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**Original Research Article**

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## **Assessment of point of care testing services in community pharmacies in Delta State, Nigeria**

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### **Abstract**

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**Purpose:** Assessing the nature and quality of point of care services offered by community pharmacists is critical to maintaining quality of service delivery. The purpose of this study was to assess the range, frequency, resource availability, extent of documentation and referrals for point of care services in community pharmacies.

**Methods:** A cross sectional survey of 107 community pharmacies in the study area was carried out using a pre-tested self-administered questionnaire. Data was analysed using SPSS version 21. Chi square test was used to explore association between categorical variables.

**Results:** Majority 82 (95.4%) of the pharmacies carried out blood pressure measurement. There were more referrals to physicians for hypertensive 28 (32.6%), than diabetes 19 (22.1%) and overweight

patients 2 (2.3%). Pharmacists followed-up more blood pressure patients than other groups of screened patients 56 (65.1%). Only 30 (34.8%) regularly documented tests results and referrals. Most instruments were not validated over time.

**Conclusion:** Community pharmacies in the study area were satisfactorily involved in the provision of point of care testing services however documentation and instrument validation were poor. There is a need to broaden the scope of services offered and provide training for pharmacists ensure competence in point of care testing.

**Keywords:** Screening tests, Community Pharmacists, Service delivery, Instrument validation, Point of care service

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**Indexing:** Index Copernicus, African Index Medicus

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### **Introduction**

Point of care testing is defined as “diagnostic testing performed at or near the site of patient care”<sup>[1]</sup>. The intention is not to replace actual laboratory testing but to supplement standard testing procedures<sup>[2]</sup>. A key area in which pharmacists can make a major contribution to health care is in the area of preventive health care services through the provision of health screening services. The International Federation of Pharmacists (FIP) has emphasized the potential health and economic benefits of the provision of these services in pharmacies<sup>[3]</sup>. Point of care testing services enable pharmacists to contribute more meaningfully to the patient

care process and to support patients’ self-care activities. For instance, pharmacists can provide disease state monitoring services, improve medication adherence, ensure rational drug therapy and initiate appropriate patient referrals based on results obtained<sup>[4]</sup>. Point of care tests that can be performed in the pharmacy include, blood pressure tests, blood glucose tests, blood cholesterol tests, triglyceride tests, low and high density lipoprotein tests, chlamydia tests, bone densitometry scanning, body mass index checks, amongst others. Studies designed to determine the range, frequency and the availability of functional instruments used in carrying out such services in community pharmacies are few and there have been no studies documenting

pharmacist’s involvement in point of care testing in delta state. The objectives of this study were to assess the range and frequency of point of care testing services available in community pharmacies in Delta State, the availability of functional instruments, extent of referrals or follow up made with regards to the results obtained and to determine frequency of instrument validation and the extent of documentation of the results obtained from the provision of such services.

**Methods**

**Setting**

The setting of the study is Delta State, Nigeria. Delta State is an oil rich state, located in the Niger delta region of the country with Asaba as the capital city. It is a multi- tribal state made up of the Urhobo, Isoko, Igbo or Anioma, the Ijaws and the Itsekiri people. The geopolitical zone has a population of 4,098,291 and occupies an area of 17.011 square kilometres <sup>[5-6]</sup>. Medical services are offered by a Teaching Hospital, Federal Medical Centers and Central Hospitals located in different parts of the state. All these facilities offer laboratory services. In many cases patients are referred to private laboratory facilities distributed liberally across the state.

**Study design and data collection**

The study was a cross sectional survey of the community pharmacies in the study area. A pre-tested self-administered eighteen-item questionnaire exploring various aspects of point of care testing services in a community pharmacy setting was the main instrument of data collection. Section A dealt with demographic data. Section B examined the availability of point of care testing services along with associated components of the service. A total of 107 licensed community pharmacies in the study area were included in this study. Only retail pharmacies with demonstrable evidence of the presence of a registered pharmacist were included in the study. Pharmacy premises were excluded from the survey if the presence of a registered pharmacist could not be established.

