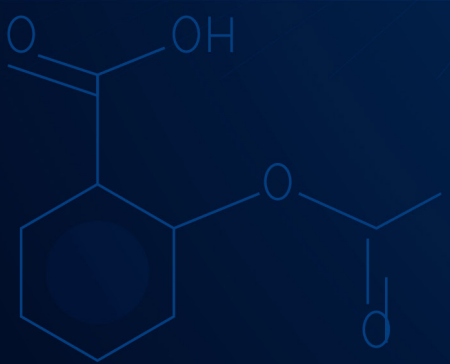
American Journal of Chemistry and Pharmacy (AJCP)

ISSN: 2834-0116 (ONLINE)

VOLUME 4 ISSUE 1 (2025)



PUBLISHED BY
E-PALLI PUBLISHERS, DELAWARE, USA

American Journal of Chemistry and Pharmacy (AJCP)

Volume 4 Issue 1, Year 2025
ISSN: 2834-0116 (Online)
DOI: https://doi.org/10.54536/ajcp.v4i1.4310
https://journals.e-palli.com/home/index.php/ajcp

Patterns of Health Complaints and Perception of the Role of Pharmacists Among Clients Visiting Community Pharmacies in Lagos State, South-West Nigeria

Promise Olaitan Ernest-Otaru[1], Tinuola Omotomilayo Odugbemi[1], Aloysius Obinna Ikwuka[2*], Francis Chigozie Udeh[2]

Article Information

Received: January 03, 2025
Accepted: February 01, 2025
Published: March 10, 2025

Keywords

Community Pharmacies, Health Complaints, Lagos State, Nigeria, Patterns, Perception, Pharmacists

ABSTRACT

Health complaints and its patterns differ generally in the population. The public perception of community pharmacies and drug vendors as a one-stop facility for almost all health complaints and services is a major determinant of the type, quantity, quality, effectiveness, and success of healthcare as they encourage irrational use of drugs and poor utilization of health facilities. In addition, the existing high prevalence of self-medication encouraged by the constant displays, advertisement, and access to over-the-counter drugs contribute to the problem. The aim of this study was to assess the patterns of health complaints and perception of the role of pharmacists among clients visiting community pharmacies in Agege Local Government Area (LGA) of Lagos State. A descriptive cross-sectional study of 305 adults visiting community pharmacies in Agege LGA using a multi-stage stratified sampling technique was used. Data was collected using an interviewer-administered questionnaire and analyzed using SPSS Version 23. The Chi-square test was used to test the association between socio-demographic and socio-economic characteristics (independent variables) and perception of the role of pharmacists (dependent variable) of the study participants at a significance level of $p<0.05$. Among the study participants, the mean age was 36.83±11.89 years, the majority were females, married, from the Yoruba tribe, living with family members, employed, and earning below the poverty level of US$2 per day. The patterns of health complaints ranged from minor ailments like pain (21.0%), multiple symptoms (13.1%), upper respiratory tract infections (11.5%), and fever (8.9%) to more major conditions like gastrointestinal disorders (6.6%) and non-communicable diseases like hypertension, diabetes mellitus, and hyperlipidemia (11.1%). The majority (83.0%) of the study participants have a positive perception of the role of pharmacists, as 77.7% of them believed that pharmacists should be able to advise them on their medications, and 56.7% believed they should be able to report any drug-related adverse effect to a pharmacist. The socio-demographic and socio-economic characteristics of the study participants have no statistically significant association with their perception of the role of pharmacists in community pharmacies ($p>0.05$). The patterns of health complaints at community pharmacies ranged from minor to more serious complaints that were related to age groups and income status. Therefore, community pharmacies should be stocked with over-the-counter as well as prescription-only drugs.

INTRODUCTION

Pharmaceutical care has recently become a vital element of national healthcare systems. When data from this sector is accurately gathered, it can significantly aid in compiling healthcare statistics and tracking disease trends, spread, and prevalence. In Nigeria, community pharmacies serve as private drug retail centers overseen by licensed pharmacists, offering a variety of primary healthcare (PHC) services alongside traditional medication dispensing (Bradley, 2013; Ihekoronye, 2020). In low- and middle-income countries (LMICs), community pharmacists in these private drugstores are instrumental in monitoring the health of both children and adults, as people often visit these pharmacies for minor health issues. This trend is driven by the accessibility of over-the-counter drugs and a growing preference for self-diagnosis and self-treatment (Zawahir, 2021; De Tran, 2019). In these settings, community pharmacists generally interact with 11–30 patients daily, with each consultation lasting an average of 4.8 minutes (Ayele, 2018; Yusuff, 2021). Community pharmacies have expanded their services beyond dispensing medications; they now offer counseling, healthcare advice, and affordable medication options, all while prioritizing confidentiality and adherence to medical ethics (Ihekoronye, 2020). As they normally open late and are often available on weekends, community pharmacies make healthcare accessible without appointments.

The types of complaints presented at community pharmacies vary depending on factors like location, demographics, seasons, and prevailing public health concerns in the host community and environs. Common complaints include detailed symptom information, with cases such as diarrhea in infants and adults and flu being prevalent in economically disadvantaged regions (Nguyen, 2023; Nafade, 2019). Flu is a serious public health threat in regions with impoverished populations and poor healthcare accessibility (Nguyen, 2023). Other frequent issues in LMICs include aches, migraines, physical injuries, fever, allergies, insect bites, skin rashes and reactions, cardiovascular disorders, and other respiratory and gastrointestinal upsets, with common

[1] College of Medicine, University of Lagos, Lagos State, Nigeria
[2] College of Medicine and Health Sciences, American International University West Africa, Banjul, The Gambia
[*] Corresponding author's e-mail: aloysiussweet@yahoo.com

treatment requests for cold remedies, oral rehydration solutions, and pain relievers (Ihekoronye, 2020; Yusuff, 2021). Some other customers visit pharmacies to refill ongoing prescriptions.

In many urban areas of Nigeria, including the Agege Local Government Area (LGA) of Lagos State, community pharmacies play a crucial role in addressing diverse health complaints. However, the specific patterns of these health complaints presented at these pharmacies are not completely understood. There is lack of clarity on patient perception of the role of pharmacists in these community pharmacies, which may hinder the optimal use of community pharmacies and potentially lead to poorer health outcomes.

Patient satisfaction plays a crucial role in influencing perception and continued use of healthcare services. Studies have examined patient satisfaction across various healthcare settings, finding that factors like demographics, health status, medical care, communication with the patient, and patient expectations impact satisfaction (Ferreira, 2023). More specifically, patients' satisfaction with community pharmacy services has been studied in some European countries where patients reported being highly satisfied (Cavaco, 2005; Edideco, 2000). However, a similar study in Nigeria reported that patients were unsatisfied with undue delay in drug dispensation (Afolabi, 2003).

There is a growing interest in evaluating patients' perception of the actual role of pharmacists in community pharmacies, with studies conducted in some countries in Europe e.g. Malta (Wirth, 2011), Bosnia and Herzegovina (Catic, 2013); in Africa e.g. Nigeria (Aderemi-Williams, 2017), Ethiopia (Fekadu, 2011); and in the Middle-East e.g. Saudi Arabia (Al-Arifi, 2012), United Arab Emirates (Akshar, 2014).

The quality of service and effectiveness of community pharmacists' primary healthcare (PHC) interventions depend largely on contextual variables such as patient health outcomes, duration per encounter, cost of drugs, the emotional concern of community pharmacists, the delivery of care by the community pharmacists, and the overall patient experience. These factors are important determinants of patients' perception and acceptability of community pharmacists in local practice settings (Aderemi-Williams, 2017; Afolabi, 2003; Ekpenyong, 2018). From entering the pharmacy to obtaining medications and paying for them, every step influences patient satisfaction and the perception of the role of pharmacists in community pharmacies in rendering quality healthcare (Aderemi-Williams, 2017).

Recognizing that the success of PHC and therapy are dependent on patient satisfaction and health outcomes, and that patients constitute an essential source of information about care effectiveness (Donabedian, 1992), this study therefore aimed to provide a comprehensive data on the patterns of health complaints and perception of the role of pharmacists in community pharmacies among clients visiting community pharmacies in Agege LGA of Lagos State, South-West Nigeria.

