.	0(0%)	0(0%)	0(0%)	4(4%)	14(14%)	29(30%)	50(52%)	97	5.29	0.866
I counsel on maintaining ideal body weight.	0(0%)	1(1%)	2(2%)	2(2%)	17(18%)	28(29%)	47(48%)	97	5.16	1.038
I counsel on proper use of OTC and prescription medicines.	0(0%)	0(0%)	0(0%)	5(5%)	9(9%)	22(23%)	61(63%)	97	5.43	0.865
I counsel on alcohol and substance abuse.	0(0%)	0(0%)	1(1%)	1(1%)	10(10%)	27(28%)	58(60%)	97	5.44	0.803

Table 5: Respondents' responses on pharmaceutical public health constraints

Variables	No constraint N(%)	Hardly a constraint N(%)	Less of a constraint N(%)	A constraint N(%)	Serious constraint N(%)	More serious constraint N(%)	Most serious constraint N(%)	Total	Mean	Standard deviation
Lack of time.	11(11%)	14(14%)	22(23%)	14(15%)	14(15%)	13(13%)	9(9%)	97	2.84	1.830
Lack of remuneration.	14(14%)	10(10%)	12(12%)	21(22%)	14(14%)	13(14%)	13(14%)	97	3.05	1.938
Lack of demand from the public.	14(14%)	21(22%)	20(21%)	25(26%)	11(11%)	4(4%)	2(2%)	97	2.19	1.481
Inadequate staff.	11(11%)	14(14%)	17(18%)	21(23%)	11(11%)	15(15%)	8(8%)	97	2.87	1.806
Inadequate space.	13(13%)	16(16%)	13(13%)	14(14%)	17(19%)	18(19%)	6(6%)	97	2.87	1.869
Inadequate knowledge about public health.	19(20%)	13(13%)	19(20%)	15(15%)	14(14%)	12(12%)	5(6%)	97	2.49	1.838
Lack of standard practice guidelines.	14(14%)	10(10%)	17(18%)	16(16%)	14(14%)	17(18%)	9(10%)	97	2.96	1.898
Lack of support from professional bodies.	7(7%)	9(9%)	6(6%)	12(12%)	18(19%)	20(21%)	25(26%)	97	3.91	1.904
Ownership of premises by non-pharmacists.	4(4%)	8(8%)	17(18%)	13(13%)	23(24%)	10(10%)	22(23%)	97	3.66	1.779
Government regulations.	9(9%)	9(9%)	11(11%)	15(15%)	15(15%)	20(21%)	18(20%)	97	3.55	1.926

Table 6: Regression weights for measuring impacts

Variable	Standard estimate	p - value	Remark
Impact of knowledge on attitude	0.885	***	Significant
Impact of knowledge on practice	-1.253	0.211	**Not Significant**
Mediated impact of knowledge on practice	1.627	0.001	Significant
Impact of constraints on practice	-0.118	0.230	**Not Significant**

Relationship of knowledge, attitude and practice of pharmaceutical public health

Fig. 1 shows the graphical representation of the results. The model in Fig 1 is the obtained fitted model. The indicators shown in the model are the ones whose factor loadings were found to be satisfactory. The fit indices obtained show that the results of the model are reliable.

Discussion

Based on the objective of this study, the impact of knowledge on attitude was positive and statistically significant. However, surprisingly, the impact of knowledge on PPH practice was not statistically significant. This is contrary to an Ethiopia-based study where lack of knowledge impacted PPH practice [15]. The findings from this study show that knowledge only had an impact on PPH practice when mediated by attitude, demonstrating the potential impact of attitude on PPH practice.

This is also contrary to the finding of some authors who found that, despite their positive attitudes towards PPH practice, community pharmacists demonstrated little practice of PPH [16,24]. Our results compare well with the findings of a study in Sudan where a positive attitude combined with knowledge were reported to be associated with PPH practice [23]. Although Offu and other authors argued that knowledge could influence PPH practice, our finding does not agree with this position [16]. Rather, this study indicates that knowledge alone did not translate into PPH practice, a finding that is consistent with the report of Laliberte and others [25].