**Data analysis**

The completed questionnaires were coded and analysed with the aid of SPSS version 21

package <sup>[7]</sup>. Categorical data was reported in frequencies and percentages. The relationship between demographic variables and the provision of point of care services was explored using the chi square test. A p value of less than 0.05 was regarded as significant.

**Results**

The questionnaire response rate was 80.4%, (87/107). The reliability of the instrument using Chronbach alpha was 0.684. There was urban predominance 80 (93%) in the location of the pharmacies surveyed. Nearly half, 36 (41.9%) of pharmacists had practiced for 16 years or more. Fifty-four (62.8%) of the pharmacists had no additional qualifications. The doctor of pharmacy degree was the most common additional qualification among the community pharmacists 15(17.4%). Details of the demographic characteristics of the pharmacies and pharmacists surveyed are shown in Table 1

**Table 1:** Demographic characteristics of pharmacy respondents N=86

<b>Item</b>	<b>Frequency (%)</b>
<b>Location</b>	
Urban	80(93.0)
Rural	6(7.0)
<b>Duration of pharmacist’ practice (yrs)</b>	
<1	2(2.3)
1-5	15 (17.4)
6-10	14(16.3)
11-15	19(22.1)
16 and over	36(41.9)
<b>Duration of pharmacy operation (yrs)</b>	
<1	1(1.2)
1-5	26(30.2)
6-10	32(37.2)
11-15	10(11.6)
Over 15	17(19.8)
<b>Qualification of pharmacist*</b>	
No additional qualification	54(62.8)
Pharm D	15(17.4)
M. Pharm	10(11.6))
MPH	2(2.3)
FPC Pharm	8(9.3)
Ph.D.	2(2.3)
Others	4(3.6)

*\*Percentages do not add to 100 because some respondents had multiple qualifications*

The sphygmomanometer and stethoscope were the instruments most commonly found in pharmacies 78 (90.7%), while the blood cholesterol meter was the least 11 (12.8%). None of the pharmacies had Chlamydia test kits and dual energy X ray absorptiometry (DEXA) machine. Blood pressure screening was carried out by most of the pharmacists 82 (95.4%). The least available test was the pregnancy test, which accounted for 4 (4.7%). None of the pharmacists reported carrying out tests for triglycerides, low density lipoproteins, high density lipoproteins and, Chlamydia. Similarly, bone densitometry scanning was unavailable (Table 2).

**Table 2:** Number of pharmacies having functional instruments and types of point of care testing services performed

Instrument	Frequency N=86	%
Sphygmomanometer and stethoscope	78	90.7
Digital sphygmomanometer	53	61.6
Blood glucometer	51	59.3
Blood cholesterol meter	11	12.8
Chlamydia test kit	0	0.0
Meter Rule and Weighing Scale	24	27.9
<b>Services</b>		
BP check	82	95.4
Blood glucose check	51	59.3
Blood cholesterol check	13	15.1
BMI assessment	27	31.4
Pregnancy test	4	4.7

Less than half of the pharmacies surveyed always document test results 30 (34.8%). The commonest form of documentation was found to be the paper documentation system 74 (86%), while the longest period of stay of test results in the pharmacy was 1 to 2 years (Table 3).

Blood pressure measurement was the test most frequently done. A monthly average of 50 screenings was reported by 25(29.1%) of the

pharmacies. There were more referrals to physicians for blood pressure patients 28 (32.6%) than blood glucose patients 19(22.1%), and overweight patients 2(2.3%) (Table 4 and Table 5).