MATERIALS AND METHODS

Study Area

The study was conducted in Agege Local Government Area (LGA) of Lagos State, South-West Nigeria. Agege LGA has a vibrant economy with several urban markets, about 35 community pharmacies, and an estimated population of 683,600 (City Population, 2024). The recorded population of residents above 15 years of age within the study area from a previously conducted census was 307,677 (City Population, 2024). The estimated number of community pharmacies in Agege and Ifako-Ijaiye LGAs (both in Lagos State) is 150, each of which receives 30 patients daily (Medpages, 2024).

Study Design

A descriptive, cross-sectional, community-based survey was conducted for six (6) weeks using a well-structured interviewer-administered questionnaire.

Study Population

The clients who visited community pharmacies within the Agege LGA within the study period constituted the study population.

Sample Size

A sample size of 305 was deduced from the total population using the Cochrane formula for single proportion formula, $n = (Z^2PQ)/d^2$, in concordance with (Okeke, 2023a; Okeke, 2023b; Okoro, 2024a; Okoro, 2024b; Udeh, 2023).

Where:

n = minimum sample size when the population is greater than 10,000.

Z = standard normal deviation usually set at 1.96 corresponding to a 95% confidence interval obtained from a standard statistical table of normal distribution.

P = proportion of the population that visits community pharmacies in a similar study conducted among adult traders in Agege LGA with a non-response rate of 40%, and P was 85% = 0.85 (Afolabi, 2008).

Q = 1 – P = 1 – 0.85 = 0.15

d = degree of accuracy desired (absolute precision) = 5.0% = 0.05

Therefore:

$n = (1.96^2 \times 0.85 \times 0.15)/0.05^2 = 195.9$, approximately 196

It is ideal to consider a non-response after calculating the minimum sample size using the Cochrane sample size formula. Similar to another study (Afolabi, 2008), a non-response rate of 40% was considered to cover erroneously filled questionnaires, some study participants dropping out, or loss of data.

To adjust the estimated minimum sample size for non-response and attrition,

$n = n_0 /$ expected response rate $= 196/0.6 = 326.67$ ~327 sample size

Of this calculated sample size, only 305 individuals who agreed to participate were selected using a multistage stratified sampling method. Five wards (Isale/Idimangoro, Orile Agege, Darocha, Keke, and Okekoto) were balloted from the eleven wards in Agege LGA. Three community pharmacies were balloted from each ward, making a total of fifteen selected community pharmacies visited within six weeks for data collection.

Inclusion and Exclusion Criteria

Male and female adults, resident and non-resident clients visiting community pharmacies in Agege LGA were included in the study. Health professionals including medical doctors, nurses, and pharmacists currently working in other healthcare facilities and patent medicine vendors within Agege LGA were excluded in the study.

Study Procedures

One-on-one well-structured interviewer-administered developed Google form questionnaires containing a total of 33 questions, consisting majorly of closed-ended questions together with a few open-ended questions adapted from the literatures, were piloted and used as data collection tools for this study. Each questionnaire has three sections:

Socio-demographic and socio-economic characteristics of the study participants

Patterns of complaints of the study participants

Perception of the role of pharmacists by the study participants

Study Techniques and Data Collection

A reserved area, free from interruption, was created within the pharmacy and used for the interview. Using a stratified random sampling method, clients who visited the pharmacies within the six weeks of the survey and were willing to participate were selected. On average, 50 questionnaires were administered weekly. From the in-flow of clients into the community pharmacy, an individual was approached every 20 minutes. Only a member of the research team was involved in administering and filling out the questionnaires on Google Forms. Upon successful data collection, questionnaires were cross-checked for adequacy of information, numbered, organized, and entered into a Microsoft Excel sheet for data analysis.

Reliability of Study Techniques and Data Collection

A pre-test of the data collection tool (questionnaire) was carried out among 30 clients (approximately 10% of the sample size) in two community pharmacies in a different LGA (Ikeja LGA). Some questions were later modified for clarity. Using the Pearson correlation coefficient (r), the test-retest reliability of the data was determined for this study. $r>0.7$ was obtained which was enough to justify the use of research instruments since 0.7 is the minimum score for a good test-retest (Kline, 2000).

Data Analysis

Statistical Package for Social Sciences (SPSS) version 23 software was used to validate and analyze the data. A 5% significance level (p-value) was considered significant. The socio-demographic and socio-economic characteristics of the study participants and their responses to questions were expressed in frequencies and percentages. The patterns of complaints were recorded and compared to the age groups and income status of the study participants. The perception of the role of pharmacists in community pharmacies was assessed using the eight (8) different response options in which they can select multiple choices that are appropriate. Six (6) out of the eight question options provided were appropriate responses while two (2) were inappropriate responses. The maximum obtainable score was 8 and the minimum was 0. Any respondent who scored >4 by choosing appropriate options was classified as having a positive perception, and any score ≤4 was classified as a negative perception. Bivariate analysis was conducted using Chi-square to determine the association between socio-demographic and socio-economic characteristics (independent variables) and perception (dependent variable).

Ethical Considerations

Ethical approval for the study was obtained from the Health Research and Ethics Committee (HREC) of the Lagos University Teaching Hospital (LUTH). A letter of introduction was obtained from the Department of Community Health and Primary Care in the College of Medicine, University of Lagos and this letter was presented to community pharmacies to seek permission from the related authorities of the community pharmacies which were involved in the study. The interviewer properly informed the participants of the nature of the study, its objectives, its confidentiality, its importance to the society, and an informed oral consent was obtained from all study participants. There were no financial benefits to the study participants. The participants were also assured that they could withdraw from the study at any time during the data collection stage without suffering any consequence if they choose not to participate further.

RESULTS AND DISCUSSION

A total of 305 individuals participated voluntarily in this present study, giving a 93.3% response rate from the anticipated 327 sample size. The obtained results are presented in tables and figures.

Table 1: Socio-demographic characteristics of the study participants

Variable	Frequency (n=305)	Percentage (%)
Age group (years)		
< 20	6	2.0

20-24	21	6.9
25-29	73	23.9
30-34	64	21.0
35-39	47	15.4
40-44	24	7.9
45-49	19	6.2
50-54	18	5.9
55-59	14	4.6
≥60	19	6.2
Mean±SD	**36.83±11.89**	
Gender		
Male	138	45.2
Female	166	54.4
Transgender	1	0.3
Marital status		
Single	93	30.5
Married	201	65.9
Divorced/Separated	6	2.0
Widowed	5	1.6
Ethnicity		
Yoruba	202	66.2
Igbo	41	13.4
Hausa	33	10.8
Others	29	9.5
Living status		
With family	252	82.6
Alone	40	13.1
With non-family	13	4.3

The mean age was 36.83±11.89 years, the majority were young adults between the ages of 25 years and 44 years. Most were female - 166 (54.4%), majority (65.9%) were married, were of the Yoruba tribe (66.2%) and live with their family (82.6%).

Table 2: Socio-economic characteristics of the study participants

Variable	**Frequency (n)**	**Percentage (%)**
Highest level of education completed		
Highest level of education completed	6	2.0
None	21	6.9
Vocational	73	23.9
Primary	64	21.0
Secondary		
Tertiary		
Employment status		
Employed		
Self-employed	139	45.6
Private employed	89	29.2
Government employed	30	9.8
Unemployed		
Student	26	8.5

Retired	12	3.9
Unemployed (due to lack of job)	9	3.0
Estimated monthly income in Naira (N)		
<N10,000	10	3.3
N10,000 – N30,000	12	3.9
N30,001 – N50,000	51	16.7
N50,001 – N100,000	131	43.0
N100,001 – N200,000	73	23.9
N200,001 – N500,000	20	6.6
>N500,000	8	2.6
LGA of residence in Lagos State		
Agege	274	89.8
Ifako-Ijaiye	12	3.9
Alimosho	8	2.6
Ojodu	5	1.6
Ota	2	0.7
Surulere	1	0.3
Eti-Osa	1	0.3
Ikeja	1	0.3
Isolo	1	0.3

Majority of the study participants reside within Agege LGA of Lagos State - 274 (89.8%), had completed the tertiary level of education – 175 (57.4%), and were employed - 258 (84.6%). Most - 204 (66.9%) earned below US$2 per day, out of which 22 (7.2%) earned below the prevailing minimum wage (as of the time of data collection) of 30,000 naira approved by the Federal Government of Nigeria. As of today, the minimum wage in Nigeria has been increased to 70,000 naira by the Federal Government of Nigeria.