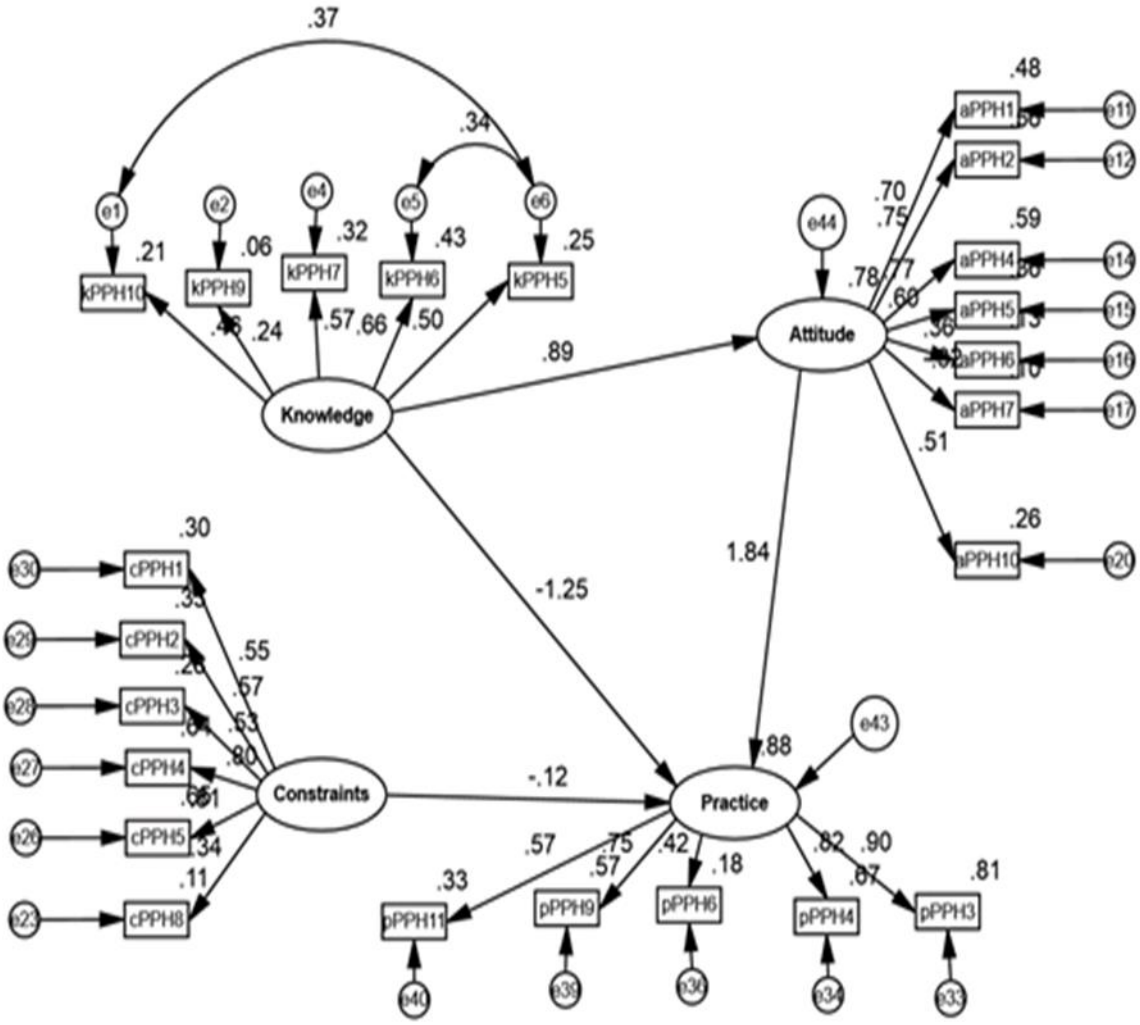

Figure 1: Relationship between knowledge, attitude and practice of pharmaceutical public health

Note: *In Fig 1, kPPH5, kPPH6, kPPH7, kPPH9, kPPH10 are questionnaire items on knowledge; aPPH1, aPPH2, aPPH4, aPPH5, aPPH6, aPPH7, aPPH10 are questionnaire items on attitude; pPPH3, pPPH4, pPPH6, pPPH9, pPPH11 are questionnaire items on practice; cPPH1, cPPH2, cPPH3, cPPH4, cPPH5, cPPH8 are questionnaire items on constraints.*

Concerning the impact of constraints on PPH practice, the results show that lack of time, inadequate remuneration, low demand for PH services, inadequate staff and space, and lack of support from professional bodies constitute constraining factors fitted in the structural model. However, Table 2 shows that these constraints (regression weight=-0.118, p=0.230) do not significantly impact the practice of PPH. This implies that an increase in the constraints does not translate into a significant decrease in the practice of PPH by community pharmacists. This, in turn, implies that there are other variables which account for variations in the practice of PPH than those estimated in this study. One of them could be a lack of systematic interventions by administrators of pharmaceutical practice to include public health roles for community pharmacists. Some authors have however found that certain factors (i.e. lack of time, inadequate remuneration, low demand for PH services, inadequate staffing and space, and lack of support from professional bodies) affect the practice of public health by community pharmacists [4,25,26]. The main limitation of this study is recall bias. The result of this study could however be generalised with caution to other community pharmacists in similar settings.

Conclusion

From the findings of this study, the following conclusion can be drawn: Knowledge about

public health does not automatically translate to the practice of public health without some support or motivation like community pharmacists' positive attitude towards public health. Factors usually thought to constrain the practice of public health do not significantly decrease the practice of public health by community pharmacists. The inclusion of PPH in the systematic administration of pharmacy practice through training could significantly foster the practice of public health by community pharmacists. For ease of implementation, such training could be incorporated into the mandatory professional update courses already in practice for pharmacists in the country. However, for long-term impact, it may be necessary to introduce pharmaceutical public health courses into the curriculum for undergraduate pharmacy education in Nigeria. For a more impactful PPH practice, professional and regulatory bodies would need to develop and implement national guidelines on pharmaceutical public health practice and systematically include it (PPH) in general pharmacy practice Nigeria.

Conflict of Interest

No conflict of interest is associated with this work.

Contribution of Authors

We declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. VOO and MAA designed the study and drafted the manuscript. SOO contributed to the analysis and interpretation of findings. EOA and VK contributed to interpretation of findings and revisions. All authors reviewed successive versions and agreed on the final manuscript draft.

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