Overall, the sphygmomanometer was the most frequently validated instrument 47 (54.7%), while the blood cholesterol meter was the least validated 12 (14.0%). The main reason for non-validation of instruments was a lack of knowledge of where to do instrument validation. Pharmacists followed-up more blood pressure patients than other groups of screened patients 56 (65.1%).Fees were charged by 53 (61.6%) of the pharmacies surveyed for screening tests. Even though length of practice was significantly associated with the availability of functional instruments ( $X^2 = 43.280$ ,  $df = 16$ ,  $p = 0.000$ ) no such association could be established between qualification of the pharmacist and availability of functional instruments ( $X^2 = 17.367$ ,  $df = 36$ ,  $P= 0.996$ ), or the type and frequency of tests done in the pharmacy ( $X^2 =30.748$ ,  $df = 36$ ,  $P = 0.716$ ).

**Table 3:** Documentation of test results in community pharmacies (N=78)

Item	Frequency	Percent
<b>Documentation of test results?</b>		
Always	30	36.6
Sometimes	35	42.7
When needed	13	15.9
Never	4	4.9
<b>Mode of documentation</b>		
Paper	74	94.9
Electronic	4	5.1
<b>Length of stay in pharmacy</b>		
< 1 month	4	5.1
1 month to <1year	22	28.2
1 to < 2 years	28	35.9
Over 2 years	1	1.3
Indefinitely	23	29.5

**Table 4:** Average number of point of care services per month

Item	Number of screening tests per month N (%)					
	<10	11-20	21-30	31-40	41-50	>50
Blood Pressure test	12(14.0)	17(19.8)	19(22.1)	6(7.0)	3(3.5)	25(29.1)
BloodGlucose test	18(20.9)	17(19.8)	12(14.0)	0(0.0)	0(0.0)	4(4.7)
Blood Cholesterol test	8(9.3)	4(4.7)	0(0.0)	0(0.0)	0(0.0)	1(1.2)
Pregnancy test	4(4.7)	0(0.0)	0(0.0)	0(0.00)	1(1.2)	0(0.0)
B.M.I assessment	15(17.4)	8(9.3)	3(3.5)	0(0.0)	1(1.2)	0(0.0)

**Table 5:** Frequency of Referrals Made with Respect to Abnormal Results Obtained from Point of Care Services

Item	N (%)				
	Routine	Always	Sometimes	Rarely	Never
B.P screening	8(9.3)	20(23.3)	36(41.9)	2(2.3)	15(17.4)
Blood glucose screening	7(8.1)	12 (14.0)	27(31.4)	1(1.2)	4(4.7)
Blood cholesterol screening	1(1.2)	0(0.0)	5(5.8)	0(0.0)	0(0.0)
BMI screening	2(2.3)	0(0.0)	8(9.3)	4(4.7)	2(2.3)
Pregnancy screening	1(1.2)	1(1.2)	0(0.0)	0(0.0)	0(0.0)

## Discussion

The demographic profile of the pharmacies surveyed is consistent with a similar study carried out in Warri, Delta State, Nigeria which showed an 80.0% urban predominance of community pharmacies with only 1.8% located in the rural area<sup>[8]</sup>. A similar situation was observed in Ghana<sup>[9]</sup>. In this study, over half of the pharmacists (62.8%) had no additional qualification. This is consistent with the average profile of pharmacists in other developing countries, for example in Saudi Arabia, almost 90% of community pharmacists possess only the basic pharmacy qualification<sup>[10]</sup>. This might indicate a need for community pharmacists to go beyond focusing on the commercial aspects of pharmacy practice by acquiring additional training in order to continue to remain relevant to the society.

Screening in community pharmacies is designed to provide access to screening services to members of the public who may not be able to access or source this intervention through their general practitioner<sup>[11]</sup>. The results of this survey showed that most of the pharmacies were involved in blood pressure check only. In a survey carried out in community pharmacies in the regions of Pretoria, Potchefstroom and Klerksdorp, South Africa, all seventy two pharmacies surveyed carried out blood pressure checks, 82% carried out blood glucose tests, 68% carried out cholesterol checks, 13% carried out BMI checks and 57% carried out pregnancy tests<sup>[12]</sup>. The higher level of involvement in screening tests may be as a result of the fact that pharmacies in South Africa have offered screening tests since the late 1980s.