Table 3: Types of complaints among study participants, other reasons for visits to community pharmacies

S/No. Types of complaints	Frequency (n=305)	Percentage (%)
Pains	64	21.0
Multiple symptoms	40	13.1
Upper respiratory tract infections	35	11.5
Non-communicable diseases (NCDs – hypertension, diabetes mellitus, hyperlipidemia)	34	11.1
Fever	27	8.9
Gastrointestinal tract (GIT) disorders	20	6.6
Refill of prescriptions	17	5.6
Genital infections	14	4.6
Need for supplements	13	4.3
Dermatological conditions	11	3.6
Hormonal related issues	9	3.0
Need for OTC drugs	6	2.0
Ear infection	4	1.3
Eye infection	3	1.0
Other eye problems	3	1.0
Insomnia	3	1.0
Shortness of breath	1	0.3
Other complaints (BPH, erectile dysfunction, cramps)	1	0.3

Pain was highly prevalent among this population aside other complaints as it was reported by 21.0% of the study participants. Other symptoms with high prevalence were multiple symptoms (13.1%), upper respiratory tract infections (11.5%), non-communicable diseases (hypertension, diabetes mellitus, and hyperlipidemia) 11.1%, and fever 8.9%.

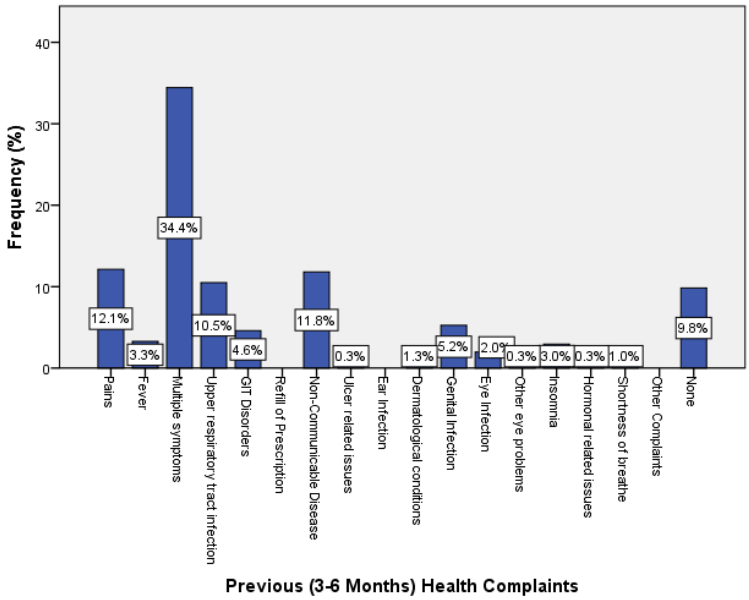


Figure 1: Previous (3-6 months) health complaints of the study participants

The commonest health complaints of the study participants in the past three to six months were collected, recorded, and compared with their present health complaints. The majority of the study participants have had multiple symptoms (34.4%), pains in different parts of the body (12.1%), complaints of non-communicable disease (11.8%) which was almost similar (in percentage) to complaints of upper respiratory tract infections (10.5%). Other health complaints were GIT disorders (4.6%), fever (3.3%), genital infection (5.2%), eye infection (2.0%), shortness of breath (1.0%), insomnia (3.0%), ulcer related issues (0.3%), and hormonal related issues (0.3%).

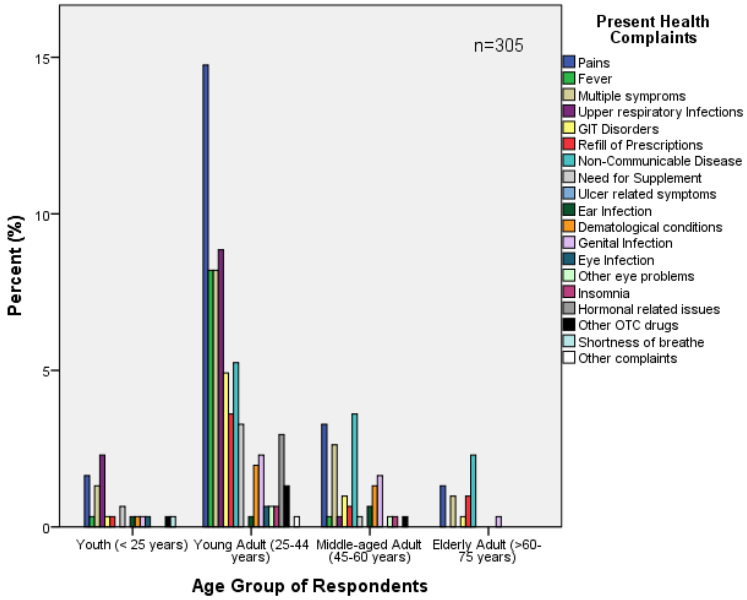


Figure 2: Health complaints of the study participants by age group

The majority of the old adult respondents complained of having non-communicable diseases and many of them were there to fill their prescriptions. Next to them were the middle-aged adults. Conversely, the majority of the young adult respondents complained of pains and upper respiratory tract infections. Multiple symptoms were presented across all the age groups. A lower percentage of the elderly adult respondents presented multiple

symptoms while a higher but similar percentage of the young adults and middle-aged adults presented it.

In addition, the highest percentage of those who complained of genital infection were the elderly adults followed by middle-aged adults, and GIT disorders were also more common among the elderly adult respondents.

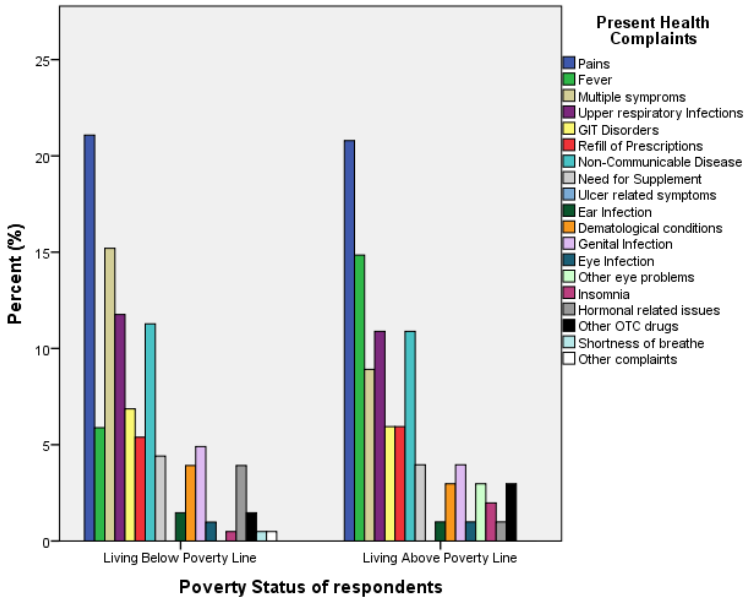


Figure 3: Health complaints of the study participants by income status

Pain was the most frequently reported health complaint in both income groups (living below poverty line and living above poverty line), with a slightly higher percentage in those living below poverty line. The percentage is over 20% for both groups, making it the dominant complaint across all categories. Both groups reported a notable percentage of upper respiratory tract infections, with slightly higher percentages among those living above poverty line.

The respondents complained of multiple symptoms while a lower percentage of the middle-income respondents and upper-income respondents presented it. The highest percentage of those who complained of genital infection was the upper-income respondents followed by middle-income respondents. Moreover, the highest percentage of those who complained of genital infection was the upper-income respondents followed by middle-income respondents, and GIT disorders were also more common among the middle- and upper-middle-income respondents.

Table 4: Perception of the role of community pharmacists by the study participants

S/No. Types of complaints	Frequency (n=305)	Percentage (%)
Advise me on the drugs I am using	237	77.7
Report to them if I react to a drug	173	56.7
Seek advice from them if the condition is not serious enough to visit a physician	153	50.2
Provide information on the use of drugs and answer my drug-related questions	98	32.1
Help monitor and provide information on my health progress with the medication	77	25.2
Provide extended services like health screening services, BP monitoring, and blood sugar monitoring mainly in community pharmacies	48	15.7
Function as a medical doctor	13	4.3
Give injections or drips	7	2.3

The majority of the study participants believed that a pharmacist should be able to give them advice on the drugs that they are using - 237 (77.7%), they should be able to report any drug reactions to the pharmacist - 173 (56.7%), and they should be able to seek advice from the pharmacist in conditions that are not serious enough to visit a physician - 153 (50.2%). However, the majority of the study participants did not expect a pharmacist to give injections or drips (97.7%), function as a medical doctor (95.7%), nor provide extended services like health screening services, BP monitoring, and blood sugar monitoring mainly in community pharmacies (84.3%).

Table 5 shows that the majority of the study participants - 253 (83.0%), had a positive perception of the role of pharmacists in community pharmacies.

Table 5: Overall perception of the role of pharmacists in community pharmacies by the study participants

Variable	Frequency (n)	Percentage (%)
Positive Perception	253	83.0
Negative Perception	52	17.0

Table 6: Association between socio-demographic characteristics and perception of the role of pharmacists in community pharmacies by the study participants

Variable	Positive Perception n=253	Negative Perception n=52	X^2	df	Fisher's exact p-value
Age group (years)			**3.561**	**9**	**0.938**
<20	5 (83.3%)	1 (16.7%)			
20–24	16 (76.2%)	5 (23.8%)			
25–29	59 (80.8%)	14 (19.2%)			
30–34	53 (82.8%)	11 (17.2%)			
35–39	40 (85.1%)	7 (14.9%)			
40–44	22 (91.7%)	2 (8.3%)			
45–49	15 (78.9%)	4 (21.1%)			
50–54	14 (77.8%)	4 (22.2%)			
55–59	12 (85.7%)	2 (14.3%)			
≥60	17 (89.5%)	2 (10.5%)			
Gender			**0.241**	**2**	**0.887**
Male	115 (83.3%)	23 (16.7%)			
Female	137 (82.5%)	29 (17.5%)			
Transgender	1 (100.0%)	-			
Marital status			**1.138**	**2**	**0.566**
Single	74 (79.6%)	19 (20.4%)			
Married	170 (84.6%)	31 (15.4%)			
Divorced/Separated/ Widowed	9 (81.8%)	2 (18.2%)			
Ethnicity			**5.694**	**3**	**0.127**
Yoruba	171 (84.7%)	31 (15.3%)			
Igbo	29 (70.7%)	12 (29.3%)			
Hausa	27 (81.8%)	6 (18.2%)			
Others	26 (89.7%)	3 (10.3%)			
Living status			**1.421**	**2**	**0.491**
Living with family	212 (84.1%)	40 (15.9%)			
Alone	31 (77.5%)	9 (22.5%)			
Living with non-family	10 (76.9%)	3 (23.1%)			

*Please note: ** statistically significant (Fisher's exact p-value), X2 – Chi squared, df - degree of freedom, p-value<0.05*

There was no statistical significant association between any of the socio-demographic characteristics of the study participants and their perception of the role of pharmacists in community pharmacies as all p-values were above 0.05. However, the majority of them across the age classification had a positive perception of the role of pharmacists in community pharmacies. In addition, there was a close similarity between the perceptions of males (83.3%), and females (82.5%). Most of them (84.1%) who live with family had a positive perception.

Table 7: Association between socio-economic characteristics and perception of the role of pharmacists in community pharmacies by the study participants

Variable	Positive Perception n=253	Negative Perception n=52	X^2	df	Fisher's exact p-value
Level of education completed			3.309	4	0.508

None	8 (66.7%)	4 (33.3%)			
Vocational	22 (81.5%)	5 (18.5%)			
Primary	7 (87.5%)	1 (12.5%)			
Secondary	72 (86.7%)	11 (13.3%)			
Tertiary	144 (82.3%)	31 (17.7%)			
Employment status			**0.173**	**1**	**0.677**
Employed	215 (83.3%)	43 (16.7%)			
Unemployed	38 (80.9%)	9 (19.1%)			
Estimated monthly income in Naira			**4.158**	**4**	**0.385**
<N30,000	17 (77.3%)	5 (22.7%)			
N30,001 – N50,000	44 (86.3%)	7 (13.7%)			
N50,001 – N100,000	112 (85.5%)	19 (14.5%)			
N100,001 – N200,000	60 (82.2%)	13 (17.8%)			
>N200,001 – N500,000	20 (71.4%)	8 (28.6%)			

*Please note: **statistically significant (Fisher's exact p-value), X2 – Chi-squared, df - degree of freedom, p-value<0.05*

No statistical significant association exists between socio-economic characteristics and the perception of the role of pharmacists in community pharmacies by the study participants (p>0.05). However, most of the study participants had a positive perception of the role of pharmacists in community pharmacies regardless of their socio-economic status.

The average age of 36.83 years obtained in this current study indicates that the study participants consisted predominantly of adults (25-39 years) opposing the study of (Ojha, 2023) where teenagers and young adults (18-29 years) dominated. The dominance of adults in this current study can be related to the fact that adults within the 25-39 years age group are non-dependent and are much more active in earning for themselves (Korn, 1987; National Bureau of Statistics, 2021), predisposing them to several stressors that cause ailments, which make them visit the community pharmacies often for treatment.

The slight female majority - 166 (54.4%) aligns with global trends where women are more likely to engage with healthcare services than men (Bertakis, 2000; Dluhos-Sebesto, 2021). The negligible transgender representation mirrors societal dynamics in Nigeria, where transgender individuals are a marginalized group, often leading to underreporting in surveys.

The high percentage of married respondents - 201 (65.9%) can be attributed to the cultural importance of marriage in the Nigerian society, while the predominance of the Yoruba ethnicity - 202 (66.2%) can be attributed to the study location which is a Yoruba-dominated area as reported by (Okoro, 2024a; Okoro, 2024b). The finding that 252 (82.6%) of the study participants live with their family suggests a significant influence of family on the patterns of health complaints and perceptions of healthcare services (Omeire, 2017).

Most 274 (89.8%) of the respondents reside in Agege LGA, which is a reflection of the targeted sampling within a specific locality. The level of educational attainment is commendable with over half (57.4%) of the respondents having completed tertiary education. This is indicative of the status of Lagos State as an educational hub in Nigeria, which might influence the lifestyle of the respondents and which in turn determines their patterns of health complaints at community pharmacies and their perception of the role of pharmacists in community pharmacies.

With a higher number (84.6%) of employed respondents, majority (66.9%) of them earn below the current poverty line (US$2 per day). This economic constraint likely impacts their healthcare choices, such as reliance on over-the-counter (OTC) medications and self-medication, as evidenced in other parts of this current study. The income distribution further emphasizes the economic challenges faced by the respondents, with only 9.2% earning above ₦200,000 monthly, reflecting the prevalent income disparity.

The patterns of health complaints indicate a broad spectrum of conditions are presented at community pharmacies, ranging from minor complaints like pain and fever to more significant health conditions like GIT disorders and non-communicable diseases (NCDs) e.g. hypertension, diabetes mellitus, hyperlipidemia. Metabolic disorders e.g. hypertension, adiposity, diabetes mellitus and dyslipidemia collectively known as Metabolic Syndrome Diseases (MSDs) are diseases related to one another and have very high morbidity and mortality rates (Ikwuka, 2015; Ikwuka, 2017a; Ikwuka, 2017c; Ikwuka, 2023c; Ikwuka, 2023f; Virstyuk, 2016). Adiposity (obesity) is a risk factor for hypertension. Obesity is also a risk factor for Non-Hodgkin lymphoma (Ikwuka, 2023e). Results obtained from different researches have shown that hypertension, adiposity, diabetes mellitus, dyslipidemia, asymptomatic hyperuricemia, systemic immune inflammation activation, and fibrogenesis can lead to kidney damage (Ikwuka, 2017d; Ikwuka, 2017e; Ikwuka, 2018c; Ikwuka, 2018d; Ikwuka, 2019a;

Ikwuka, 2019c; Ikwuka, 2022; Ikwuka, 2023d; Virstyuk, 2017a; Virstyuk, 2018a; Virstyuk, 2019; Virstyuk, 2021a; Virstyuk, 2021b).

The study identified that the most frequently reported health complaint among the respondents was pain. This aligns with the research of (Shehnaz, 2013) which explained that pain or ache management was the primary reason expatriate high school students sought help at community pharmacies. Similar to these findings, other studies conducted on adolescents in Malta and Tamil Nadu, India reported that pain was the second-highest complained symptom (Ellul, 2008; Arul, 2010). Pharmacies are often the first point of contact for patients experiencing pain, due to the accessibility of over-the-counter (OTC) medications and the convenience of pharmacy services, a point highlighted by (Ellul, 2008) where pharmacies were reported as the most prevalent source of medicines. This trend underscores the role of community pharmacies as crucial providers of immediate relief for minor ailments.