Fees were charged by pharmacists in over half of the pharmacies surveyed. This is not surprising as some test equipments are quite expensive and other devices used along with them may require regular replacements, for example, strip and chip

replacements for blood glucometers and blood cholesterol meters.

The purchase and proper maintenance of equipment represents a part of the resources that have to be devoted to providing a testing service<sup>[3]</sup>. The possession of blood pressure apparatus by majority of respondents to the exclusion of other testing devices was also observed in a similar survey done in Benin City, Nigeria, where the apparatus was available in 83.0% of community pharmacies<sup>[13]</sup>. This pattern has also been observed in other countries<sup>[14]</sup>. More pharmacies should be encouraged to acquire other point of care testing equipment so as to broaden the range of services obtainable in community pharmacies. The level of documentation of point of care testing results is quite low with less than half of the pharmacists always documenting test results. Paper documentation was most frequently used by majority of the pharmacists. This contrasts with the situation in the United States of America where a majority of the pharmacists documented the results of the services provided and nearly half use commercially available computerized systems or personally developed computerized documentation<sup>[15]</sup>. This may be indicative of the need for pharmacists in Nigeria to adopt and incorporate information technology in their various practices.

Point of care testing may be performed by nurses, community volunteers, and patients or by pharmacists as a component of health screening<sup>[4]</sup>. Point of care testing in community pharmacies is not intended to replace laboratory tests but only serves as a means of identifying persons who may need the expertise of the physician, therefore referral of patients with abnormal test results is of utmost importance. A little less than half of pharmacists make referrals to physicians for abnormal blood pressure and blood glucose results. A similarly low rate of referrals (38%) was observed in a study conducted in Benin City, Nigeria, involving

patient referrals with regards to participation in primary health care programmes<sup>[13]</sup>. A more robust referral culture should be encouraged in order to ensure better outcomes in patients with chronic conditions.

The accuracy of pharmacy based screening would be greatly improved if pharmacies that offer screening services were provided with quality control systems similar to those used in routine laboratories<sup>[12]</sup>. Therefore the low level of validation of test instruments in this study is a cause for concern. A similar situation was observed in the South African study. The major reason for non-validation was lack of information about where to validate these instruments. Efforts should be made to improve access to instrument validation services.

For point of care testing to make meaningful impact a robust system of patient consent, follow-up and referral should be put in place<sup>[16]</sup>. Follow-up can also aid in monitoring treatment outcomes and in the detection of drug therapy problems which would be subsequently communicated to the physician. Appropriate follow up by pharmacists should be encouraged for abnormal results in other groups of patients.

## Conclusion

community pharmacies involvement in point of care testing services was generally satisfactory. The quality of the services rendered with respect to related components of the service was fair. There is however a need for pharmacists to broaden the scope of services offered and to participate in training programmes on screening tests in order to improve the quality of point of care services and ensure continued competence in the use of equipment, quality control measures, interpretation of results, documentation systems. There is also a need for the provision of more resources and equipment used in carrying out these services. Basic education and proper training on health screening in the curriculum of pharmacy schools should be improved upon.

## Acknowledgements

We thank the officers and members of the association of Community Pharmacists, Delta State for their cooperation and support. We also appreciate the financial support of the

Educational Trust Fund (ETF) in facilitating this work

## Conflict of Interest

We declare that no conflict of interest is associated with this work.

## Authors Contribution

We declare that this work was done by the authors named in this article and all liabilities pertaining to the claims relating to the content of this article will be borne by the authors. Opara A C- Conception and design of study, revision of manuscript, Adje U D- Drafting of article, Data analysis and Literature search, and Williams E F-Literature search, Proof reading and editing Ezeagwuna O O Data collection, Literature search, Preliminary draft

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