Multiple symptoms were also commonly reported, reflecting the complexity of health conditions presented at community pharmacies. This may indicate either the presence of multi-factorial illnesses or the recurrence of inadequately treated conditions. The co-occurrence of symptoms suggests that many clients might be experiencing complex health issues, necessitating a comprehensive pharmaceutical care.

Upper respiratory tract infections (URTIs) were another prevalent complaint. Other studies also reported symptoms related to URTI like cough and cold to be prevalent (Ellul, 2008; Arul, 2010). The incidence of URTIs is consistent with the seasonal occurrence of respiratory illnesses, especially in urban areas like Agege LGA. This finding is significant given the role that pharmacies play in managing symptoms of URTIs, such as coughs and colds, which are common reasons for self-medication. Urbanization has been associated with increased oxidative stress. Linked with the induction of oxidative stress are major free radicals. Among these major free radicals, superoxide anion, hydroxyl radical, and hydroperoxyl radical are of physiological significance. Non-radical of physiological significance is hydrogen peroxide (Ikwuka, 2023b). Increased oxidative stress can lead to mutation which is an alteration in the DNA sequence which produces new alleles (Ikwuka, 2023a).

The complaints of NCDs like hypertension, diabetes mellitus, and hyperlipidemia by the respondents reflect the increasing burden of chronic diseases in Nigeria, particularly in urban areas. The growing prevalence of these diseases emphasizes the need for sustained management and the potential role of community pharmacists in providing ongoing monitoring and care. Nevertheless, there is also need for new and effective treatment options in patients with Metabolic Syndrome Diseases. Sodium-Glucose Linked Transporter 2 (SGLT-2) inhibitors e.g. Dapagliflozin and Glucagon-like Peptide 1 Receptor Agonists (GLP-1 RAs) e.g. Liraglutide have been found to improve the efficacy of treatment and clinical course of type 2 diabetes mellitus and hypertension in patients with such comorbidities (Ikwuka, 2017b; Ikwuka, 2018a; Ikwuka, 2018b; Ikwuka, 2019b; Ikwuka, 2021; Ikwuka, 2024; Virstyuk, 2017b; Virstyuk, 2018b; Virstyuk, 2018c).

Complaints about fever were among the middle-range prevalent complaint. However, according to (Shehnaz, 2013), most of the respondents complained about fever. The complaint about fever could be indicative of underlying infections such as malaria. The timing of this current study, conducted during a period with higher incidence of malaria, could explain the prominence of fever as a reported symptom. The correlation between seasonal changes and the incidence of fever points to the need for community pharmacies to be well-equipped to manage febrile illnesses.

Comparison of the current health complaints reported by the study participants at community pharmacies to their previous (3 to 6 months) health complaints showed a recurrence or persistence of certain health conditions. This is evident from the close similarity in the percentages of some specific conditions, for example, upper respiratory tract infections accounted for 10.5% of previous health complaints, and 11.5% of current health complaints. Non-communicable diseases were reported in 11.8% of previous health complaints and in 11.1% of current health complaints. Many clients who visited community pharmacies complained of multiple symptoms, as reflected in 34.4% of previous health complaints and in 13.1% of current health complaints.

It is also apparent that conditions such as pain, fever, gastrointestinal disorders, upper respiratory tract infections, non-communicable diseases, dermatological conditions, and genital infections occur more frequently than other health complaints such as eye infections, ear infections, and insomnia. The observed increase in cases of pain, fever, and gastrointestinal disorders may be related to the seasonal timing of data collection which took place in June, a period of frequent rainfall when many people were experiencing malaria symptoms (Ipadeola, 2024). Factors perceived as contributing to these febrile illnesses included stress, mosquito bites, unclean water, and rain (Das, 2024; Ipadeola, 2024).

The results indicate that clients visiting community pharmacies may have a variety of reasons beyond seeking treatment for illnesses. Some visit to obtain supplements, which could be considered a preventive health measure, with 4.3% of respondents doing so. Approximately 5.6% of respondents were recorded visiting the pharmacy to fill or refill prescriptions, suggesting that some clients see a physician for diagnosis before visiting the pharmacy, and that prescription-only medicines (POMs) are still being obtained with a prescription. However, it is unclear whether all patients requiring POMs come with a doctor's prescription.

Figure 2 illustrates the patterns of health complaints by age groups. It can be inferred that pain was a significant health complaint in all age groups, but is highest among

young adults between 25-44 years. Young adults were the highest to complain about fever and multiple symptoms. This indicates that antipyretic drugs purchased as OTC were mostly used by this group. Associating pain with fever, and multiple symptoms suggests that malaria which presents with symptoms such as pain, fever, and which has been reported to be associated with the rainy season which was the period this research was conducted, is predominant among young adults. Elderly adults visit community pharmacies frequently for NCDs.

The data also indicates that complaints of genital infections were low among respondents between the age of 18-24 years and those above 60 years because the latter group includes the elderly who were already less active sexually. On the other hand, complaints about genital infections were high among respondents between the ages of 25-44 years (young adults). This finding indicates that even though the World Health Organization (WHO) reported a high incidence of sexually transmitted infections (STIs) among individuals between 15-49 years (WHO, 2024), those below 25 years were more cautious in preventing STIs, and those older than 25 years were more reckless sexually, supporting the findings of (Du, 2022) which stated that the incidence of age-standardized incidence rates (ASRs) of syphilis, chlamydia, gonorrhea, trichomoniasis, and genital herpes increased by 1.70% globally. The variety of health complaints decreases with age, and certain health complaints are more prevalent in specific age groups, for example, URTIs, pain, multiple symptoms, and fever are most common among young adults (25-44 years old), likely due to cumulative occupational exposure as this group is predominantly of working age (Korn, 1987).

The association between health complaints of the study participants by income status showed that pain was the most frequently reported health complaint among individuals living below and above the poverty line, with an insignificantly higher percentage in the former group likely because many are in the non-dependent age group and face socio-economic vulnerabilities, leading them to undertake menial jobs or lower-tier employment (Fagerlund, 2023). Respondents below the poverty line complained less about fever and more about multiple symptoms, indicating that multiple symptoms are dominated by fever (pyretic symptoms) leading to the dispensing of antipyretic drugs and subsequently lowering the fever complaints. The high rate complaints of URTIs, and a slightly lower rate of GIT disorders in both groups are almost inseparable respectively.

Other health complaints such as ear infections, eye infections, insomnia, and hormonal-related issues are less frequent across both groups but show slight variations, with some complaints like dermatological conditions, genital infections and hormonal-related issues being more prevalent among those living below the poverty line. Refill of prescriptions and complaints of NCDs were seen more often among those living above the poverty line, which may be attributable to their socio-economic status and better access to healthcare services enabling them to manage chronic conditions. Those below the poverty line reported a broader range of symptoms, which indicate a more complex health burden and less access to preventive healthcare.

The perception of the role of pharmacists in community pharmacies was assessed using eight different question options depicting user's perception, from which they can select as many that are appropriate. A client's understanding of the role of pharmacists in community pharmacies will help the client to align his/her expectations with the role of the pharmacist which will improve the quality of the services they receive. As described in Table 4, six out of the eight question options provided were appropriate responses while two were inappropriate responses. Respondents who scored >4 were classified as having a positive perception while those who scored ≤4 were classified as having a negative perception.

In this current study, the perception of the role of pharmacists in community pharmacies was largely positive (83.0%), with 77.7% believing that pharmacists should provide advice on drug use. This finding is consistent with the study of (Awad, 2017; El-Kholy, 2022; Xuan, 2023), where 86.3%, 72.0%, and 76.1% of respondents respectively, believed that it is the role of pharmacists to counsel patients about their medications, highlighting the trusted position of pharmacists in the community especially for drug-related consultations. The high expectation for pharmacists to manage drug-related issues, including adverse reactions (56.7%), is higher than the 40.0% reported by (El-Kholy, 2022), and 54.8% reported by (Awad, 2017). This finding further emphasizes the community's reliance on pharmacists for their pharmaceutical care.

Interestingly, 50.2% of the study participants indicated they would seek advice from pharmacists for conditions not serious enough to warrant a visit to a physician. This finding agrees with the findings of (Xuan, 2023) where 67.5% of respondents agree to seek a pharmacist's services in treating minor symptoms such as cough, cold, constipation, and diarrhea. This suggests significant trust in pharmacists as the first point of contact for minor health concerns. However, the expectation for pharmacists to perform roles beyond their traditional scope, such as health screening services (15.7%), functioning as medical doctors (4.3%) or giving injections or drips (2.3%) was notably low. This finding reflects a lack of awareness about the expanding roles of pharmacists in some healthcare settings or cultural norms that delineate the roles of different healthcare professionals, similar to the reports of (Akshar, 2014; Awad, 2017).

Moreover, while a majority (83.0%) of the respondents had a positive perception of the role of pharmacists in community pharmacies, a lower proportion (17.0%) had a negative perception, indicating room for improvement in public education. This gap in understanding could be addressed through community outreach and educational programs designed to inform the public about the

comprehensive services pharmacists can offer, including health screenings and chronic disease management.

There was no statistical significant association between socio-demographic characteristics (e.g. age group, gender, marital status, ethnicity, living status) and socio-economic characteristics (e.g. level of education, employment status, estimated monthly income) with perception of the role of pharmacists in community pharmacies, suggesting that perception was generally consistent across different population groups. The close similarity in positive perception between males (83.3%) and females (82.5%) further supports this finding. However, those living with family members had a better positive perception (84.1%), which could be linked to family influence in shaping healthcare decisions and perception.

However, one limitation of this current study should be pointed out. The fact that data collection was carried out in June characterized with rains may influence the patterns of health complaints. In other non-rainy, dry and dusty months, the patterns of health complaints may differ.

CONCLUSION

In conclusion, the recurrence of certain health complaints suggests that community pharmacies are a primary resource for ongoing care, particularly for chronic medical conditions. There is a need for better public education on the expanding role of pharmacists in healthcare delivery. Enhancing public awareness about the risks of self-medication and the comprehensive health services offered by pharmacists, as well as a stricter regulation and enforcement on drug sales and acquisition could lead to better health outcomes. Leveraging family dynamics and addressing the broader socio-economic challenges in the society could further improve the community's approach to healthcare.

Acknowledgments

The authors express their gratitude to everyone who contributed in one way or the other to make this research a success. The authors are also grateful to all the men and women who participated in this research for their cooperation and support, which are highly appreciated.

Conflict of Interest

The authors hereby declare that they do not have any possible conflicts of interest.

REFERENCES

Aderemi-Williams, R. I., Igwe, C N., & Soremekun, R. O. (2017). Clients' perception of community pharmacists' services in Owerri, Imo State, Nigeria. *West African Journal of Pharmacy, 28*(1), 85-97. https://doi.org/10.60787/wapcp-28-1-139.

Afolabi, A. O. (2008). Factors influencing the pattern of self-medication in an adult Nigerian population. *Annals of African Medicine, 7*(3), 120–127. https://doi.org/10.4103/1596-3519.55666.

Afolabi, M. O., & Erhun, W. O. (2003). Clients' response to waiting time in an out-patient pharmacy in Nigeria. *Tropical Journal of Pharmaceutical Research, 2*(2), 207-214.

Akshar, S., Metwaly, Z., & Mohammed, S. (2014). Patients' perception of community pharmacy practice in UAE: an overview. *IOSR Journal of Pharm., 4,* 8–14.

Al-Arifi, M. N. (2012). Clients' perception, views and satisfaction with pharmacists' roles as health care providers in community pharmacy setting at Riyadh, Saudi Arabia. *Saudi Pharmacists Journal, 20*(4), 323- 330.

Arul, P. K. C., & Senthil, K. N. (2010). Assessment of health complaints and use of medicines among adolescents in Tamil Nadu. *Journal of Pharmaceutical Research, 3*(12), 2799-2801.

Awad, A. I., Al-Rasheedi, A., & Lemay, J. (2017). Public perceptions, expectations, and views of community pharmacy practice in Kuwait. *Medical Principle and Practice, 26,* 438-446. https://doi.org/10.1159/000481662.

Ayele, A. A., Mekuria, A. B., Tegegn, H. G., Gebresillassie, B. M., Mekonnen, A. B., & Erku, D. A. (2018). Management of minor ailments in a community pharmacy setting: Findings from simulated visits and qualitative study in Gondar town, Ethiopia. *PloS One, 13*(1), e0190583.

Bertakis, K. D., Azari, R., Helms, L. J., Callahan, E. J., & Robbins, J. A. (2000). Gender differences in the utilization of health care services. *The Journal of Family Practice, 49*(2), 147–152.

Bradley, F., Schafheutle, E. I., Willis, S. C., & Noyce, P. R. (2013). Changes to supervision in community pharmacy: Pharmacist and pharmacy support staff views. *Health & Social Care in the Community, 21*(6), 644–654. https://doi.org/10.1111/hsc.12053.

Catic, T., Jusufovic, F. I., & Tabakovic, V. (2013). Clients' perception of community pharmacists in Bosnia and Herzegovina. *Materia Socio-medica, 25*(3), 206-209.

Cavaco, A. M., Dias, J .P., & Bates, I. P. (2005). Consumers' perception of community pharmacy in Portugal. *Pharmacy World and Science, 27*(1), 54-60.

City Population. (2024). Lagos State: Subdivision. Available online: https://www.citypopulation.de/en/nigeria/admin/NGA025__lagos/

Das, S., Neupane, R., Beard, J., Solomon, H., Das, M., Errickson, N., Simon, J. L., Nisar, Y. B., MacLeod, W. B., & Hamer, D. H. (2024). Aetiology of diarrhoea in children aged zero to nine years in low- and middle-income countries: A systematic review. *Journal of Global Health, 14,* 04168. https://doi.org/10.7189/jogh.14.04168.

De Tran, D., Dorofeeva, V. V., Loskutova, E. E., Lagutkina, T. P., & Kosovae, I. V. (2019). Factors influencing community pharmacists' recommendation of over-the-counter medications in four Vietnam cities. *Tropical Journal of Pharmaceutical Research, 18*(2), 421-427. https://doi.org/10.4314/tjpr.v18i2.29.

Dluhos-Sebesto, C., Jethwa, T. E., Bertasi, T. G. O., Bertasi, R. A. O., Nishi, L. Y. M., Pantin, S. A. L., Argenio, S. L., Shahsamand, A., Omololu, A., & Pujalte, G. G. A. (2021). Women's health information

survey: Common health concerns and trusted sources of health information among different populations of female patients. *Women's Health Reports (New Rochelle, N.Y.), 2*(1), 173–181. https://doi.org/10.1089/whr.2020.0118.

Donabedian, A. (1992). Quality assurance in health care: Consumers' role. *Quality in Health Care, 1*(4), 247-251.

Du, M., Yan, W., Jing, W., Qin, C., Liu, Q., Liu, M., & Liu, J. (2022). Increasing incidence rates of sexually transmitted infections from 2010 to 2019: an analysis of temporal trends by geographical regions and age groups from the 2019 Global Burden of Disease Study. *BMC Infectious Diseases, 22*(1), 574. https://doi.org/10.1186/s12879-022-07544-7.

Edideco. (2000). Are you satisfied with the pharmacy service? *Teste Sau´de, 23,* 22–7.

Ekpenyong, A., Udoh, A., Kpokiri, E., & Bates, I. (2018). An analysis of pharmacy workforce capacity in Nigeria. *Journal of Pharmaceutical Policy and Practice, 11*(20), 1-9. https://doi.org/10.1186/s40545-018-0147-9.

El-Kholy, A. A., Abdelaal, K., Alqhtani, H., Abdel-Wahab, B. A., & Abdel-Latif, M. M. M. (2022). Publics' perceptions of community pharmacists and satisfaction with pharmacy services in Al-Madinah City, Saudi Arabia: *A cross-sectional study. Medicina, 58,* 432-436. https://doi.org/10.3390/medicina58030432.

Ellul, R. D., Cordina, M., Buhagiar, A., Fenech, A., & Mifsud, J. (2008). Health complaints and use of medicines among adolescents in Malta. *Pharmaceutical Practice (Granada), 6*(3), 165-170.

Fagerlund, P., Salmela, J., Pietiläinen, O., Salonsalmi, A., Rahkonen, O., & Lallukka, T. (2023). Life-course socioeconomic circumstances in acute, chronic and disabling pain among young employees: a double suffering. *Scandinavian Journal of Public Health, 51*(2), 257–67. Available online: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9969306/

Fekadu, A., Mosse, A., & Hailemichael, Y. (2011). Assessment of clients' satisfaction with health service deliveries at Jimma University Specialized Hospital. *Ethiopian Journal of Health Science, 21*(2), 101-109. https://doi.org/10.4314/ejhs.v21i2.69050.

Ferreira, D. C., Vieira, I., Pedro, M. I., Caldas, P., & Varela, M. (2023). Patient satisfaction with healthcare services and the techniques used for its assessment: A systematic literature review and a bibliometric analysis. *Healthcare, 11,* 639-671. https://doi.org/10.3390/healthcare11050639.

Ihekoronye, M. R., Osemene, K. P., Erhun, W. O., & Afolabi, M. O. (2020). Qualitative analysis of strengths, weaknesses, opportunities and threats of professional services by community pharmacies in Nigeria. *Journal of Health and Medical Sciences, 3*(4), 437-448. https://doi.org/10.31014/aior.1994.03.04.138.

Ikwuka, A. O. (2015). Risk factors for the pathogenesis of diabetes mellitus type 2. Materials of 84th Scientific and Practical Conference of Students and Young Scientists with International Participation "Innovations in medicine", p. 19. Available online: http://www.ifnmu.edu.ua/images/snt/files/konferenciya/Tezu_2015.pdf

Ikwuka, A. O. (2017)a. Dyslipidemia risk severity in patients with diabetes mellitus type 2 and essential hypertension. *Journal of the 21st International Medical Congress of Students and Young Scientists,* p. 59.

Ikwuka, A. O. (2017)b. Effectiveness of dapagliflozin in patients with diabetes mellitus type 2 and essential hypertension. Book of abstracts of the 7th International Students' Scientific Conference of Young Medical Researchers, p. 102. Available online: http://www.stn.umed.wroc.pl/files/lm/Accepted_papers.16113.pdf

Ikwuka, A. O. (2017)c. Influence of dyslipidemia in patients with diabetes mellitus type 2 and essential hypertension. *The Pharma Innovation Journal, 6*(3), 101-103. Available online: http://www.thepharmajournal.com/archives/?year=2017&vol=6&issue=3&part=B

Ikwuka, A. O., & Haman, I. O. (2017)d. Features of kidney damage in patients with diabetes mellitus type 2 and essential hypertension. *Journal of 86th Scientific and Practical Conference of Students and Young Scientists with International Participation "Innovations in medicine",* p. 144. Available online: http://www.ifnmu.edu.ua/images/snt/86-konf-tezi%20(1).pdf

Ikwuka, A. O., Virstyuk, N. G., & Luchko, O. R. (2017) e. Features of the functional state of kidneys in patients with diabetes mellitus type 2 and essential arterial hypertension. Materials of scientific-practical conference with international participation "Babenkivski reading", 48.

Ikwuka, A. O. (2018)a. Clinical dynamics in patients with diabetes mellitus type 2 and concomitant essential hypertensive disease treated with dapagliflozin. *Journal of the 22nd International Medical Congress of Students and Young Scientists*, 32.

Ikwuka, A. O. (2018)b. Clinical effectiveness of SGLT-2 inhibitors in patients with diabetes mellitus type 2 and essential hypertensive disease. *Endocrine Practice, 24*(1), 74. https://doi.org/10.1016/S1530-891X(20)47129-0.

Ikwuka, A. O. (2018)c. Features of kidney damage in patients with arterial hypertension and type 2 diabetes mellitus and optimization of treatment. Specialized Academic Council IFNMU, Available online: http://www.ifnmu.edu.ua/images/zagalna_informacia/spec_vcheni_radi/2017-2019/%D0%9420.601.01/Ikvuka/Avtoreferat.pdf

Ikwuka, A. O., & Paliy, Yu. (2018)d. Structural changes of the left ventricular myocardium in patients with essential arterial hypertension and diabetes mellitus type 2. *Abstracts of the 87th Scientific Conference of Students and Young Scientists with International Participation "Innovations in medicine",* 25-26. Available online: https://www.ifnmu.edu.ua/images/snt/

zaproshennia_eng.pdf

Ikwuka, A. O. (2019)a. Clinical dynamics of nephropathy in patients with diabetes mellitus type 2 and concomitant essential hypertensive disease. *Clinical Medicine, 19*(2), s39. https://doi.org/10.7861/clinmedicine.19-2-s39.

Ikwuka, A. O. (2019)b. Clinical effectiveness of GLP-1 RAs in patients with metabolic syndrome diseases. *Endocrine Practice, 25*(1), 104-105. https://doi.org/10.1016/S1530-891X(20)46611-X.

Ikwuka, A. O., & Virstyuk, N. G. (2019)c. Pattern of cardiac remodelling of the left ventricle in patients with essential hypertensive disease and concomitant type 2 diabetes mellitus. *Clinical Medicine, 19*(3), s92. https://doi.org/10.7861/clinmedicine.19-3-s92.

Ikwuka, A. O., & Virstyuk, N. G. (2021). Influence of SGLT2 inhibitor and A2RB (AT1) on fibrogenesis and heart failure in patients with essential hypertensive disease combined with diabetes mellitus type 2. E-Poster No. *143 of the 44th & 45th Annual General and Scientific Meeting of the West African College of Physicians (WACP),* 1 - 3 November, 2021. https://doi.org/10.13140/RG.2.2.26912.87047.

Ikwuka, A. O., & Virstyuk, N. (2022). Prognostic markers of nephropathy in patients with dual metabolic syndrome diseases (essential hypertensive disease and concomitant type 2 diabetes mellitus). *Endocrine Practice, 28*(5), S65-S66. https://doi.org/10.1016/j.eprac.2022.03.164.

Ikwuka, A. O. (2023)a. *Dr. Aloy's Core Essential Series (DACES) Medical Genetics* (1st ed.). Science and Education Publishing, USA, 9.

Ikwuka, A. O. (2023)b. *Dr. Aloy's Core Essential Series (DACES) Immunology* (1st ed.). Science and Education Publishing, USA, 30.

Ikwuka, A. O., & Virstyuk, N. (2023)c. Patterns and Influence of Cardio-Metabolic Insufficiency in Patients with Essential Hypertensive Disease and Concomitant Type 2 Diabetes Mellitus. *Endocrine Practice, 29*(5), S32-S33. https://doi.org/10.1016/j.eprac.2023.03.076.

Ikwuka, A. O., Virstyuk, N. G., Luchko, O. R., & Kobitovych, I. (2023)d. Heterogeneity Of Renal Pathogenicity On The Background Of Asymptomatic Hyperuricemia In Patients With Dual Metabolic Syndrome Diseases (Essential Hypertensive Disease and Type 2 Diabetes Mellitus). *British Journal of Medical and Health Research, 10*(2), 1-9. https://doi.org/10.5281/zenodo.7690636.

Ikwuka, A. O. (2023)e. *Dr. Aloy's Core Essential Series (DACES) Hematology* (1st ed., pp. 59). Science and Education Publishing, USA.

Ikwuka, A. O., Omoju, D. I., & Mahanera, O. K. (2023) f. Profiling of Clinical Dynamics of Type 2 Diabetes Mellitus in Patients: A Perspective Review. *World Journal of Current Medical and Pharmaceutical Research, 5*(5), 210-218. https://doi.org/10.37022/wjcmpr.v5i5.294.

Ikwuka, A. O., Virstyuk, N., Luchko, O., & Kobitovych, I. (2024). Optimization of treatment in MSD patients using a combination of HMG-CoA reductase inhibitor, SGLT-2 inhibitor and A2RB (AT1): Resultant clinical effectiveness. *Endocrine Practice, 30*(5), S60-S61. https://doi.org/10.1016/j.eprac.2024.03.243.

Ipadeola, A. F., Akinnola, O. O., Kolawole, O. M., Attah, T. A., Monday, T., Osawe, O. S., Okonkwo, R. I., Ojurongbe, O. D., Baba, M. M., & Olasehinde, G. I. (2024). Prevalence, seasonality, and risk factors of malaria and some arboviral infections and co-infections in Nigeria. *Universal Journal of Public Health, 12*(6), 1084 - 1098. https://doi.org/10.13189/ujph.2024.120606.

Kline, R. B. (2000). *Beyond significance testing: Reforming data analysis methods in behavioural research*. Washington, DC: American Psychological Association.

Korn, R. J., Dockery, D. W., Speizer, F. E., Ware, J. H., & Ferris, B. G., Jr. (1987). Occupational exposures and chronic respiratory symptoms: A population-based study. *The American Review of Respiratory Diseases, 136*(2), 298–304. https://doi.org/10.1164/ajrccm/136.2.298.

Medpages. (2024). Pharmacies - Retail in Agege, Ikeja, Lagos, Nigeria. Available online: https://www.medpages.info/sf/x.p?page=listing&servicecode=141&countryid=0&regioncode=0&subregioncode=0&suburbcode=14840&pageno=1

Nafade, V., Huddart, S., Sulis, G., Daftary, A., Miraj, S. S., Saravu, K., & Pai, M. (2019). Over-the-counter antibiotic dispensing by pharmacies: A standardised patient study in Udupi district, India. *BMJ Global Health, 4*, e001869. https://doi.org/10.1136/bmjgh-2019-001869.

National Bureau of Statistics. (2021). *Demographic Statistics Bulletin*. A Publication of Demographic Statistics Division. Available online: https://nigerianstat.gov.ng/pdfuploads/DEMOGRAPHIC%20BULETIN%202021.pdf

Nguyen, P. H., Nguyen, P. T., Vo, T. M. H., & Nguyen, T. T. M. (2023). Evaluation of routine practices of dispensing pattern among community pharmacists in Can Tho city, Vietnam: A cross-sectional simulated patient approach. *Journal of Public Health Research, 12*(3), 22799036231196681. https://doi.org/10.1177/22799036231196681.

Ojha, A., Bista, D., & Badri, K. C. (2023). Patients' perceptions on community pharmacy services of a ward (10) of Kathmandu Metropolitan. *Patient Preference and Adherence, 17,* 1487-1499.

Okeke, G. C., Okeke, I. K., Ikwuka, A. O., & Udeh, F. C. (2023)a. Knowledge, perception and acceptance of COVID-19 vaccination amongst pregnant women in Adena, Kwara State, Nigeria. *World Journal of Public Health, 8*(2), 165-174. https://doi.org/10.11648/j.wjph.20230802.29.

Okeke, G. C., Okeke, I. K., Ikwuka, A. O., & Udeh, F.

C. (2023)b. COVID-19 Vaccination in pregnancy: Acceptance and challenges amongst pregnant women in Adena, North-Central Nigeria. *World Journal of Preventive Medicine, 11*(1), 1-9. https://doi.org/10.12691/jpm-11-1-1.

Okoro, L. C., Odukoya, O., Ikwuka, A. O., & Udeh, F. C. (2024)a. Prevalence, patterns and peculiarities of depression among tuberculosis patients attending Directly Observed Treatment Short-course (DOTS) centers in Lagos State Nigeria. *American Journal of Medical Science and Innovation, 3*(1), 62-72. https://doi.org/10.54536/ajmsi.v3i1.2653.

Okoro, L. C., Odukoya, O., Ikwuka, A. O., & Udeh, F. C. (2024)b. Knowledge, attitude and factors associated with depression in tuberculosis patients attending Directly Observed Treatment Short-course (DOTS) centers in South-West Nigeria. *European Journal of Medical and Health Sciences, 6*(4), 85-99. https://doi.org/10.34104/ejmhs.021.085099.

Omeire, E. (2017). Factors affecting health seeking behaviour among rural dwellers in Nigeria and its implication on rural livelihood. *European Journal of Social Sciences Studies, 2*(2), 1-13. Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2962954

Shehnaz, S. I., Khan, N., Sreedharan, J., Issa, K. J., & Arifulla, M. (2013). Self-medication and related health complaints among expatriate high school students in the United Arab Emirates. *Pharmacy Practice, 11*(4), 211-218.

Udeh, F. C., Ikwuka, A. O., Nwandu, T. C., Ewunonu, E. O., Egwu, O. A., Ezinwa, G. A., & Anaetor, I. S. C. (2023). Human Anatomy Education: Knowledge, attitude, perception and challenges encountered by medical and nursing students in two Gambian Universities. *Journal of Tertiary Education and Learning, 1*(3), 29-38. https://doi.org/10.54536/jtel.v1i3.2277.

Virstyuk, N. G., Ikwuka, A. O., Haman, I. O., & Adebomi, M. S. (2016). Diabetes mellitus type 2, arterial hypertension and dyslipidemia. Materials of *2nd International Scientific and Practical Conference "Therapeutic readings: modern aspects of diagnosis and treatment of diseases of internal organs*", 46-47.

Virstyuk, N. G., & Ikwuka, A. O. (2017)a. Diagnostic and prognostic markers of the diabetes mellitus type 2 course in connection with essential arterial hypertension taking into account the kidney function. *Precarpathian Journal Pulse, 8*(44), 53-62.

Virstyuk, N. H., Ikwuka, A. O., Losyuk, L. V., Kobrynska, O. Ya., & Markiv, H. D. (2017)b. Dapagliflozin utility in patients with diabetes mellitus type 2 and essential hypertensive disease. *Actual Problems of Modern Medicine, 4*(60)1, 76-79. Available online: http://www.umsa.edu.ua/journal2stat4_2017_eng.html

Virstyuk, N. G., & Ikwuka, A. O. (2018)a. Features of asymptomatic hyperuricemia in patients with diabetes mellitus type 2 and concomitant essential arterial hypertension. *Clinical and Experimental Pathology, 1*(63), 22-26. https://doi.org/10.24061/1727-4338.XVII.1.63.2018.5.

Virstyuk, N. G., Ikwuka, A. O., & Didushko, O. M. (2018)b. Effect of dapagliflozin on the level of uric acid during asymptomatic hyperuricemia in patients with diabetes mellitus type 2 and concomitant arterial hypertension. *Art of Medicine, 1*(5), 21-26. Available online: https://art-of-medicine.ifnmu.edu.ua/index.php/aom/article/view/179/150

Virstyuk, N. H., & Ikwuka, A. O. (2018)c. Dapagliflozin influence on the clinical course of diabetes mellitus type 2 and essential hypertension in patients. *Recent Advances in Environmental Science from the Euro-Mediterranean and Surrounding Regions,* 2007-2008. https://doi.org/10.1007/978-3-319-70548-4_582.

Virstyuk, N. G., & Ikwuka, A. O. (2019). Nephropathic characteristics in patients with diabetes mellitus type 2 and essential hypertensive disease. *Art of Medicine, 1*(5), 44-47. https://doi.org/10.21802/artm.2019.1.9.44.

Virstyuk, N. G., & Ikwuka, A. O. (2021)a. Asymptomatic hyperuricemia and functional state of the kidneys in patients with essential arterial hypertension and concomitant diabetes mellitus type 2. *European Journal of Clinical Medicine, 2*(3), 100-104. https://doi.org/10.24018/clinicmed.2021.2.3.65.

Virstyuk, N. H., Ikwuka, A. O., Luchko, O. R., & Kocherzhat, O. I. (2021)b. Peculiarities of renal insufficiency in patients with diabetes mellitus type 2 and arterial hypertension. Materials of scientific-practical conference with international participation "Achievements and prospects of experimental and clinical endocrinology" *Twentieth Danilevsky readings,* 86-87.

Wirth, F., Tabone, F., Azzopardi, L. M., Gauci, M., Zarb Adami, M., & Serracino-Inglott, A. (2011). Consumer perception of the community pharmacist and of community pharmacy services in Malta. *Journal of Pharmaceutical Health Services Research, 1*(4), 189-194.

World Health Organization. (2024). *Sexually Transmitted Infections*. Available online: https://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-(stis)

Xuan, Y. W., Goh, H. P., Rehman, I. U., Shafqat, N., Al-Worafi, Y. M., Ming, L. C., & Hermansyah, A. (2023). Assessing consumers' perception and demand on the community pharmacists' dispensing. *Journal of Pharmaceutical Policy and Practice, 16,* 162-178. https://doi.org/10.1186/s40545-023-00609-1.

Yusuff, K. B., Makhlouf, A. M., & Ibrahim, M. I. (2021). Community pharmacists' management of minor ailments in developing countries: A systematic review of types, recommendations, information gathering and counselling practices. *International Journal of Clinical Practice, 75*(10), e14424. https://doi.org/10.1111/ijcp.14424.

Zawahir, S., Lekamwasam, S., & Aslani, P. (2021). Factors related to antibiotic supply without a prescription for common infections: A cross-sectional national survey in Sri Lanka. *Antibiotics (Basel, Switzerland), 10*(6), 647. https://doi.org/10.3390/antibiotics10060647.